HTML Overview Condensed

Elements, Attributes, Values, & References

R. Scott Granneman & Jans Carton

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Slides

granneman.com/downloads/web-dev/HTML-Overview-Condensed.pdf

chnsa.ws/html-condensed-slides

Notes

granneman.com/downloads/web-dev/HTML-Overview-Condensed.txt

chnsa.ws/html-condensed-notes

All of my presentations

granneman.com/presentations/all-presentations

chnsa.ws/all-presentations

👍	Great!
👎	Don’t
🤮	Horrible
🚫	Broken

Symbol Key

HTML	Structure & meaning
CSS	Presentation & layout
JavaScript	Behavior & interaction

Separation of Concerns: A design principle that separates a computer program into distinct sections, or *concerns*, each focusing on a specific resource or set of information

Note: HTML, CSS, & JavaScript can sometimes overlap their functions!

If you think about it, all documents — printed or digital — have similar components:

headings & subheadings • paragraphs • lists • a way to group sections of content together • headers & footers • images (& other media) • ways to emphasize text • tables • forms • & more

HTML provides you with *elements* to create all of those

HTML 4.01 consisted of 91 elements that tell the web browser about the webpage's structure & appearance

HTML5 (as of 2023) consists of 112 elements + 32 that are obsolete

Your First Webpage

<html>, <head>, & <body>

<meta> & <title>

<h1>, <p>, &

Basic Document Structure

```
<html>

<head>

<body>
```

`<html>` … `</html>`

Root of the HTML document

Tells rendering engines where HTML starts & ends

`<head> … </head>`

Contains:

» *Information & metadata* primarily for rendering engines, computers, & search bots
» *Resources* (CSS & JavaScript) for displaying the page

index.html — foo

EXPLORER

OPEN EDITORS
- index.html
- main.css css

FOO
- css
  - main.css
- index.html

index.html > html > head > link

```html
<!doctype html>
<html lang="en">

  <head>
    <meta charset="UTF-8">
    <title>Untitled Document</title>
    <link rel="stylesheet" href="/css/main.css">
  </head>

  <body>



  </body>

</html>
```

<head> contains <meta> for character encoding, <title>, & <link> to the site's CSS file

OUTLINE
TIMELINE
TEMPLATES

0 0 GIST [github] Ln 7, Col 49 Spaces: 2 UTF-8 LF HTML Rsync: ESLint Profile: undefined

`<body> ... </body>`

Content that appears in the viewport for humans to see & use

Sectioning root for the content on the webpage (more in *Sectioning* later)

```
<html>
  <head>
    …
  </head>
  <body>
    …
  </body>
</html>
```

Inside

<head>

```
<meta>

<title>
```

Metadata is data about data

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Metadata about *Linux Phrasebook, 2nd Edition*

Certain elements in HTML act as metadata about the webpage

These elements set up…

- how content will be presented (e.g., `<style>`) or behave (e.g., `<script>`),
- how the webpage relates to other documents (e.g., `<link>`), or
- provide other information (e.g., `<meta>` & `<title>`)

`<meta>`

Specifies *metadata* information about the document

No closing `</meta>`!

Can have several `<meta>` elements in `<head>`

Required

Useful

```
<head>
  <meta charset="utf-8">
  <meta name="description" content="Do NOT
read this!">
  <meta name="viewport" content="width=device-
width, initial-scale=1, shrink-to-fit=no">
</head>
```

Use with responsive (later!)

`<title>` … `</title>`

Title of the webpage used by browsers, computers, & search bots

Appears by default for humans to see in…

» Tab bar
» Bookmarks
» ~~Title bar~~ (almost all browsers today hide the title bar)

The Call of Cthulhu | The H.P.

https://lovecraft.fandom.com/wiki/The_Call_of_Cthulhu

S-Foc | Ent | RSG | WS | Best | G | Soc | Apps | lets | News

FANDOM

FAN CENTRAL BETA

GAMES

H.P. Lovecraft Wiki

The H. P. Lovecraft Wiki

SIGN IN | REGISTER

5,149 PAGES

EXPLORE | WIKI CONTENT | COMMUNITY

in: Lovecraft Circle Works, H. P. Lovecraft works

The Call of Cthulhu

SIGN IN TO EDIT

Discord 12 Members Online

DevTools - lovecraft.fandom.com/wiki/The_Call_of_Cthulhu

Elements | Recorder | Console | Sources | Network | Performance | Memory | Application

35 1 1

```
<!DOCTYPE html>
<html class="client-js sse-other macos desktop landscape ve-available" lang="en" dir="ltr">
▼<head>
  <meta charset="UTF-8">
  <title>The Call of Cthulhu | The H.P. Lovecraft Wiki | Fandom</title> == $0
  <script defer src="https://cdn-gl.imrworldwide.com/conf/P26086A07-C7FB-4124-A679-8AC404198BA7.js#n
  <script async src="https://btloader.com/tag?o=5199505043488768&upapi=true"></script>
  <script async src="//c.amazon-adsystem.com/aax2/apstag.js"></script>
  <script async src="https://seg.ad.gt/api/v1/s/158"></script>
  <script async src="//static.wikia.nocookie.net/fandom-ae-assets/prebid.js/v8.37.0/20240222-1.min.j
  <script async src="https://www.googletagmanager.com/gtm.js?id=GTM-N6XD44P"></script>
```

Styles | Computed | Layout

Filter :hov .cls

```
element.style {
}
*, :after, :before {                load.php?la…omdesktop:1
  box-sizing: inherit;
}
title {                  user agent stylesheet
  display: none;
```

Pick good keywords for your `<title>`

Search engines give the words in `<title>` a lot of weight in ordering search results

Try to keep it under 60 characters — research suggests if you do ~ 90% of your titles will display properly in search engine results

Don’t be vague: `<title>Introduction</title>`

Don’t be too long: `<title>Encyclopædia Britannica; or, A dictionary of arts, sciences, and miscellaneous literature; Constructed on a Plan, by which the different sciences and arts Are digested into the Form of Distinct treatises or systems, comprehending The History, Theory, and Practice, of each, according to the Latest Discoveries and Improvements</title>`

Don’t try any tricks!

No keyword stuffing: `<title>H. P. Lovecraft horror weird monsters Cthulhu pulp Yog-Sothoth cosmic Mountains Madness</title>`

✏️ SIDE NOTE

Now you'll get this joke!

A SEO expert walks into a bar, tavern, pub, grill, public house, irish bar, bartender, drinks, beer, wine, liquor.

✏️ SIDE NOTE

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```
<title>Great Horned Owl | St. Louis Zoo</title>

<title>All Presentations | Scott Granneman
</title>

<title>Wingspan Rules | Rulepop</title>

<title>Leonardo da Vinci - Wikipedia</title>

<title>Letterboxd • Social film discovery</title>
```

Good examples

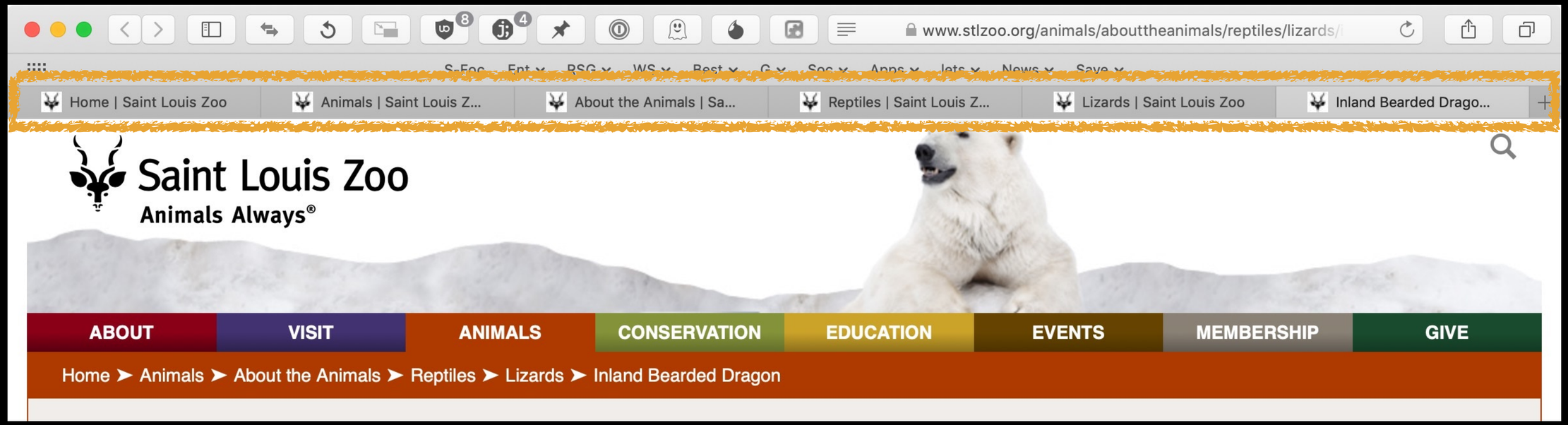
`<title>` should include both the title of the page & the name of the website — for the user & for SEO*

Page should go first, then a separator, & then the site

```
<title>Assignments | Scott Granneman</title>
<title>Technology - The New York Times</title>
<title>Site Map :: WebSanity Help</title>
```

It doesn't matter what the separator is — we like `::` because it looks cool 😃

* SEO: *search engine optimization*




```
<title>Animals | Saint Louis Zoo</title>
```

Why the page first & then the site?

So the page title shows up on tabs, even if it gets cut off

Inside
<body>

```
<h1>

<p>

<br>
```

`<h1>`

Title of the webpage for humans to see

Use it only once per page (usually)

HTML

```html
<!doctype html>
<html>
  <head>
    <meta charset="UTF-8">
    <title>Simple Web Page</title>
  </head>
  <body>
    <h1>
      From H. P. Lovecraft's
      <br>“The Whisperer in Darkness”
    </h1>
    <p>
      I cannot do better than transcribe in full, so far as is possible, the long letter in which Akeley introduced himself, and which formed such an important landmark in my own intellectual history.
    </p>
  </body>
</html>
```

CSS (SCSS)

JS

From H. P. Lovecraft's “The Whisperer in Darkness”

I cannot do better than transcribe in full, so far as is possible, the long letter in which Akeley introduced himself, and which formed such an important landmark in my own intellectual history.

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    </p>
  </body>
</html>
```

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JS

From H. P. Lovecraft's "The Whisperer in Darkness"

I cannot do better than transcribe in full, so far as is possible, the long letter in which Akeley introduced himself, and which formed such an important landmark in my own intellectual history.

The `<title>` & `<h1>` usually do not match

`<h1>` does not have to be the very first thing on the webpage

READ SOMETHING THAT MEANS SOMETHING.
$1 A WEEK ›
SUBSCRIBE
RENEW
GIVE A GIFT
NON-U.S. ORDERS

THE FINANCIAL PAGE | OCTOBER 20, 2014 ISSUE

CONTENT AND ITS DISCONTENTS <h1>

BY JAMES SUROWIECKI

TABLE OF CONTENTS »

SIGN UP FOR NEWSLETTERS

E-mail address SIGN UP

Adam Sandler, whatever his virtues, hardly seems like the kind of guy who might hold the fate of Hollywood in his hands. But when, recently, Netflix announced that it had signed a deal for Sandler to make four movies for its streaming service, and said that it would also be financing and

ALLMUSIC

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Scott

Discography

Ben Branch & The Operation Breadbasket Orchestra <h1>

+ Follow Artist

Discography Songs Credits

Share on

Album Discography

full condensed

blue highlight denotes album pick

Filter Discography By

Albums All

	Year ▲	Album	Label	AllMusic Rating	User Ratings
	1968	The Last Request	Geffen		(0)

Stream or buy on:

amazon

Ben Branch & The Operation Breadbasket Orchestra - Artist Details

Genre Pop/Rock

Submit Corrections

Amazingly great soul album!

`<p> ... </p>`

Paragraph

Very common element!

HTML

```html
<p>
  The writing was in a system of hieroglyphics unknown to me, and unlike anything I had ever seen in books, consisting for the most part of conventionalised aquatic symbols such as fishes, eels, octopi, crustaceans, molluscs, whales and the like. Several characters obviously represented marine things which are unknown to the modern world, but whose decomposing forms I had observed on the ocean-risen plain.
</p>
<p>
  It was the pictorial carving, however, that did most to hold me spellbound…
</p>
<p>
  From “Dagon”, by H. P. Lovecraft
</p>
```

CSS

JS

The writing was in a system of hieroglyphics unknown to me, and unlike anything I had ever seen in books, consisting for the most part of conventionalised aquatic symbols such as fishes, eels, octopi, crustaceans, molluscs, whales and the like. Several characters obviously represented marine things which are unknown to the modern world, but whose decomposing forms I had observed on the ocean-risen plain.

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Built-in browser styles provide default formatting for `<p>` (& all elements, actually)

HTML

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From “Dagon”, by H. P. Lovecraft

Top & bottom margins

HTML

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<p>
  From “Dagon”, by H. P. Lovecraft
</p>
```

CSS

JS

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It was the pictorial carving, however, that did most to hold me spellbound…

From “Dagon”, by H. P. Lovecraft

Block style — no indentation

HTML

```html
<p>
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CSS

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It was the pictorial carving, however, that did most to hold me spellbound…

From “Dagon”, by H. P. Lovecraft

Ragged right margin

You can use CSS to *justify* the right side so it’s even instead of ragged, but don’t — it will look OK until it looks horrendous

It looks terrible in Word too!

Don't start selling those cakes, t-shirts, or alternate art cards though - selling products that have our intellectual property in it would be infringing on our rights. When we say "selling products", we mean any type of money exchanging hands in return for a Fan Creation, regardless of profit. This includes any type of fundraising (like Kickstarter), actively or passively suggesting/requesting donations (like having a Patreon

This is awful — thanks, justified text 🤮

account), or other types of direct or indirect monetary sponsorship.

2. *Give credit to the IP Owner.*
Make sure that somewhere on or in your Fan Creation you state what game the intellectual property came from and include the proper copyright notice on or next to any artwork/images. You can find the proper copyright notice by looking at the "fine print" on the back of our packaging, on the credits page of our rulebooks, and most of the time on or right next to the artwork on cards. Don't forget to credit yourself as well for what you made!

- ★ This policy only relates to our intellectual property - many of our games include intellectual property or other property owned by other companies or individuals. We cannot give permission or assurances that what is generally acceptable to us will be acceptable to any other intellectual property owner. It is up to you to find the guidelines of, or obtain specific permission from, those owners.

A "Fan Creation" is something that you have made using our intellectual property (being the brands and brand-related universes, artwork, text, graphic design, or game mechanics and methods of play owned by us in the games we publish). Here are some examples of Fan Creations:

- ★ **Alternate art cards or scenarios to use in our games**
- ★ **Fiction set in one of our universes**
- ★ **Artwork using our characters or set in our universes**
- ★ **Fan-dedicated websites**

See the weird spacing in this line? Justified text strikes again

Did you make a cake with the logo of your favorite game on it? Did you make your own t-shirt with a hilarious game reference on it? Take a picture and show it off to your friends! Heck, show it off to us, too!

If you made something like an alternate art card, or made your own scenario, and you are following all of these Guidelines, we are fine with you sharing it with the community for them to use as well.

📦 FORMATTING GUIDE

```
1. <p>
2.   You fool, Warren is dead!
3. </p>
```

👍

```
1. <p>You fool, Warren is dead!</p>
```

👎

```
1. <p>You fool, Warren is dead!
2. </p>
```

🤮

untitled text

(New Document) (functions)

```
<p>Toward one o'clock Old Whateley gained consciousness, and interrupted his wheezing to
choke out a few words to his grandson.</p>
<p>"More space, Willy, more space soon. Yew grows — an' that grows faster. It'll be ready
to sarve ye soon, boy. Open up the gates to Yog-Sothoth with the long chant that ye'll
find on page 751 of the complete edition, an' then put a match to the prison. Fire from
airth can't burn it nohaow."</p>
<p>He was obviously quite mad. After a pause, during which the flock of whippoorwills
outside adjusted their cries to the altered tempo while some indications of the strange
hill noises came from afar off, he added another sentence or two.</p>
<p>"Feed it reg'lar, Willy, an' mind the quantity; but dun't let it grow too fast fer the
place, fer ef it busts quarters or gits aout afore ye opens to Yog-Sothoth, it's all over
an' no use. Only them from beyont kin make it multiply an' work… Only them, the old uns as
wants to come back…"</p>
<p>But speech gave place to gasps again, and Lavinia screamed at the way the whippoorwills
followed the change. It was the same for more than an hour, when the final throaty rattle
came. Dr. Houghton drew shrunken lids over the glazing grey eyes as the tumult of birds
faded imperceptibly to silence. Lavinia sobbed, but Wilbur only chuckled whilst the hill
noises rumbled faintly.</p>
<p>"They didn't git him," he muttered in his heavy bass voice.</p>
<p>Wilbur was by this time a scholar of really tremendous erudition in his one-sided way,
and was quietly known by correspondence to many librarians in distant places where rare
and forbidden books of old days are kept. He was more and more hated and dreaded around
Dunwich because of certain youthful disappearances which suspicion laid vaguely at his
door; but was always able to silence inquiry through fear or through use of that fund of
old-time gold which still, as in his grandfather's time, went forth regularly and
increasingly for cattle-buying. He was now tremendously mature of aspect, and his height,
having reached the normal adult limit, seemed inclined to wax beyond that figure. In 1925,
```

L: 7 C: 869 HTML Unicode (UTF-8) Unix (LF) (never saved) 2,291 / 408 / 7 - 100%

untitled text

(New Document) (functions)

Toward one o'clock Old Whateley gained consciousness, and interrupted his wheezing to choke out a few words to his grandson.

"More space, Willy, more space soon. Yew grows — an' that grows faster. It'll be ready to sarve ye soon, boy. Open up the gates to Yog-Sothoth with the long chant that ye'll find on page 751 of the complete edition, an' then put a match to the prison. Fire from airth can't burn it nohaow."

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L: 7 C: 869 HTML Unicode (UTF-8) Unix (LF) (never saved) 2,291 / 408 / 7 100%

untitled text

(New Document) (functions)

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```

L: 17 C: 869 HTML Unicode (UTF-8) Unix (LF) (never saved) 2,311 / 408 / 17 - 100%

```
<p>
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</p>
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<p>
  He was obviously quite mad. After a pause, during which the flock of whippoorwills outside adjusted their cries to the altered tempo while some indications of the strange hill noises came from afar off, he added another sentence or two.
</p>
<p>
  "Feed it reg'lar, Willy, an' mind the quantity; but dun't let it grow too fast fer the place, fer ef it busts quarters or gits aout afore ye opens to Yog-Sothoth, it's all over an' no use. Only them from beyont kin make it multiply an' work… Only them, the old uns as wants to come back…"
</p>
<p>
  But speech gave place to gasps again, and Lavinia screamed at the way the whippoorwills followed the change. It was the same for more than an hour, when the final throaty rattle came. Dr. Houghton drew shrunken lids over the glazing grey eyes as the tumult of birds faded imperceptibly to silence. Lavinia sobbed, but Wilbur only chuckled whilst the hill noises rumbled faintly.
```

📦 FORMATTING GUIDE

Don’t forget `</p>`! 👎

```
<p>
  123 Fourth Street Arkham, MA 65340
    <p>
      colors@miskatonic.edu
        <p>
          Socialize
            <p>
              Social media goes here
```

📦 FORMATTING GUIDE

```
<p>
  Cthulhu
</p>
Yog-Sothoth
<p>
  Nyarlathotep
</p>
```

No free-floating text!

```
<p>
  Cthulhu
</p>
<p>
  Yog-Sothoth
</p>
<p>
  Nyarlathotep
</p>
```

If not `<p>`, then *something*

`<br>`

Line break

Looks like single spacing

Very limited uses: poetry & addresses

No `</br>`!

HTML

```html
<h2>Poem</h2>

<p>
  The woods are lovely, dark and deep,
  <br>But I have promises to keep,
  <br>And miles to go before I sleep,
  <br>And miles to go before I sleep.
</p>

<h2>Address</h2>

<p>
  Dr. Marinus Bicknell Willett<br>
  10 Barnes Street<br>
  Providence, RI 02906
</p>
```

CSS

JS

Poem

The woods are lovely, dark and deep,
But I have promises to keep,
And miles to go before I sleep,
And miles to go before I sleep.

Address

Dr. Marinus Bicknell Willett
10 Barnes Street
Providence, RI 02906

`<br>` can go at the beginning or end of a line

I prefer it at the beginning so it's easier to see when scanning down through code

Warning!

Never use 2 `<br>` consecutively to create a fake paragraph, as it complicates styling with CSS!

```
<br>
<br>The Dunwich horror itself came between
Lammas and the equinox in 1928…
```

↓

```
<p>
  The Dunwich horror itself came between
Lammas and the equinox in 1928…
</p>
```

```
<br>
<br>The Dunwich horror itself came between
Lammas and the equinox in 1928…
```

↓

```
<p>
  The Dunwich horror itself came between
Lammas and the equinox in 1928…
</p>
```

💡 PRO TIP

So, why isn't there a `</br>`?

HTML5 spec defines the following as *void elements**:
`<br>`, `<hr>`, `<img>`, `<input>`, `<link>`, `<meta>`, `<source>`, `<track>`

Void elements do not contain content, so they lack a closing tag (remember, there is no `</br>` or `</hr>`)

* There are others besides these; I just listed the elements you will commonly use

💡 PRO TIP

XHTML (2000–2014) required that all void elements also be *self-closing*, so instead of `<br>` you *had* to use `<br/>` or `<br />` — that opens & closes the element in the same tag

HTML5 dropped the requirement for self-closing void elements — so *never* use `<br/>` or `<br />`!

(And that applies to every other void element too!)

📦 FORMATTING GUIDE

```
<p>
  <br>Better yet, if called by a panther,
  <br>Don't anther.
</p>
```

👎

Never have a `<br>` as the first thing in any element

```
<p>
  Better yet, if called by a panther,
  <br>Don't anther.
</p>
```

👍

📦 FORMATTING GUIDE

```
</ul>
<br> Tools
<ul>
```

🚫

Huh?

.....

```
</ul>
<p>
  Tools
</p>
<ul>
```

👍

HTML

```html
<!doctype html>
<html>
  <head>
    <meta charset="UTF-8">
    <title>Simple Web Page</title>
  </head>
  <body>
    <h1>
      The Cow
    </h1>
    <p>
      The cow is of the bovine ilk;
      <br>One end is moo, the other, milk
    </p>
    <p>
      —Ogden Nash
    </p>
  </body>
</html>
```

CSS (SCSS)

JS

The Cow

The cow is of the bovine ilk;
One end is moo, the other, milk

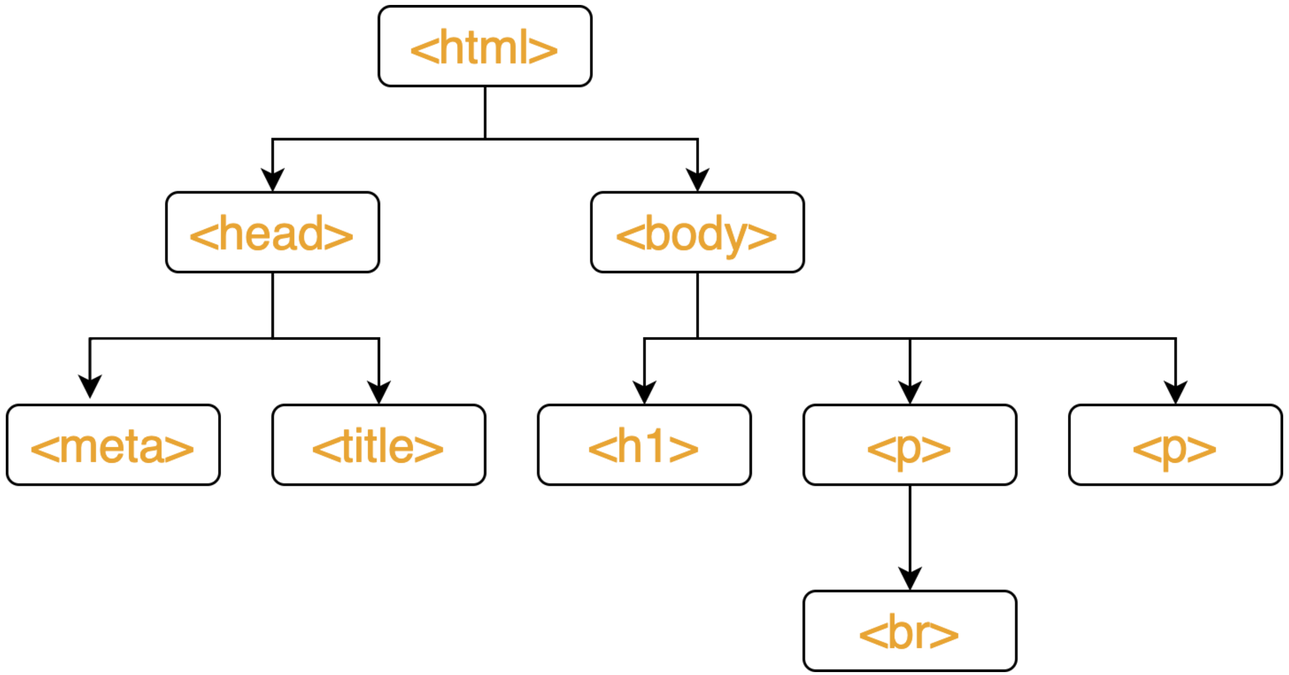
—Ogden Nash

HTML

```html
<!doctype html>
<html>
  <head>
    <meta charset="UTF-8">
    <title>Simple Web Page</title>
  </head>
  <body>
    <h1>
      The Cow
    </h1>
    <p>
      The cow is of the bovine ilk;
      <br>One end is moo, the other, milk
    </p>
    <p>
      —Ogden Nash
    </p>
  </body>
</html>
```

CSS (SCSS)

JS



HTML creates a tree structure

Formatting Guide

Some tags always go on 1 line:

```
<b>This is bold</b>
```

Some tags always go on 3 or more lines:

```
<p>
  This is a paragraph
</p>
```

Some tags go on 1 line *or* 3 or more lines, depending upon content

1 (wrapped) line, always

`a` • `abbr` • `b` • `bdi` • `button` • `caption` • `cite` • `data` • `dd` • `del` • `dfn` • `dt` • `em` • `h1` • `h2` • `h3` • `h4` • `h5` • `h6` • `i` • `ins` • `kbd` • `label` • `legend` • `li` • `mark` • `meter` • `object` • `option` • `output` • `progress` • `q` • `rp` • `rt` • `ruby` • `s` • `samp` • `small` • `span` • `strong` • `sub` • `summary` • `sup` • `time` • `title` • `u` • `var`

1 (wrapped) line, always, because no closing tag

`area` • `base` • `br` • `col` • `embed` • `hr` • `img` • `input` • `link` • `meta` • `source` • `track` • `wbr`

3 or more lines, always

`address` • `article` • `aside` • `bdo` • `blockquote` • `body` • `canvas` • `colgroup` • `datalist` • `details` • `dialog` • `div` • `dl` • `fieldset` • `figure` • `footer` • `form` • `head` • `header` • `hgroup` • `html` • `iframe` • `main` • `map` • `menu` • `nav` • `noscript` • `ol` • `optgroup` • `p` • `picture` • `pre` • `search` • `section` • `select` • `style` • `table` • `tbody` • `template` • `textarea` • `tfoot` • `thead` • `tr` • `ul`

1 (wrapped) line, or 3 or more lines, depending

`audio` • `code` • `figcaption` • `script` • `slot` • `td` • `th` • `video`

Headings

<h1>, <h2>, <h3>, <h4>, <h5>, <h6>

<hgroup>

```
<h1> … </h1>
<h2> … </h2>
<h3> … </h3>
<h4> … </h4>
<h5> … </h5>
<h6> … </h6>
```

Headings, from biggest (most important) to smallest (least important)

Used to break up content & establish hierarchy

HTML

```html
<h1>Heading 1</h1>
<h2>Heading 2</h2>
<h3>Heading 3</h3>
<h4>Heading 4</h4>
<h5>Heading 5</h5>
<h6>Heading 6</h6>
<p>Paragraph</p>
```

200%	Heading 1
150%	Heading 2
120%	Heading 3
100%	Heading 4
89%	Heading 5
60%	Heading 6
100%	Paragraph

CSS

JS

Default font sizes for headings

Headings are always **bolded** by default

HTML

```html
<h1>Heading 1</h1>
<h2>Heading 2</h2>
<h3>Heading 3</h3>
<h4>Heading 4</h4>
<h5>Heading 5</h5>
<h6>Heading 6</h6>
<p>Paragraph</p>
```

CSS

JS

200%

150%

120%

100%

89%

60%

100%

Heading 1

Heading 2

Heading 3

Heading 4

Heading 5

Heading 6

Paragraph

`<h1>` displays the *title of the webpage for humans* to see

`<h1>` often shares some of the same text as in `<title>`

Use it only once per page

HTML

```html
<h1>Heading 1</h1>
<h2>Heading 2</h2>
<h3>Heading 3</h3>
<h4>Heading 4</h4>
<h5>Heading 5</h5>
<h6>Heading 6</h6>
<p>Paragraph</p>
```

CSS

JS

200%	**Heading 1**
150%	**Heading 2**
120%	**Heading 3**
100%	**Heading 4**
89%	**Heading 5**
60%	**Heading 6**
100%	Paragraph

`<h2>` is used to label or indicate major sections

`<h3>` indicates sub-section of `<h2>`

`<h4>` indicates sub-section of `<h3>`

HTML

```html
<h1>Heading 1</h1>
<h2>Heading 2</h2>
<h3>Heading 3</h3>
<h4>Heading 4</h4>
<h5>Heading 5</h5>
<h6>Heading 6</h6>
<p>Paragraph</p>
```

200%	Heading 1
150%	Heading 2
120%	Heading 3
100%	Heading 4
89%	Heading 5
60%	Heading 6
100%	Paragraph

CSS

JS

`<h4>` by default is the same font size as `<p>`

HTML

```html
<h1>Heading 1</h1>
<h2>Heading 2</h2>
<h3>Heading 3</h3>
<h4>Heading 4</h4>
<h5>Heading 5</h5>
<h6>Heading 6</h6>
<p>Paragraph</p>
```

200%	Heading 1
150%	Heading 2
120%	Heading 3
100%	Heading 4
89%	Heading 5
60%	Heading 6
100%	Paragraph

CSS

JS

`<h5>` & `<h6>`

If you're using those, you're probably going too deep

Plus they're really small — 89% & 60%!

Use as many headings per page as you need

Search engines (probably) give text inside headings extra weight, so use good keywords

✏️ SIDE NOTE

Matthew Butterick, typographer: “Always Avoid Title Case, Because Your Headings Aren’t Titles”

`<h2>Cthulhu’s minions are eager to meet</h2>` 😀👍

`<h2>Cthulhu’s Minions Are Eager to Meet</h2>` ☹️👎

Yes, this is (slightly) debatable…

The first heading in a section *labels* that section

Any other heading *creates an implicit section* & also *labels* that implicit section

BREALEY MYERS ALLEN

Principles *of* Corporate Finance

TENTH EDITION

1-3 Goals of the Corporation

Shareholders Want Managers to Maximize Market Value

Wal-Mart has over 300,000 shareholders. There is no way that Wal-Mart's shareholders can be actively involved in management; it would be like trying to run New York City by town meetings. Authority has to be delegated to professional managers. But how can Wal-Mart's managers make decisions that satisfy all the shareholders? No two shareholders are exactly the same. They differ in age, tastes, wealth, time horizon, risk tolerance, and investment strategy. Delegating the operation of the firm to professional managers can work only if the shareholders have a common objective. Fortunately there is a natural financial objective on which almost all shareholders agree: Maximize the current market value of shareholders' investment in the firm.

A smart and effective manager makes decisions that increase the current value of the company's shares and the wealth of its stockholders. This increased wealth can then be put to whatever purposes the shareholders want. They can give their money to charity or spend it in glitzy nightclubs; they can save it or spend it now. Whatever their personal tastes or objectives, they can all do more when their shares are worth more.

Maximizing shareholder wealth is a sensible goal when the shareholders have access to well-functioning financial markets.[6] Financial markets allow them to share risks and transport savings across time. Financial markets give them the flexibility to manage their own savings and investment plans, leaving the corporation's financial managers with only one task: to increase market value.

A corporation's roster of shareholders usually includes both risk-averse and risk-tolerant investors. You might expect the risk-averse to say, "Sure, maximize value, but don't touch too many high-risk projects." Instead, they say, "Risky projects are OK, *provided* that expected profits are more than enough to offset the risks. If this firm ends up too risky for my taste, I'll adjust my investment portfolio to make it safer." For example, the risk-averse shareholders can shift more of their portfolios to safe assets, such as U.S. government bonds. They can also just say good-bye, selling shares of the risky firm and buying shares in a safer one. If the risky investments increase market value, the departing shareholders are better off than if the risky investments were turned down.

A Fundamental Result

The goal of maximizing shareholder value is widely accepted in both theory and practice. It's important to understand why. Let's walk through the argument step by step, assuming that the financial manager should act in the interests of the firm's owners, its stockholders.

1. Each stockholder wants three things:
   a. To be as rich as possible, that is, to maximize his or her current wealth.
   b. To transform that wealth into the most desirable time pattern of consumption either by borrowing to spend now or investing to spend later.
   c. To manage the risk characteristics of that consumption plan.

2. But stockholders do not need the financial manager's help to achieve the best time pattern of consumption. They can do that on their own, provided they have free

[6] Here we use "financial markets" as shorthand for the financial sector of the economy. Strictly speaking, we should say "access to well-functioning financial markets and institutions." Many investors deal mostly with financial institutions, for example, banks, insurance companies, or mutual funds. The financial institutions then engage in financial markets, including the stock and bond markets. The institutions act as financial intermediaries on behalf of individual investors.

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HTML

```html
<article>

    <h1>Cthulhu Mythos</h1>
    <p>The Cthulhu Mythos is a shared fictional universe, based on the work of American horror writer H. P. Lovecraft.</p>

      <h2>Yog-Sothoth</h2>
      <p>“Imagination called up the shocking form of fabulous Yog-Sothoth—only a congeries of iridescent globes, yet stupendous in its malign suggestiveness.”</p>



      <h2><i>At the Mountains of Madness</i></h2>
      <p>Creatures mentioned in the famous story.</p>

        <h3>Elder Things</h3>
        <p>“In the Mythos canon, the Elder Things were the first
```

CSS

JS

Cthulhu Mythos

The Cthulhu Mythos is a shared fictional universe, based on the work of American horror writer H. P. Lovecraft.

Yog-Sothoth

“Imagination called up the shocking form of fabulous Yog-Sothoth—only a congeries of iridescent globes, yet stupendous in its malign suggestiveness.”

At the Mountains of Madness

Creatures mentioned in the famous story.

Elder Things

“In the Mythos canon, the Elder Things were the first extraterrestrial species to come to the Earth, colonizing the planet about one billion years ago.”

HTML

```html
<article>

    <h1>Cthulhu Mythos</h1>
    <p>The Cthulhu Mythos is a shared fictional universe, based on the work of American horror writer H. P. Lovecraft.</p>

      <h2>Yog-Sothoth</h2>
      <p>“Imagination called up the shocking form of fabulous Yog-Sothoth—only a congeries of iridescent globes, yet stupendous in its malign suggestiveness.”</p>



      <h2><i>At the Mountains of Madness</i></h2>
      <p>Creatures mentioned in the famous story.</p>

        <h3>Elder Things</h3>
        <p>“In the Mythos canon, the Elder Things were the first
```

CSS

JS

Cthulhu Mythos

The Cthulhu Mythos is a shared fictional universe, based on the work of American horror writer H. P. Lovecraft.

Yog-Sothoth

“Imagination called up the shocking form of fabulous Yog-Sothoth—only a congeries of iridescent globes, yet stupendous in its malign suggestiveness.”

At the Mountains of Madness

Creatures mentioned in the famous story.

Elder Things

“In the Mythos canon, the Elder Things were the first extraterrestrial species to come to the Earth, colonizing the

Try never to immediately follow a heading with another heading

```
<h2>The Call of Cthulhu</h2>
<h3>By H.P. Lovecraft</h3>
```

A heading should always be followed by content

Nest headings correctly

Do not skip or jump levels

Headings should never *decrease* by more than 1

`<h2>` followed by `<h3>` is 👍😃

`<h2>` followed by `<h4>` is 👎😕

HTML

```html
<div class="good">
  <p>Good</p>
  <h1>Heading 1</h1>
  <h2>Heading 2</h2>
  <h3>Heading 3</h3>
  <h3>Heading 3</h3>
  <h4>Heading 4</h4>
  <h2>Heading 2</h2>
</div>
<div class="bad">
  <p>Bad</p>
  <h1>Heading 1</h1>
  <h3>Heading 3</h3>
  <h2>Heading 2</h2>
  <h4>Heading 4</h4>
  <h3>Heading 3</h3>
  <h4>Heading 4</h4>
</div>
```

CSS

JS

Good 👍

Heading 1

Heading 2

Heading 3

Heading 3

Heading 4

Heading 2

Bad 👎

Heading 1

Heading 3

Heading 2

Heading 4

Heading 3

Heading 4

📦 FORMATTING GUIDE

```
<p>
  <h2>The Call of Cthulhu</h2>
</p>
```

👎

Never surround `<h1>`–`</h6>` with `<p>`

.....

```
<h2>The Call of Cthulhu</h2>
```

👍

📦 FORMATTING GUIDE

```
<h2>
  The Call of Cthulhu
</h2>
```

👍👎

Normally I put headings on 1 line, but you don't have to (you do use fewer lines in your code with just 1 line)

.....

```
<h2>The Call of Cthulhu</h2>
```

👍

📦 FORMATTING GUIDE

```
<p>
  <b>The Call of Cthulhu</b>
</p>
```

Do not make fake headings!

.....

```
<h4>The Call of Cthulhu</h4>
```

`<hgroup>`

Contains a *heading* + *related content*, like a “sub-heading, alternative title, or tagline”

Must consist of zero or more `<p>`, followed by heading (`<h1>`–`<h6>`), followed by zero or more `<p>` — no other elements allowed!

HTML

```html
<hgroup>
  <h2>HTML Living Standard</h2>
  <p>Last Updated 19 March 2023</p>
</hgroup>

<hgroup>
  <h2>The Best of H. P. Lovecraft:</h2>
  <p>Bloodcurdling Tales of Horror and the Macabre</p>
</hgroup>

<hgroup>
  <h2>Dr. Strangelove</h2>
  <p>Or: How I Learned to Stop Worrying and Love the Bomb</p>
</hgroup>

<hgroup>
  <h2>Frankenstein;</h2>
  <p>or, The Modern
```

CSS (SCSS)

JS

HTML Living Standard

Last Updated 19 March 2023

The Best of H. P. Lovecraft:

Bloodcurdling Tales of Horror and the Macabre

Dr. Strangelove

Or: How I Learned to Stop Worrying and Love the Bomb

Frankenstein;

or, The Modern Prometheus

HTML

```html
<hgroup>
  <p>The full title of the 3rd edition, from 1797:</p>
  <h2>Encyclopædia Britannica;</h2>
  <p>or, A dictionary of arts, sciences, and miscellaneous literature; Constructed on a Plan, by which the different sciences and arts Are digested into the Form of Distinct treatises or systems, comprehending The History, Theory, and Practice, of each, according to the Latest Discoveries and Improvements; and full Explanations given of the various detached parts of knowledge, whether relating to Natural and Artificial Objects, or to
```

CSS (SCSS)

JS

The full title of the 3rd edition, from 1797:

Encyclopædia Britannica;

or, A dictionary of arts, sciences, and miscellaneous literature; Constructed on a Plan, by which the different sciences and arts Are digested into the Form of Distinct treatises or systems, comprehending The History, Theory, and Practice, of each, according to the Latest Discoveries and Improvements; and full Explanations given of the various detached parts of knowledge, whether relating to Natural and Artificial Objects, or to Matters Ecclesiastical, Civil, Military, Commercial, &c., Including Elucidations of the most important Topics relative to Religion, Morals, Manners, and the Oeconomy of Life; together with A Description of all the Countries, Cities, principal Mountains, Seas, Rivers, &c. throughout the World; A General History, Ancient and Modern, of the different Empires, Kingdoms, and States; and An Account of the Lives of the most Eminent Persons in every Nation, from the earliest ages down to the present times. Compiled from the writings of the best Authors, in several languages; the most approved Dictionaries, as well of general Science as of its particular branches; the Translations, Journals, and Memoirs of learned Societies,

The full title of the 3rd edition, from 1797:

Encyclopædia Britannica;

or, A dictionary of arts, sciences, and miscellaneous literature; Constructed on a Plan, by which the different sciences and arts Are digested into the Form of Distinct treatises or systems, comprehending The History, Theory, and Practice, of each, according to the Latest Discoveries and Improvements; and full Explanations given of the various detached parts of knowledge, whether relating to Natural and Artificial Objects, or to Matters Ecclesiastical, Civil, Military, Commercial, &c., Including Elucidations of the most important Topics relative to Religion, Morals, Manners, and the Oeconomy of Life; together with A Description of all the Countries, Cities, principal Mountains, Seas, Rivers, &c. throughout the World; A General History, Ancient and Modern, of the different Empires, Kingdoms, and States; and An Account of the Lives of the most Eminent Persons in every Nation, from the earliest ages down to the present times. Compiled from the writings of the best Authors, in several languages; the most approved Dictionaries, as well of general Science as of its particular branches; the Translations, Journals, and Memoirs of learned Societies, both at home and abroad; the MS Leaflets of Eminent Professors on different Sciences; and a variety of Original Materials, furnished by an Extensive Correspondence.

Source: Gleig, George, 1753-1840, and Colin Macfarquhar. Encyclopædia Britannica: Or, A Dictionary of Arts, Sciences, And Miscellaneous Literature. 3d ed. Edinburgh: A. Bell and C. Macfarquhar, 1797.

Lists

`<li>`

`<ul>` & `<ol>`

`<dl>`, `<dt>`, `<dd>` ← See *Bonus* section at end

Unordered (Bulleted)	Ordered (Numbered)	Description (~~Definition~~)

• Fee
• Fie
• Fo
• Fum
	1. Alien
	2. Aliens
	3. Alien³
		Lovecraft
		  Cthulhu
		Burroughs
		  Tarzan
		Dent
		  Doc Savage

3 types of lists

HTML

```html
<ul>
  <li>6 hard boiled eggs</li>
  <li>1/2 c. chopped green olives</li>
  <li>2 t yellow mustard</li>
  <li>2 T mayo</li>
  <li>2 pinches celery salt</li>
  <li>1/2 t dill weed</li>
  <li>salt & pepper to taste</li>
</ul>

<ol>
  <li>Chop eggs</li>
  <li>Combine ingredients</li>
</ol>

<dl>
  <dt>Celery salt</dt>
  <dd>Table salt + ground seeds from celery</dd>
  <dt>Dill weed</dt>
  <dd>Dried feathery leaves used as an herb</dd>
</dl>
```

CSS (SCSS)

JS

Mom’s Egg Salad

- 6 hard boiled eggs
- 1/2 c. chopped green olives
- 2 t yellow mustard
- 2 T mayo
- 2 pinches celery salt
- 1/2 t dill weed
- salt & pepper to taste

1. Chop eggs
2. Combine ingredients

Celery salt
: Table salt + ground seeds from celery

Dill weed
: Dried feathery leaves used as an herb

	Type of List		
	Unordered	Ordered	Description
Main Element	`<ul>`	`<ol>`	`<dl>`
List Item Element	`<li>`	`<li>`	`<dt>` & `<dd>`

`<li> … </li>`

List items in both unordered & ordered lists

Can be inside either `<ul>` or `<ol>`

Do *not* use on its own!

HTML

```html
<p>
  Great Old Ones in the Cthulhu Mythos:
</p>
<ul>
  <li>Cthulhu</li>
  <li>Cthugha</li>
  <li>Cyäegha</li>
</ul>

<p>
  Great Old Ones in the Cthulhu Mythos, ranked:
</p>
<ol>
  <li>Cthulhu</li>
  <li>Cthugha</li>
  <li>Cyäegha</li>
</ol>
```

CSS

JS

Great Old Ones in the Cthulhu Mythos:

- Cthulhu
- Cthugha
- Cyäegha

Great Old Ones in the Cthulhu Mythos, ranked:

1. Cthulhu
2. Cthugha
3. Cyäegha

📦 FORMATTING GUIDE

```
<li>
  The Call of Cthulhu
</li>
```

👍👎

Normally I put `<li>` on 1 line, but you don't have to (if you don't, 8 `<li>`s take up 24 lines in your code!)

.....

```
<li>The Call of Cthulhu</li>
```

👍

`<ul> … </ul>`

Unordered list

Used when item order doesn’t matter

Usually displayed with a solid bullet •, with sub-lists using other symbols ◦ ▪ (all controllable via CSS)

HTML

```html
<p>
  The Great Old Ones in the Cthulhu
  Mythos:
</p>
<ul>
  <li>Cthugha</li>
  <li>Cthulhu</li>
  <li>Cyäegha</li>
  <li>Ghatanothoa</li>
  <li>Hastur</li>
  <li>Ithaqua</li>
  <li>Tsathoggua</li>
</ul>
```

CSS

JS

The Great Old Ones in the Cthulhu Mythos:

- Cthugha
- Cthulhu
- Cyäegha
- Ghatanothoa
- Hastur
- Ithaqua
- Tsathoggua

`<ol>` … `</ol>`

Ordered list

Used when item order matters

Usually displayed with Arabic numbers (`1.`), but can use other numbering `01 I i A a` (all controllable via CSS)

HTML

```html
<p>
  The Underpants Gnomes' 3-part business
  plan:
</p>
<ol>
  <li>Collect Underpants</li>
  <li>???</li>
  <li>Profit!</li>
</ol>
```

CSS

JS

The Underpants Gnomes' 3-part business plan:

1. Collect Underpants
2. ???
3. Profit!

`<ol>` attributes

- `type`: numbering type (`1`, `A`, `a`, `I`, `i`), but use CSS instead
- `reversed`: `<li>`s are numbered in reverse order
- `start`: start value for numbering `<li>`s, but value is always an Arabic numeral (`start="3"`, even if `III` or `C` is used)

HTML

```html
<h2>Numbers used by NASA when counting down a launch</h2>

<ol reversed>
  <li>One</li>
  <li>Two</li>
  <li>Three</li>
</ol>
```

CSS (SCSS)

JS

Numbers used by NASA when counting down a launch

3. One
2. Two
1. Three

HTML

```html
<h2>Every album by The Police</h2>

<ol>
  <li>Outlandos d'Amour (1978)</li>
  <li>Reggatta de Blanc (1979)</li>
  <li>Zenyatta Mondatta (1980)</li>
</ol>

<p>
  These last two were less influenced by reggae & punk:
</p>

<ol start="4">
  <li>Ghost in the Machine (1981)</li>
  <li>Synchronicity (1983)</li>
</ol>
```

CSS (SCSS)

JS

Every album by The Police

1. Outlandos d'Amour (1978)
2. Reggatta de Blanc (1979)
3. Zenyatta Mondatta (1980)

These last two were less influenced by reggae & punk:

4. Ghost in the Machine (1981)
5. Synchronicity (1983)

					iOS		
reversed	–	79	18	6.1	6	20	4.4

You can nest unordered & ordered lists, as many levels deep as you’d like

HTML

```html
<ol>
  <li>Great Old Ones
    <ol>
      <li>Cthulhu
        <ol>
          <li><i>The Call of Cthulhu</i></li>
        </ol>
      </li>
      <li>Tsathoggua</li>
    </ol>
  </li>
  <li>Deep Ones</li>
</ol>
```

CSS (SCSS)

JS

1. Great Old Ones
    1. Cthulhu
        1. *The Call of Cthulhu*
    2. Tsathoggua
2. Deep Ones

A sub-list *must* nest inside its parent's `<li>` … `</li>`

👎

```
<ol>
  <li>Great Old Ones</li>
  <ol>
    <li>Cthulhu</li>
  </ol>
</ol>
```

👍

```
<ol>
  <li>Great Old Ones
    <ol>
      <li>Cthulhu</li>
    </ol>
  </li>
</ol>
```

👎

```
<ol>
  <li>Great Old Ones</li>
  <ol>
    <li>Cthulhu</li>
  </ol>
</ol>
```

👍

```
<ol>
  <li>Great Old Ones
    <ol>
      <li>Cthulhu</li>
    </ol>
  </li>
</ol>
```

HTML

```html
<ol>
  <li>Great Old Ones
    <ol>
      <li>Cthulhu
        <ol>
          <li><i>The Call of Cthulhu</i></li>
        </ol>
      </li>
      <li>Tsathoggua</li>
    </ol>
  </li>
  <li>Deep Ones</li>
</ol>
```

CSS (SCSS)

JS

1. Great Old Ones
    1. Cthulhu
        1. *The Call of Cthulhu*
    2. Tsathoggua
2. Deep Ones

HTML

```html
<ol>
  <li>Great Old Ones
    <ol>
      <li>Cthulhu
        <ol>
          <li><i>The Call of Cthulhu</i></li>
        </ol>
      </li>
      <li>Tsathoggua</li>
    </ol>
  </li>
  <li>Deep Ones</li>
</ol>
```

CSS (SCSS)

JS

1. Great Old Ones
    1. Cthulhu
        1. *The Call of Cthulhu*
    2. Tsathoggua
2. Deep Ones

HTML

```html
<ol>
  <li>Great Old Ones
    <ol>
      <li>Cthulhu
        <ol>
          <li><i>The Call of Cthulhu</i></li>
        </ol>
      </li>
      <li>Tsathoggua</li>
    </ol>
  </li>
  <li>Deep Ones</li>
</ol>
```

CSS (SCSS)

JS

1. Great Old Ones
    1. Cthulhu
        1. *The Call of Cthulhu*
    2. Tsathoggua
2. Deep Ones

HTML

```html
<ol>
  <li>Great Old Ones
    <ol>
      <li>Cthulhu
        <ol>
          <li><i>The Call of Cthulhu</i></li>
        </ol>
      </li>
      <li>Tsathoggua</li>
    </ol>
  </li>
  <li>Deep Ones</li>
</ol>
```

CSS (SCSS)

JS

1. Great Old Ones
    1. Cthulhu
        1. *The Call of Cthulhu*
    2. Tsathoggua
2. Deep Ones

HTML

```html
<ol>
  <li>Great Old Ones
    <ol>
      <li>Cthulhu
        <ol>
          <li><i>The Call of Cthulhu</i></li>
        </ol>
      </li>
      <li>Tsathoggua</li>
    </ol>
  </li>
  <li>Deep Ones</li>
</ol>
```

CSS (SCSS)

JS

1. Great Old Ones
    1. Cthulhu
        1. *The Call of Cthulhu*
    2. Tsathoggua
2. Deep Ones

HTML

```html
<ol>
  <li>Great Old Ones
    <ol>
      <li>Cthulhu
        <ol>
          <li><i>The Call of Cthulhu</i></li>
        </ol>
      </li>
      <li>Tsathoggua</li>
    </ol>
  </li>
  <li>Deep Ones</li>
</ol>
```

CSS (SCSS)

JS

1. Great Old Ones
    1. Cthulhu
        1. *The Call of Cthulhu*
    2. Tsathoggua
2. Deep Ones

HTML

```html
<ol>
  <li>Great Old Ones
    <ol>
      <li>Cthulhu
        <ol>
          <li><i>The Call of Cthulhu</i></li>
        </ol>
      </li>
      <li>Tsathoggua</li>
    </ol>
  </li>
  <li>Deep Ones</li>
</ol>
```

CSS (SCSS)

JS

1. Great Old Ones
    1. Cthulhu
        1. *The Call of Cthulhu*
    2. Tsathoggua
2. Deep Ones

HTML

```html
<ol>
  <li>Great Old Ones
    <ol>
      <li>Cthulhu
        <ol>
          <li><i>The Call of Cthulhu</i></li>
        </ol>
      </li>
      <li>Tsathoggua</li>
    </ol>
  </li>
  <li>Deep Ones</li>
</ol>
```

CSS (SCSS)

JS

1. Great Old Ones
    1. Cthulhu
        1. *The Call of Cthulhu*
    2. Tsathoggua
2. Deep Ones

Now let's reverse back out

HTML

```html
<ol>
  <li>Great Old Ones
    <ol>
      <li>Cthulhu
        <ol>
          <li><i>The Call of Cthulhu</i></li>
        </ol>
      </li>
      <li>Tsathoggua</li>
    </ol>
  </li>
  <li>Deep Ones</li>
</ol>
```

CSS (SCSS)

JS

1. Great Old Ones
    1. Cthulhu
        1. *The Call of Cthulhu*
    2. Tsathoggua
2. Deep Ones

HTML

```html
<ol>
  <li>Great Old Ones
    <ol>
      <li>Cthulhu
        <ol>
          <li><i>The Call of Cthulhu</i></li>
        </ol>
      </li>
      <li>Tsathoggua</li>
    </ol>
  </li>
  <li>Deep Ones</li>
</ol>
```

CSS (SCSS)

JS

1. Great Old Ones
    1. Cthulhu
        1. *The Call of Cthulhu*
    2. Tsathoggua
2. Deep Ones

HTML

```html
<ol>
  <li>Great Old Ones
    <ol>
      <li>Cthulhu
        <ol>
          <li><i>The Call of Cthulhu</i></li>
        </ol>
      </li>
      <li>Tsathoggua</li>
    </ol>
  </li>
  <li>Deep Ones</li>
</ol>
```

CSS (SCSS)

JS

1. Great Old Ones
    1. Cthulhu
        1. *The Call of Cthulhu*
    2. Tsathoggua
2. Deep Ones

HTML

```html
<ol>
  <li>Great Old Ones
    <ol>
      <li>Cthulhu
        <ol>
          <li><i>The Call of Cthulhu</i></li>
        </ol>
      </li>
      <li>Tsathoggua</li>
    </ol>
  </li>
  <li>Deep Ones</li>
</ol>
```

CSS (SCSS)

JS

1. Great Old Ones
    1. Cthulhu
        1. *The Call of Cthulhu*
    2. Tsathoggua
2. Deep Ones

HTML

```html
<ul>
  <li>Great Old Ones
    <ul>
      <li>Cthugha</li>
      <li>Cthulhu</li>
      <li>Cyäegha</li>
    </ul>
  </li> <!-- end Great Old Ones -->
  <li>Gods
    <ul>
      <li>Outer Gods
        <ul>
          <li>Azathoth</li>
          <li>Nyarlathotep</li>
          <li>Yog-Sothoth</li>
        </ul>
      </li> <!-- end Outer Gods -->
      <li>Elder Gods
        <ul>
          <li>Bastet</li>
          <li>Hypnos</li>
          <li>Nodens</li>
        </ul>
      </li> <!-- end Elder Gods -->
    </ul>
  </li> <!-- end Gods -->
</ul>
```

CSS

JS

- Great Old Ones
  - Cthugha
  - Cthulhu
  - Cyäegha
- Gods
  - Outer Gods
    - Azathoth
    - Nyarlathotep
    - Yog-Sothoth
  - Elder Gods
    - Bastet
    - Hypnos
    - Nodens

Combining `<ul>` & `<ol>` is a bit weird, but allowed

HTML

```html
<ul>
  <li>Earth
    <ul>
      <li>Tarzan
        <ol>
          <li><i>Tarzan of the Apes</i></li>
          <li><i>The Return of Tarzan</i></li>
          <li><i>The Beasts of Tarzan</i></li>
        </ol>
      </li> <!-- end Tarzan -->
      <li>Pellucidar</li>
      <li>Caspak</li>
    </ul>
  </li> <!-- end Earth -->
  <li>Other planets
    <ul>
      <li>Mars
        <ol>
          <li><i>A Princess of Mars</i></li>
          <li><i>The Gods of Mars</i></li>
          <li><i>The Warlord of Mars</i></li>
        </ol>
      </li> <!-- end Mars -->
      <li>Venus</li>
    </ul>
  </li> <!-- end Other planets -->
</ul>
```

CSS

JS

- Earth
  - Tarzan
    1. *Tarzan of the Apes*
    2. *The Return of Tarzan*
    3. *The Beasts of Tarzan*
  - Pellucidar
  - Caspak
- Other planets
  - Mars
    1. *A Princess of Mars*
    2. *The Gods of Mars*
    3. *The Warlord of Mars*
  - Venus

📦 FORMATTING GUIDE

```
<p>
  <ul>
    …
  </ul>
</p>
```

Never surround `<ul>`, `<ol>`, & `<dl>` with `<p>`

```
<ul>
  …
</ul>
```

Character References

How would you insert a ¢ in your text? Or a ≥? Or ∞?

They're not on your keyboard

The solution: *character references*

3 kinds of character references:

1. Named, e.g. `©`
2. Decimal numeric, e.g. `©`
3. Hexadecimal numeric, e.g. `©`

All begin with `&` & end with `;`

Named

You might see these in some code

```
&amp;
&copy;
&quot;
 
```

Those are *named character references* (formerly referred to as *HTML entities* or *character entities*)

There are 1,595 named character references

...as of 2022

HTML 1	3 (`amp`, `lt`, `gt`)
HTML 2	63
HTML 3.2	34
HTML 4	153
HTML5	1258 new + 84 additions to earlier ones (For example, `gt` was defined in HTML 1, but in HTML5 `GT` was added)

HTML versions & number of named character references introduced

As I said, all character references — named or numeric — begin with `&` & end with `;`

Between the `&` & `;`, *named* character references use:

» case-sensitive letters (`A-Z` & `a-z`); e.g., `©` → ©
» numbers (`0-9`) in a few cases; e.g., `½` → ½

©	©	§	§	ö	ö
™	™	¶	¶	É	É
"	"	¼	¼	é	é
“	“	—	—	÷	÷
”	”	<	<	·	•
…	…	>	>	✓	✓

Letters act as mnemonics

HTML

```html
<p>
  &copy; 2014 Cthulhu Inc.
</p>

<p>
  &quot;Hi, Nyarlathotep!&quot;
</p>

<p>
  &ldquo;Herrre, Shoggy Shoggy Shoggoth!&rdquo;
</p>

<p>
  Don’t eat me&mdash;eat him!
</p>

<p>
  Pabodie, Lake, Atwood &amp; Dyer
</p>

<p>
  Charles Dexter Ward
</p>
```

CSS

JS

© 2014 Cthulhu Inc.

"Hi, Nyarlathotep!"

“Herrre, Shoggy Shoggy Shoggoth!”

Don’t eat me—eat him!

Pabodie, Lake, Atwood & Dyer

Charles Dexter Ward

In addition to named character references, which use letters, you can also represent Unicode code points using numbers, in either *decimal* or *hexadecimal* form

These still start with `&` & end with `;`

© is `©` in decimal
© is `©` in hexadecimal

If you see an `x` after `#`, it's he`x`adecimal

Decimal

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
0																				
20														!	"	#	$	%	&	'
40	(	)	*	+	,	-	.	/	0	1	2	3	4	5	6	7	8	9	:	;
60	<	=	>	?	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
80	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_	`	a	b	c
100	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w
120	x	y	z	{	|	}	~		€		‚	ƒ	„	…	†	‡	ˆ	‰	Š	‹
140	Œ		Ž			‘	’	“	”	•	–	—	˜	™	š	›	œ		ž	Ÿ
160		¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬		®	¯	°	±	²	³
180	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿	À	Á	Â	Ã	Ä	Å	Æ	Ç
200	È	É	Ê	Ë	Ì	Í	Î	Ï	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û

Table of decimal Unicode points

Simply add row + column

… is 133 (120+13)

© is 169 (160+9)

¶ is 182 (180+2)

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
0																				
20														!	"	#	$	%	&	'
40	(	)	*	+	,	-	.	/	0	1	2	3	4	5	6	7	8	9	:	;
60	<	=	>	?	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
80	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_	`	a	b	c
100	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w
120	x	y	z	{	|	}	~		€		‚	ƒ	„	…	†	‡	ˆ	‰	Š	‹
140	Œ		Ž			‘	’	“	”	•	–	—	˜	™	š	›	œ		ž	Ÿ
160		¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬		®	¯	°	±	²	³
180	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿	À	Á	Â	Ã	Ä	Å	Æ	Ç
200	È	É	Ê	Ë	Ì	Í	Î	Ï	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û

Table of decimal Unicode points

Simply add row + column

… is 133 (120+13)

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¶ is 182 (180+2)

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
0																				
20														!	"	#	$	%	&	'
40	(	)	*	+	,	-	.	/	0	1	2	3	4	5	6	7	8	9	:	;
60	<	=	>	?	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
80	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_	`	a	b	c
100	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w
120	x	y	z	{	|	}	~		€		‚	ƒ	„	…	†	‡	ˆ	‰	Š	‹
140	Œ		Ž			‘	’	“	”	•	–	—	˜	™	š	›	œ		ž	Ÿ
160		¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬		®	¯	°	±	²	³
180	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿	À	Á	Â	Ã	Ä	Å	Æ	Ç
200	È	É	Ê	Ë	Ì	Í	Î	Ï	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û

Table of decimal Unicode points

Simply add row + column

… is 133 (120+13)

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¶ is 182 (180+2)

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
0																				
20														!	"	#	$	%	&	'
40	(	)	*	+	,	-	.	/	0	1	2	3	4	5	6	7	8	9	:	;
60	<	=	>	?	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
80	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_	`	a	b	c
100	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w
120	x	y	z	{	|	}	~		€		‚	ƒ	„	…	†	‡	ˆ	‰	Š	‹
140	Œ		Ž			‘	’	“	”	•	–	—	˜	™	š	›	œ		ž	Ÿ
160		¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬		®	¯	°	±	²	³
180	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿	À	Á	Â	Ã	Ä	Å	Æ	Ç
200	È	É	Ê	Ë	Ì	Í	Î	Ï	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û

Table of decimal Unicode points

Simply add row + column

… is 133 (120+13)

© is 169 (160+9)

¶ is 182 (180+2)

©	©	§	§	ö	ö
™	™	¶	¶	É	É
"	"	¼	¼	é	é
“	“	—	—	÷	÷
”	”	<	<	·	•
…	…	>	>	✓	✓

Decimal numeric character references

Hexadecimal

Numeral systems

Humans use *base 10*: `0`–`9`

Computers use *base 2* (*binary*): `0` & `1`

Hexadecimal uses base 16: `0`–`F` (`0`–`9`, then `A`–`F`)

The letters in hex are *not* case sensitive (`A` or `a` is fine)

Simply add row (ignore `0x`) + column • © is `00a9` (`00a0` + `09`)

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x80	€	‚	–		—											
0x90				“	”											
0xa0		¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬		®	¯
0xb0	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
0xc0	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
0xd0	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
0xe0	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
0xf0	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

Unicode Block: Latin-1 Supplement

© is `©` in decimal

© has Unicode code point `00a9`

© is therefore `©` or `©` (you don't need the `00` at the beginning) in hexadecimal

The lowercase `x` tells the browser you're about to give it a Unicode code point in he`x`adecimal

↑ is 2191 • ↬ is ? • ⇉ is ? • ⇦ is ?

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x2190	←	↑	→	↓	↔	↕	↖	↗	↘	↙	↚	↛	↜	↝	↞	↟
0x21a0	↠	↡	↢	↣	↤	↥	↦	↧	↨	↩	↪	↫	↬	↭	↮	↯
0x21b0	↰	↱	↲	↳	↴	↵	↶	↷	↸	↹	↺	↻	↼	↽	↾	↿
0x21c0	⇀	⇁	⇂	⇃	⇄	⇅	⇆	⇇	⇈	⇉	⇊	⇋	⇌	⇍	⇎	⇏
0x21d0	⇐	⇑	⇒	⇓	⇔	⇕	⇖	⇗	⇘	⇙	⇚	⇛	⇜	⇝	⇞	⇟
0x21e0	⇠	⇡	⇢	⇣	⇤	⇥	⇦	⇧	⇨	⇩	⇪	⇫	⇬	⇭	⇮	⇯
0x21f0	⇰	⇱	⇲	⇳	⇴	⇵	⇶	⇷	⇸	⇹	⇺	⇻	⇼	⇽	⇾	⇿

Unicode Block: Arrows

↑ is 2191 • ⇸ is 21aC • ⇉ is ? • ⇦ is ?

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x2190	←	↑	→	↓	↔	↕	↖	↗	↘	↙	↚	↛	↜	↝	↞	↟
0x21a0	↠	↡	↢	↣	↤	↥	↦	↧	↨	↩	↪	↫	↬	↭	↮	↯
0x21b0	↰	↱	↲	↳	↴	↵	↶	↷	↸	↹	↺	↻	↼	↽	↾	↿
0x21c0	⇀	⇁	⇂	⇃	⇄	⇅	⇆	⇇	⇈	⇉	⇊	⇋	⇌	⇍	⇎	⇏
0x21d0	⇐	⇑	⇒	⇓	⇔	⇕	⇖	⇗	⇘	⇙	⇚	⇛	⇜	⇝	⇞	⇟
0x21e0	⇠	⇡	⇢	⇣	⇤	⇥	⇦	⇧	⇨	⇩	⇪	⇫	⇬	⇭	⇮	⇯
0x21f0	⇰	⇱	⇲	⇳	⇴	⇵	⇶	⇷	⇸	⇹	⇺	⇻	⇼	⇽	⇾	⇿

Unicode Block: Arrows

↑ is 2191 • ↬ is 21aC • ⇉ is 21c9 • ⇦ is ?

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x2190	←	↑	→	↓	↔	↕	↖	↗	↘	↙	↚	↛	↜	↝	↞	↟
0x21a0	↠	↡	↢	↣	↤	↥	↦	↧	↨	↩	↪	↫	↬	↭	↮	↯
0x21b0	↰	↱	↲	↳	↴	↵	↶	↷	↸	↹	↺	↻	↼	↽	↾	↿
0x21c0	⇀	⇁	⇂	⇃	⇄	⇅	⇆	⇇	⇈	⇉	⇊	⇋	⇌	⇍	⇎	⇏
0x21d0	⇐	⇑	⇒	⇓	⇔	⇕	⇖	⇗	⇘	⇙	⇚	⇛	⇜	⇝	⇞	⇟
0x21e0	⇠	⇡	⇢	⇣	⇤	⇥	⇦	⇧	⇨	⇩	⇪	⇫	⇬	⇭	⇮	⇯
0x21f0	⇰	⇱	⇲	⇳	⇴	⇵	⇶	⇷	⇸	⇹	⇺	⇻	⇼	⇽	⇾	⇿

Unicode Block: Arrows

↑ is 2191 • ↬ is 21aC • ⇉ is 21c9 • ⇦ is 21e6

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x2190	←	↑	→	↓	↔	↕	↖	↗	↘	↙	↚	↛	↜	↝	↞	↟
0x21a0	↠	↡	↢	↣	↤	↥	↦	↧	↨	↩	↪	↫	↬	↭	↮	↯
0x21b0	↰	↱	↲	↳	↴	↵	↶	↷	↸	↹	↺	↻	↼	↽	↾	↿
0x21c0	⇀	⇁	⇂	⇃	⇄	⇅	⇆	⇇	⇈	⇉	⇊	⇋	⇌	⇍	⇎	⇏
0x21d0	⇐	⇑	⇒	⇓	⇔	⇕	⇖	⇗	⇘	⇙	⇚	⇛	⇜	⇝	⇞	⇟
0x21e0	⇠	⇡	⇢	⇣	⇤	⇥	⇦	⇧	⇨	⇩	⇪	⇫	⇬	⇭	⇮	⇯
0x21f0	⇰	⇱	⇲	⇳	⇴	⇵	⇶	⇷	⇸	⇹	⇺	⇻	⇼	⇽	⇾	⇿

Unicode Block: Arrows

©	©	§	§	ö	ö
™	™	¶	¶	É	É
"	"	¼	¼	é	é
“	“	—	—	÷	÷
„	”	<	<	·	•
…	…	>	>	✓	✓

Hexadecimal numeric character references

	<	©	&	é
Named	<	©	&	é
Decimals	<	©	&	é
Hex	<	©	&	é

Named character references are easier to remember, but there are far more numeric references

	♩	♕	⌘	💩
	Quarter note	White chess queen	Place of interest sign	Pile of poo
Named	—	—	—	—
Decimals	`♩`	`♕`	`⌘`	`💩`
Hex	`♩`	`♕`	`⌘`	`💩`

No names — numbers only

HTML

```html
<p>
  &copy; 2014 Cthulhu Inc.
</p>

<p>
  &quot;Hi, Nyarlathotep!&quot;
</p>

<p>
  &ldquo;Herrre, Shoggy Shoggy Shoggoth!&rdquo;
</p>

<p>
  Don’t eat me&mdash;eat him!
</p>

<p>
  Pabodie, Lake, Atwood &amp; Dyer
</p>

<p>
  Charles Dexter Ward
</p>
```

CSS

JS

© 2014 Cthulhu Inc.

"Hi, Nyarlathotep!"

“Herrre, Shoggy Shoggy Shoggoth!”

Don’t eat me—eat him!

Pabodie, Lake, Atwood & Dyer

Charles Dexter Ward

` ` is a *non-breaking space*

It glues words together so they can’t be split apart

HTML

```html
<p>
  Resize the browser window slowly & notice where & when “Herbert West” wraps.
</p>

<h3>Without &amp;nbsp;</h3>

<p>
  Meet my good friend—the esteemed young Dr. Herbert West.
</p>

<h3>With &amp;nbsp;</h3>

<p>
  Meet my good friend—the esteemed young Dr. Herbert West.
</p>
```

CSS

JS

Resize the browser window slowly & notice where & when “Herbert West” wraps.

Without

Meet my good friend—the esteemed young Dr. Herbert West.

With

Meet my good friend—the esteemed young Dr. Herbert West.

WIKIPEDIA
The Free Encyclopedia

Main page
Contents
Current events
Random article
About Wikipedia
Contact us
Donate

Contribute

Help
Community portal
Recent changes
Upload file

List of XML and HTML character entity references

From Wikipedia, the free encyclopedia

In SGML, HTML and XML documents, the logical constructs known as *character data* and *attribute values* consist of sequences of characters, in which each character can manifest directly (representing itself), or can be represented by a series of characters called a *character reference*, of which there are two types: a *numeric* ***ity reference***. This article lists the d in HTML and XML documents.

Great resource!

A character entity reference refers to the content of a named entity. An entity declaration is created by using the `<!ENTITY name "value">` syntax in a Document Type Definition (DTD).

Contents [hide]

1 Character reference overview
2 Standard public entity sets for characters
3 Predefined entities in XML
4 Character entity references in HTML

HTML

Dynamic HTML • HTML5 (audio • canvas • video) • XHTML (Basic • Mobile Profile • C-HTML) • HTML element (span and div) • HTML attribute • HTML frame • HTML editor • Character encodings (Unicode) • Language code • Document Object Model • Browser Object Model • Style sheets (CSS) • Font family • Web colors • HTML scripting • JavaScript (WebGL • WebCL) • W3C (Validator) • WHATWG • Quirks mode • Web storage • Rendering engine

Comparisons

Document markup languages • HTML support • XHTML (1.1)

FileFormat.Info

Search

You are in FileFormat.Info » Info » Unicode » Characters

Unicode Character Search

Unicode Character Search

Query:

include Han codepoints?

Preview: No

HTML Entities

Search Cancel

A-Z index | Search options

Terms of Service | Privacy Policy | Contact Info

Another great resource

FileFormat.Info

Search

You are in FileFormat.Info » Info » Unicode » Characters

Unicode Character Search

Do not use the general search box to search for Unicode!

Unicode Character Search

Query:

include Han codepoints?

Preview: No

HTML Entities

Search Cancel

A-Z index | Search options

Terms of Service | Privacy Policy | Contact Info

FileFormat.Info

Search

You are in FileFormat.Info » Info » Unicode » Characters

Unicode Character Search

Unicode Character Search

Query:

include Han codepoints?

Preview: No

HTML Entities

Use this one, on the Unicode Character Search page

A-Z index | Search options

Terms of Service | Privacy Policy | Contact Info

Unicode Character Search

Query:

airplane

include Han codepoints?

Search Cancel

A-Z index | Search options

Unicode Character Search

Query:

airplane

include Han codepoints?

Search Cancel

A-Z index | Search options

Results

Search: airplane

8 hits

Matching Text	Character	Description	Preview
AIRPLANE	U+2708	AIRPLANE	✈
UP-POINTING MILITARY AIRPLANE	U+1F6E6	UP-POINTING MILITARY AIRPLANE	🛦
UP-POINTING AIRPLANE	U+1F6E7	UP-POINTING AIRPLANE	🛧
UP-POINTING SMALL AIRPLANE	U+1F6E8	UP-POINTING SMALL AIRPLANE	🛨

Unicode Character 'AIRPLANE' (U+2708)

- ✈
- Browser Test Page
  Outline (as SVG file)
  Fonts that support U+2708

Unicode Data

Name	AIRPLANE
Block	Dingbats
Category	Symbol, Other [So]
Combine	0
BIDI	Other Neutrals [ON]

FileFormat.Info

Search

FileFormat.Info » Info » Unicode » Characters » U+2708

Browser Test Page for Unicode Character 'AIRPLANE' (U+2708)

You need a font that supports this character to even have a hope of seeing it correctly in the browser.

See the local font list tool and font support page to see if you have a font that supports it!

- ✈

  Image

  Server-generated

- ✈

  Decimal Escape

- ✈

  Image

  Server-generated

- ✈

  Decimal Escape

  ✈

- ✈

  Hex Escape

  ✈

- ✈

  UTF-8

- ✈

  Image

  Server-generated

- ✈

  Decimal Escape

  ✈

- ✈

  Hex Escape

  ✈

- ✈

  UTF-8

Now you can copy & paste this Unicode character directly into your code or copy

Unicode Blocks

Summary

The Unicode standard arranges groups of characters together in blocks. This is the complete list of blocks.

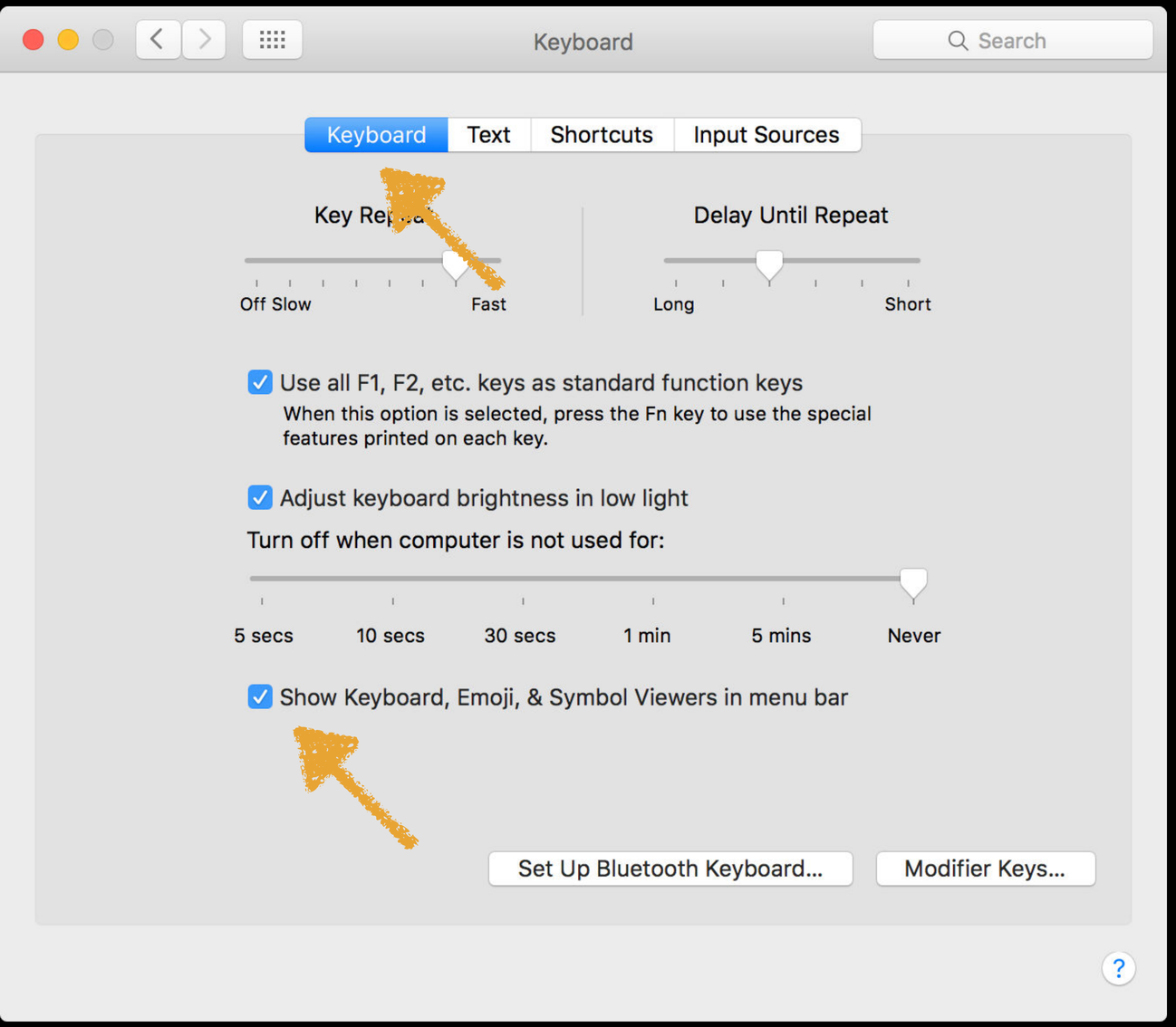
Detail

Name	From	To	# Codepoints
Basic Latin	U+0000	U+007F	(128)
Latin-1 Supplement	U+0080	U+00FF	(128)
Latin Extended-A	U+0100	U+017F	(128)
Latin Extended-B	U+0180	U+024F	(208)
IPA Extensions	U+0250	U+02AF	(96)
Spacing Modifier Letters	U+02B0	U+02FF	(80)
Combining Diacritical Marks	U+0300	U+036F	(112)

Instead of using character references we can use UTF-8 characters directly

How?

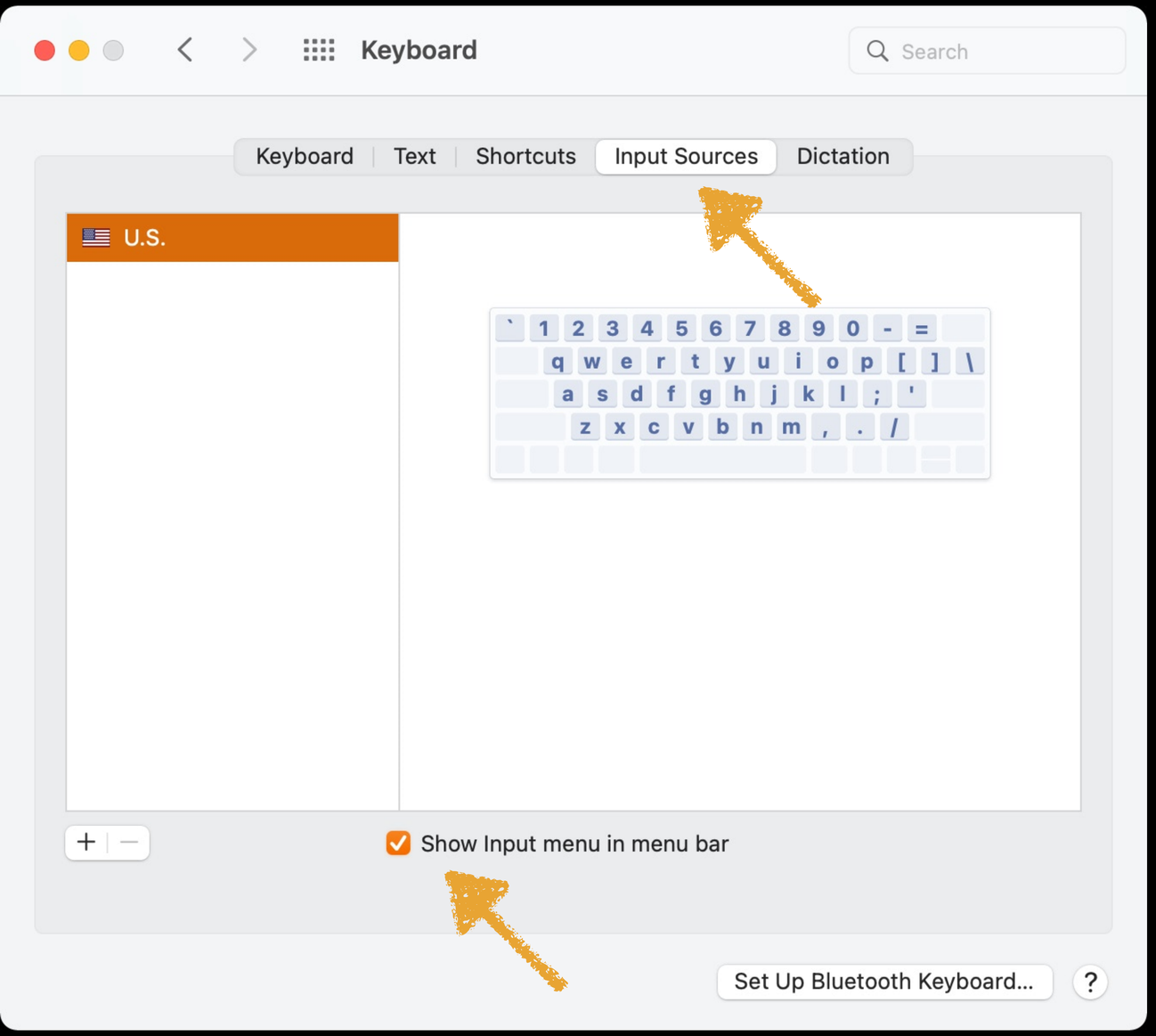
 > System Settings > Keyboard



macOS 10.15 Catalina

 > System Preferences > Keyboard > Keyboard

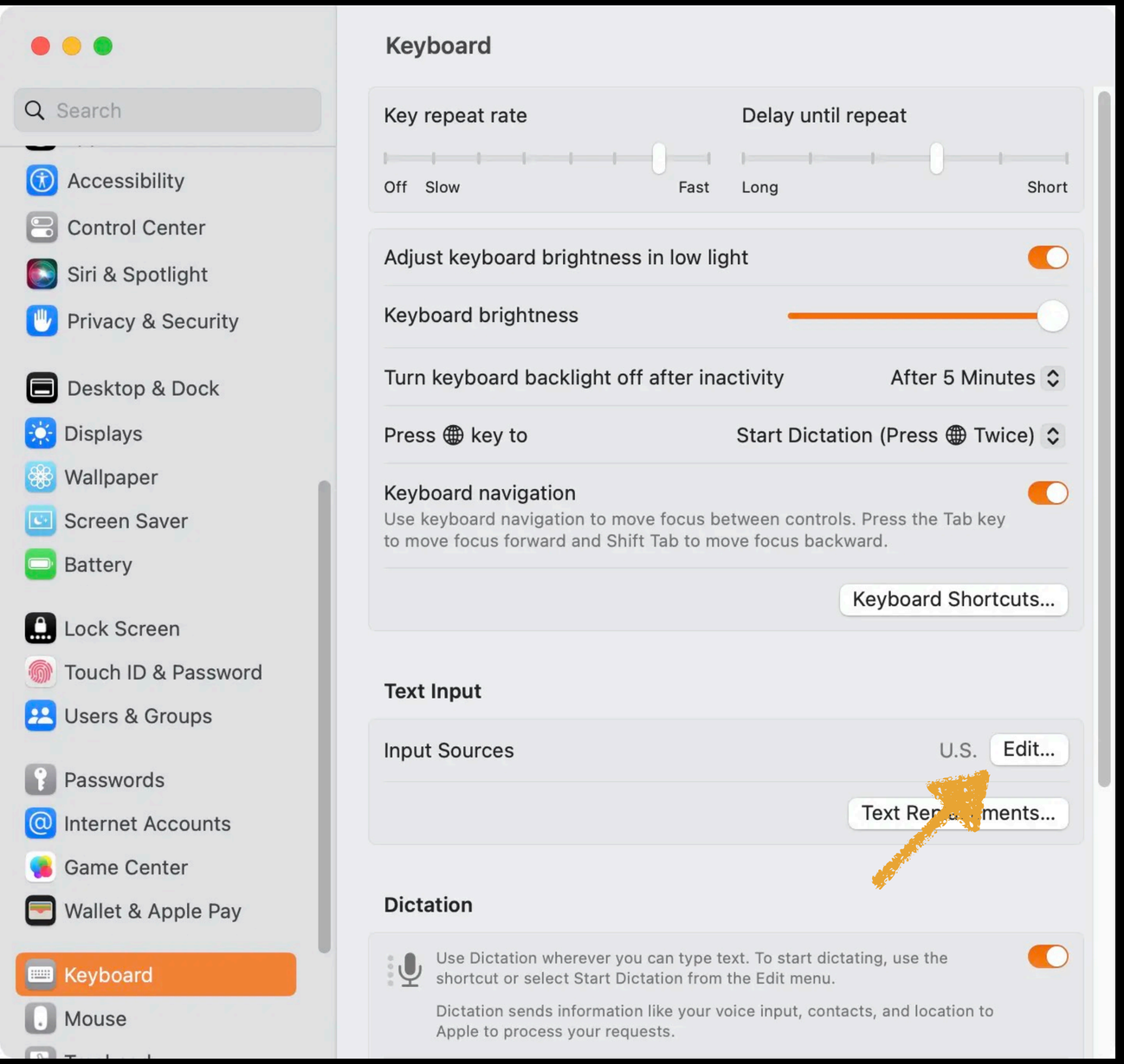
Check the box next to *Show Keyboard, Emoji, & Symbol Viewers In Menu Bar*



macOS 11 Big Sur & up

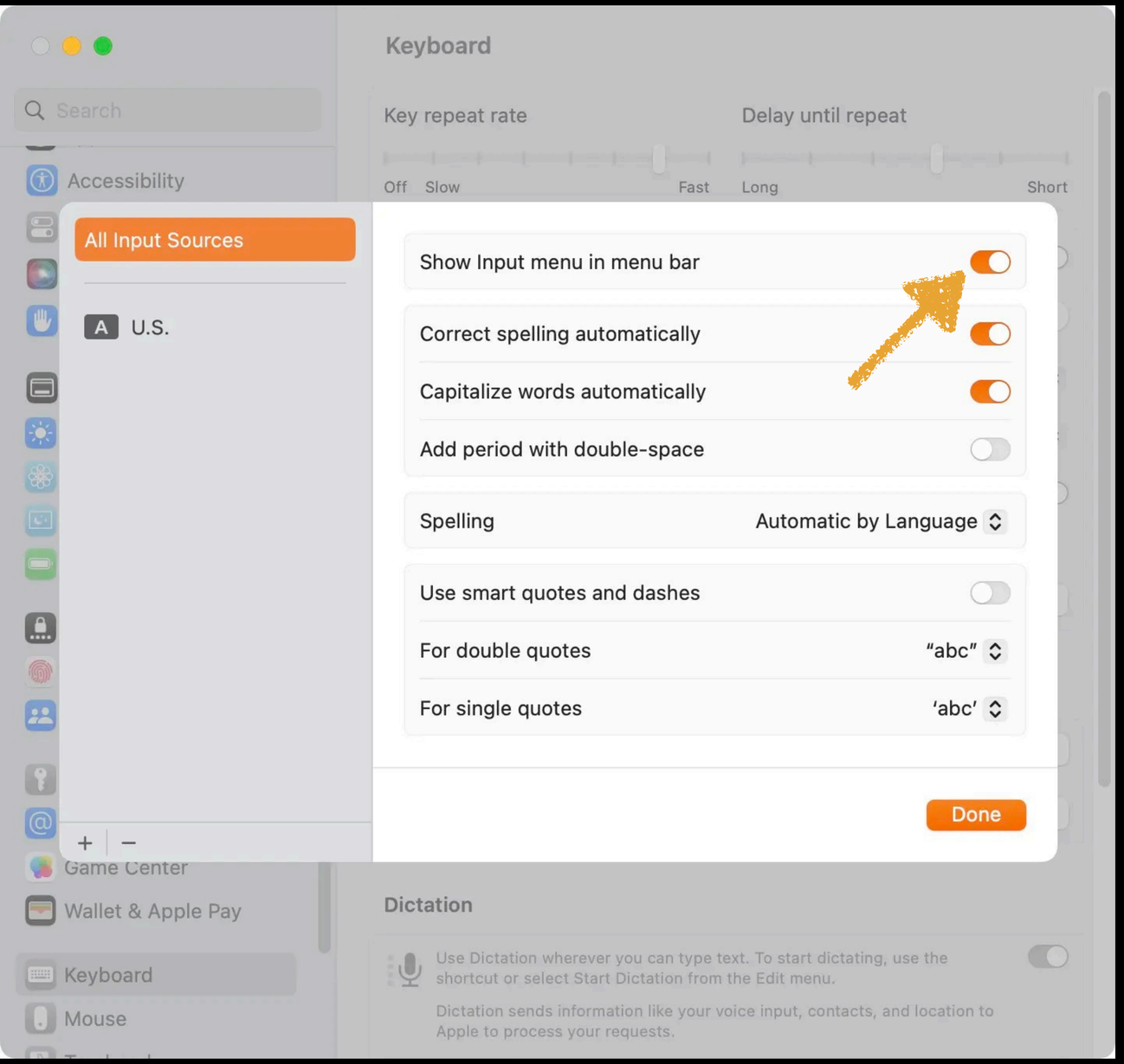
 > System Preferences > Keyboard > Input Sources

Check the box next to *Show Input menu in menu bar*

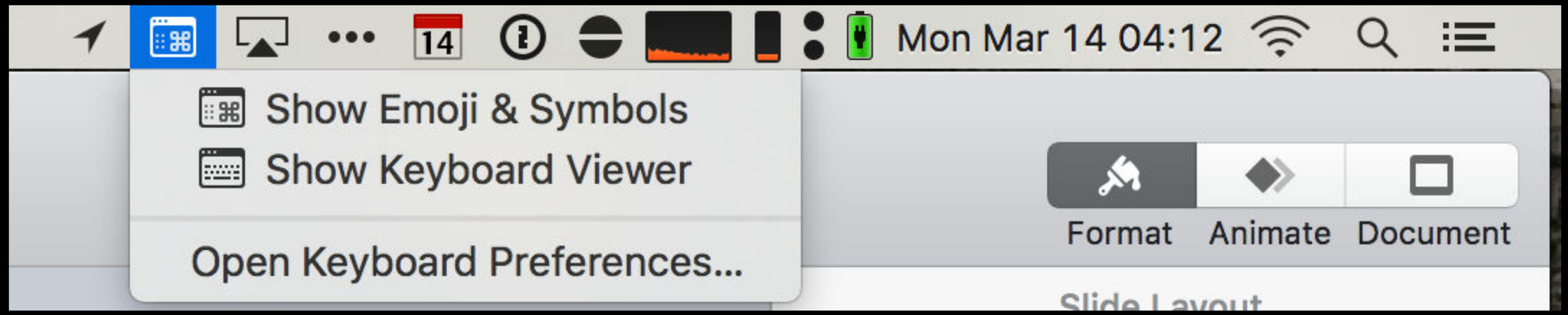


macOS 13 Ventura & up

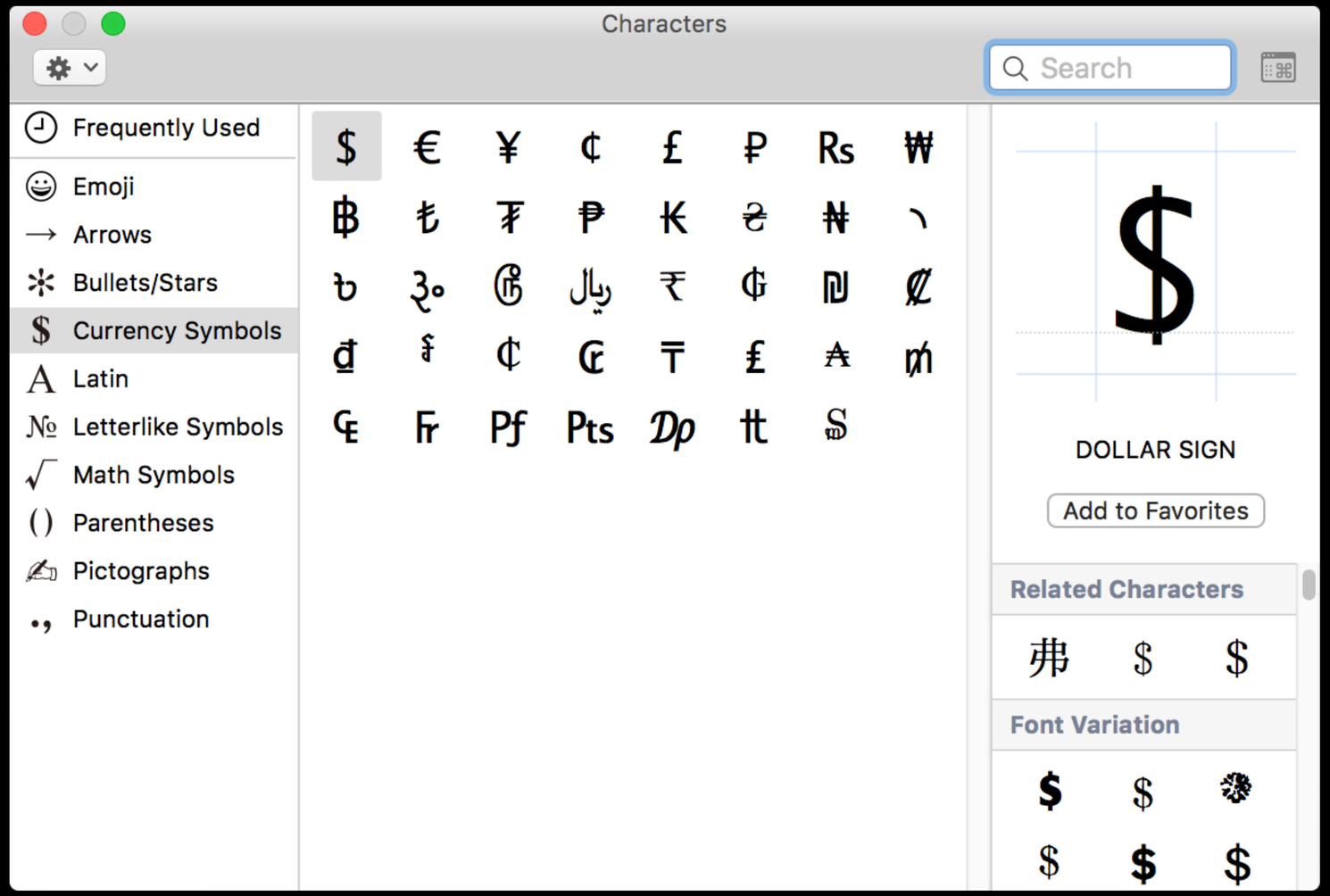
> System Settings > Keyboard



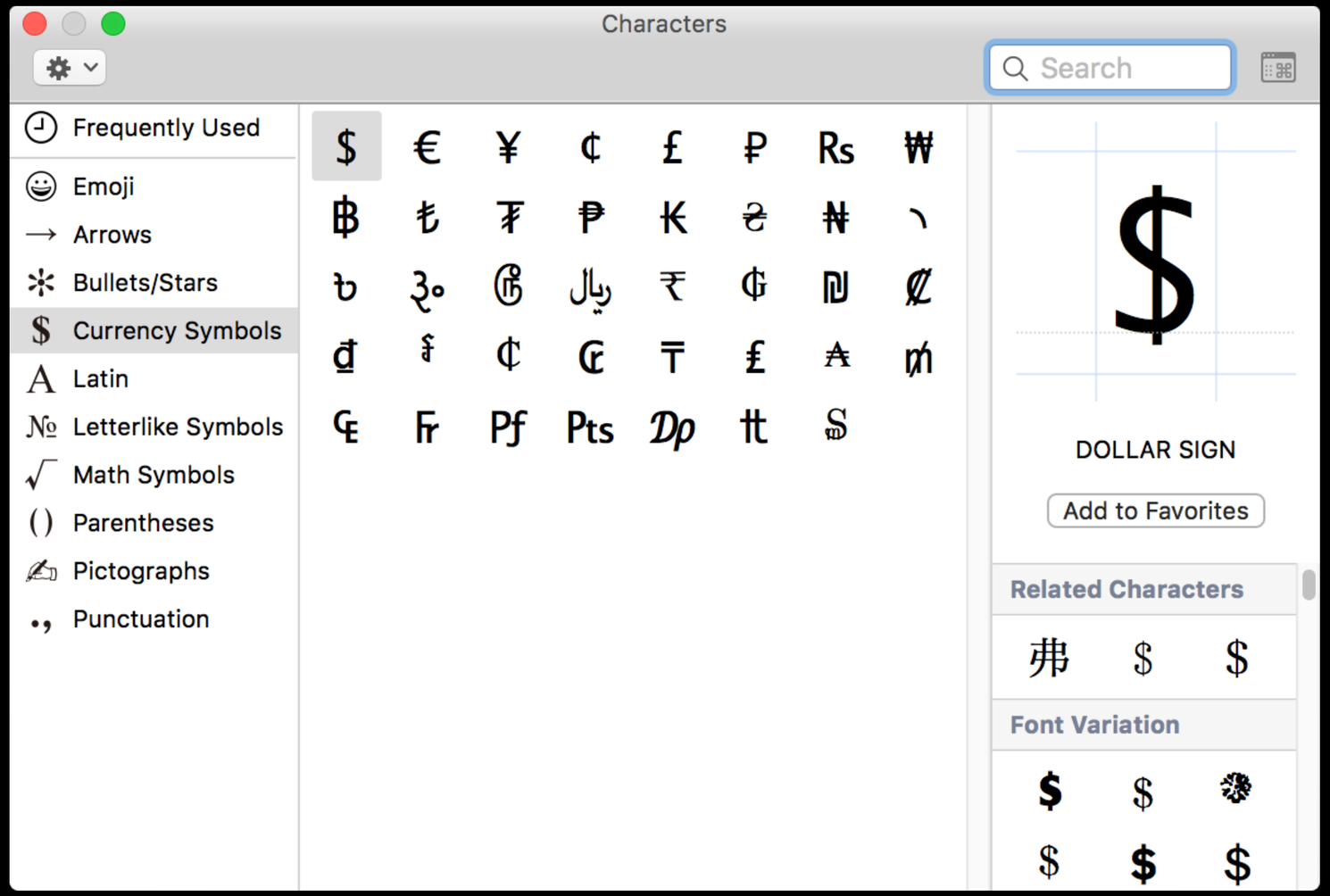
Turn on *Show Input menu in menu bar*



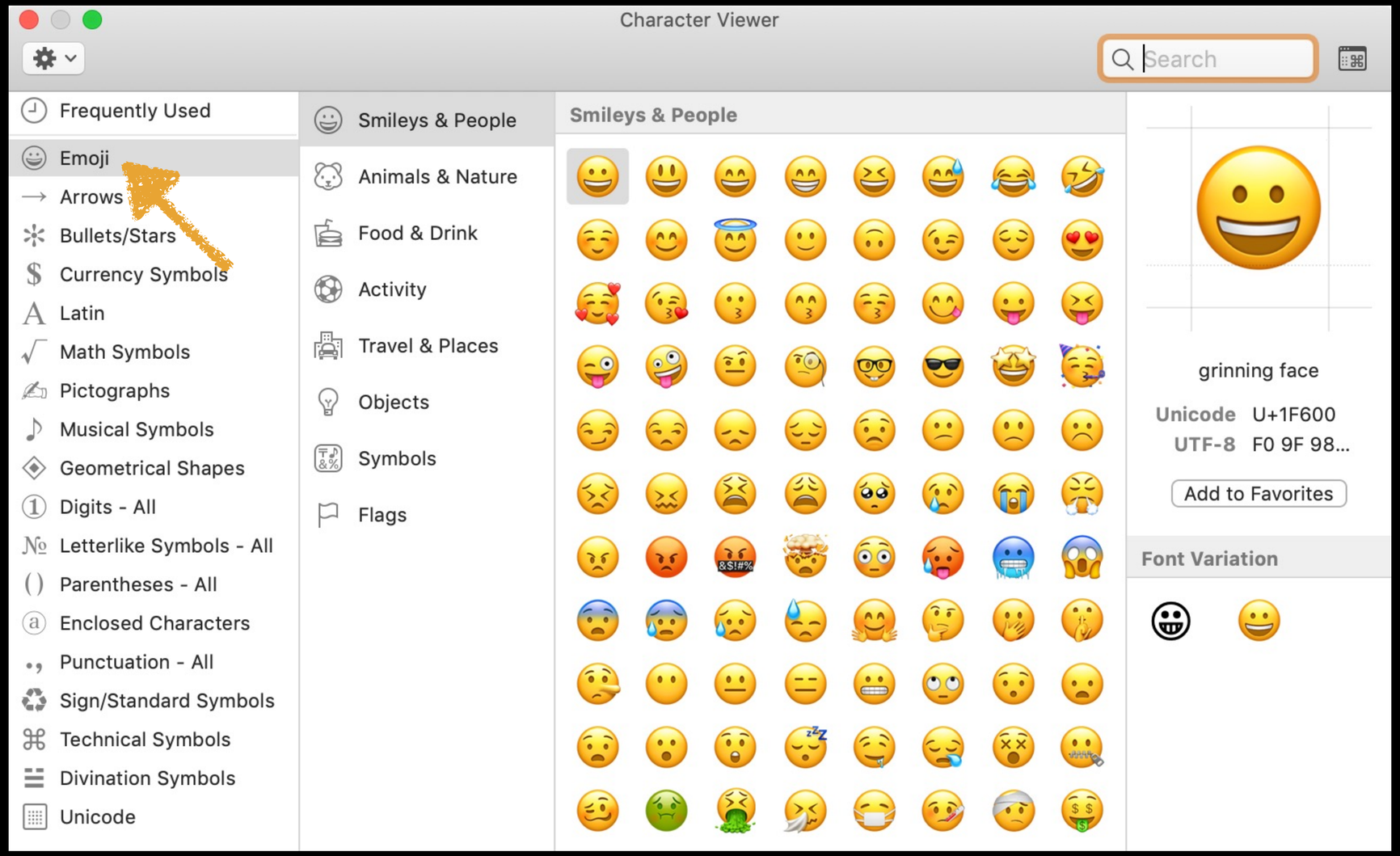
Text Input (formerly *Show Keyboard, Emoji, & Symbol Viewers*) menu extra appears



Emoji & Symbols



Double-click on a character to insert it

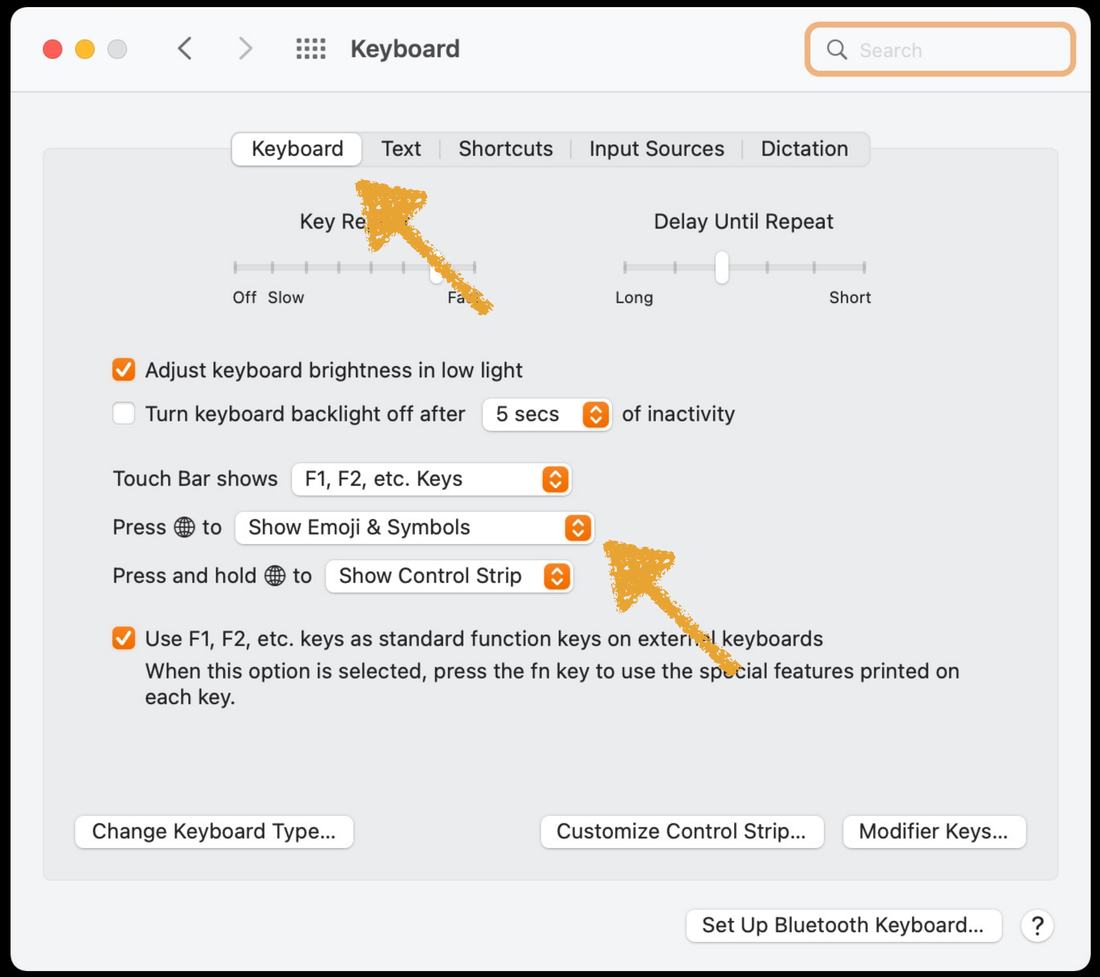


Character Viewer also contains emoji 🥳🎉🤹‍♀️

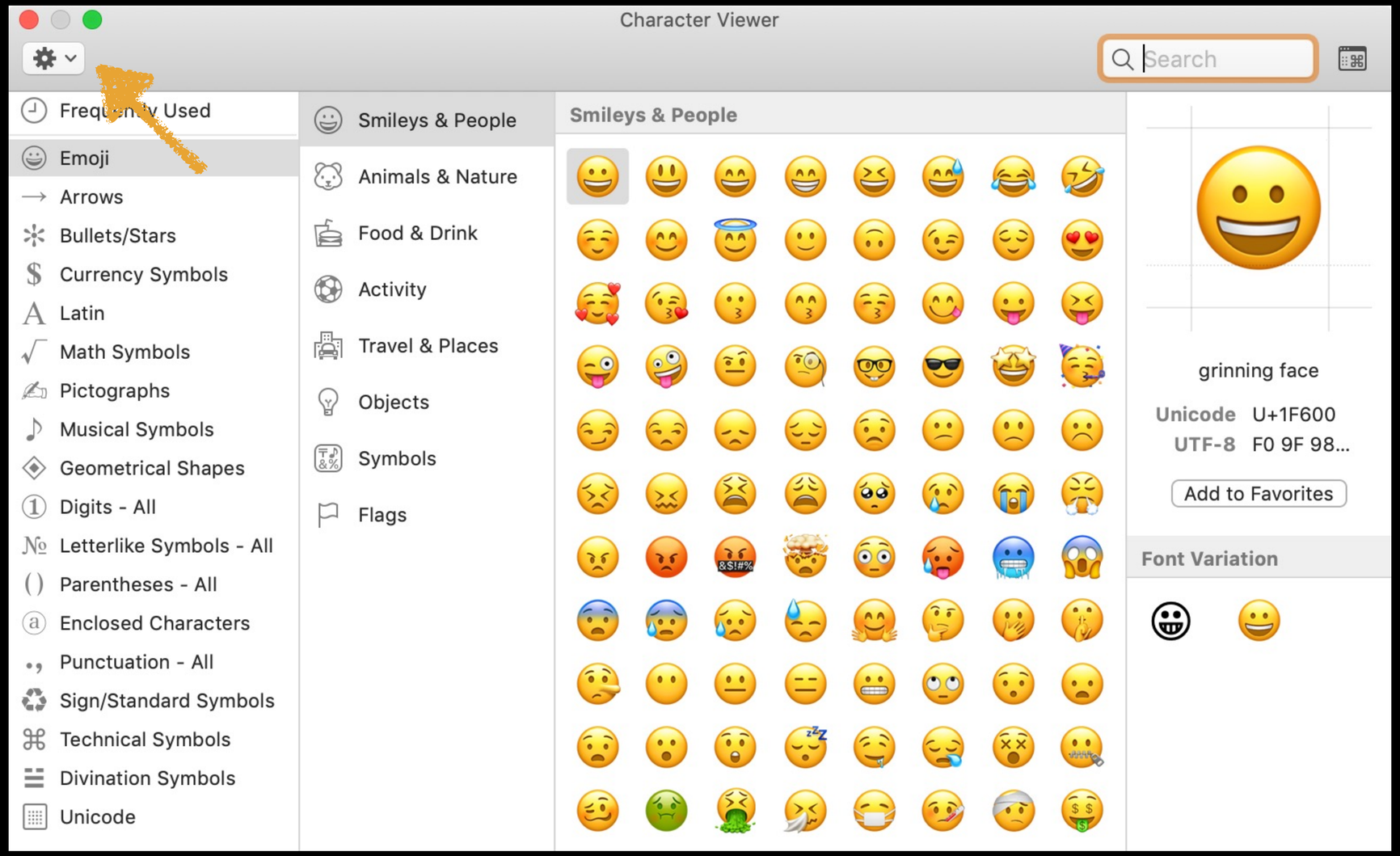
✏️ SIDE NOTE

You can also open directly to Emoji by pressing ^⌘␣

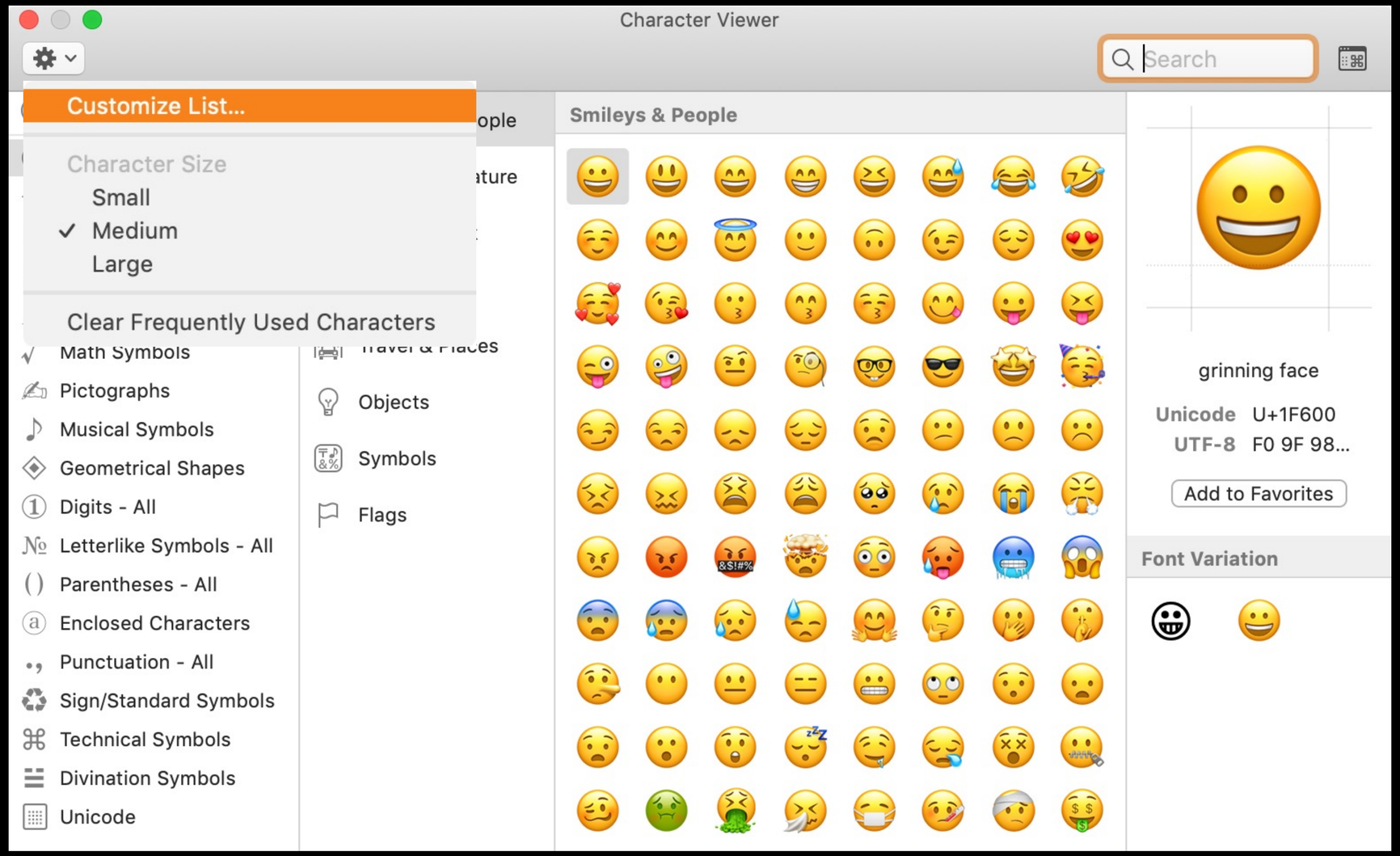
✏️ SIDE NOTE



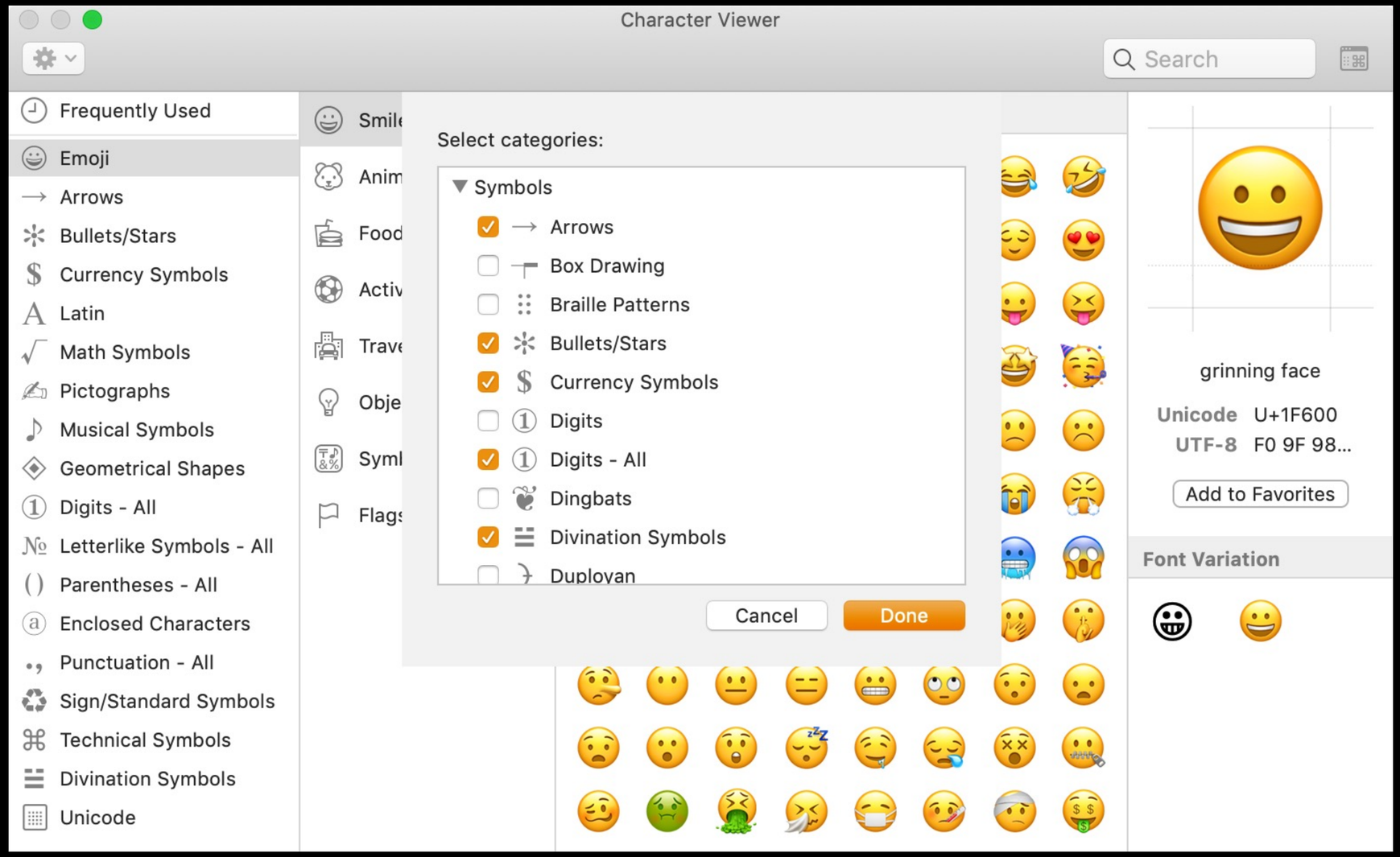
Starting in macOS 12 Monterey, you can press 🌐 (or fn if your laptop does not have a 🌐 on it) to open directly to Emoji



Customize the Character Viewer

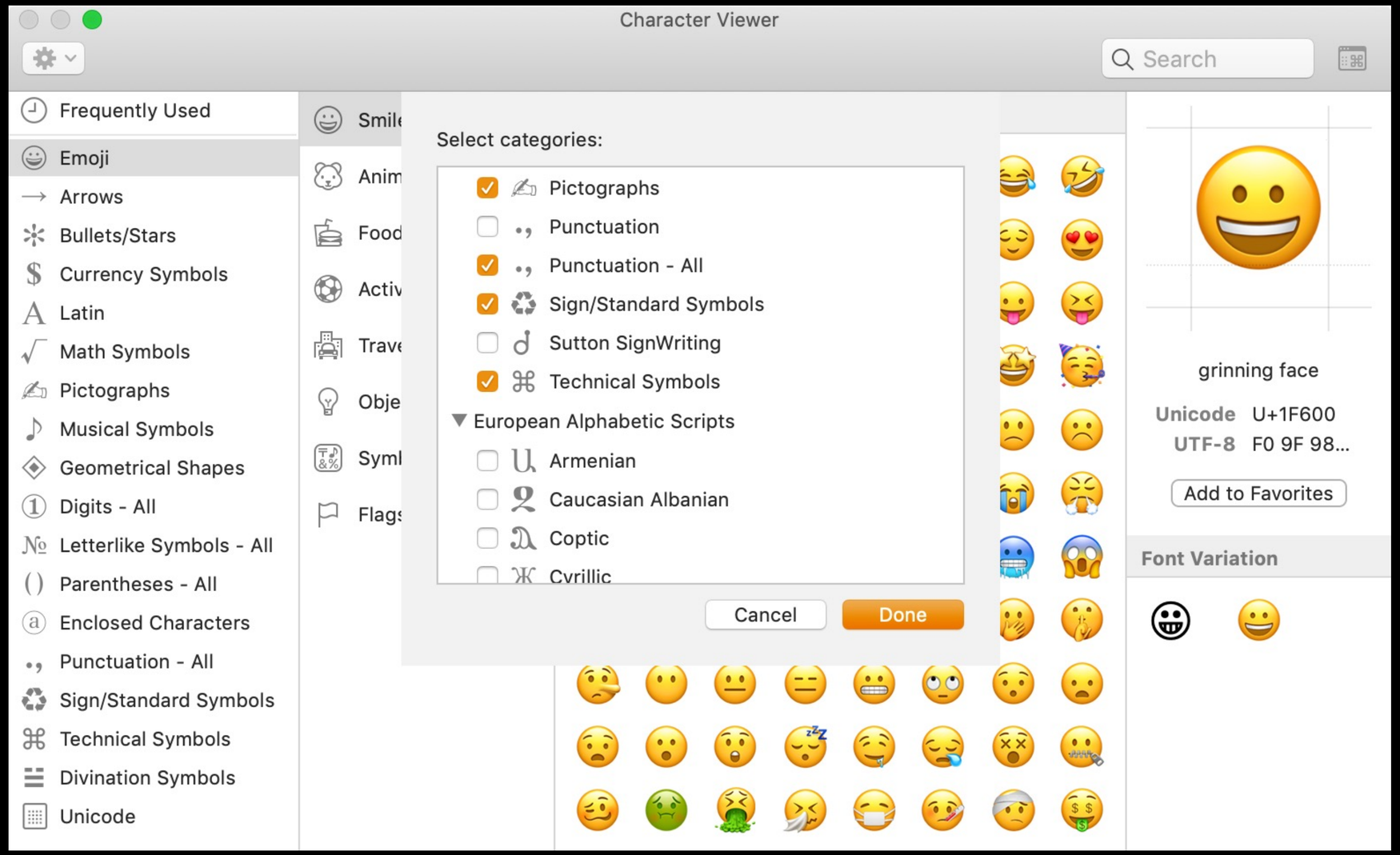


Customize the Character Viewer

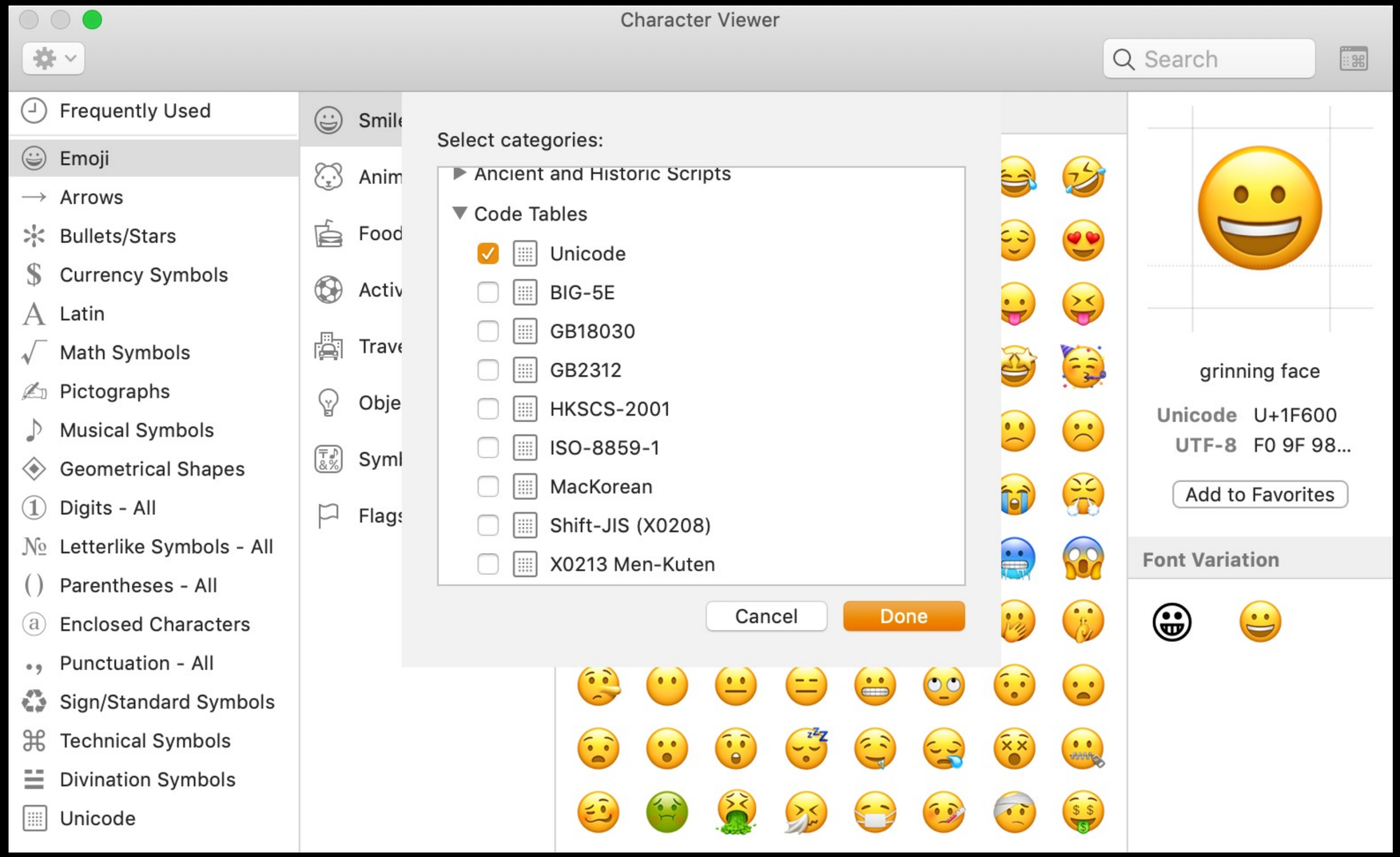


Customize the Character Viewer

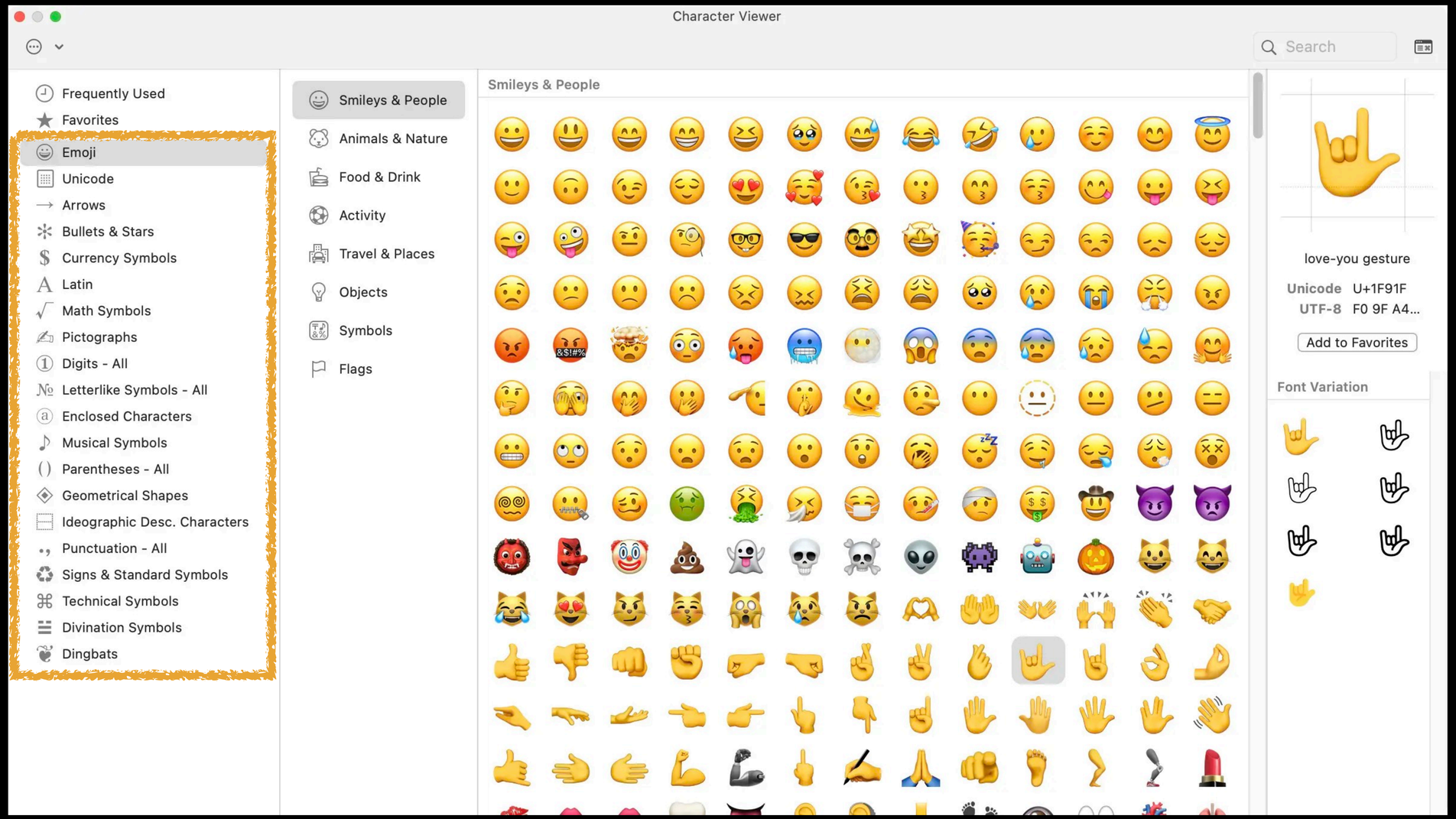
Customize the Character Viewer



Customize the Character Viewer

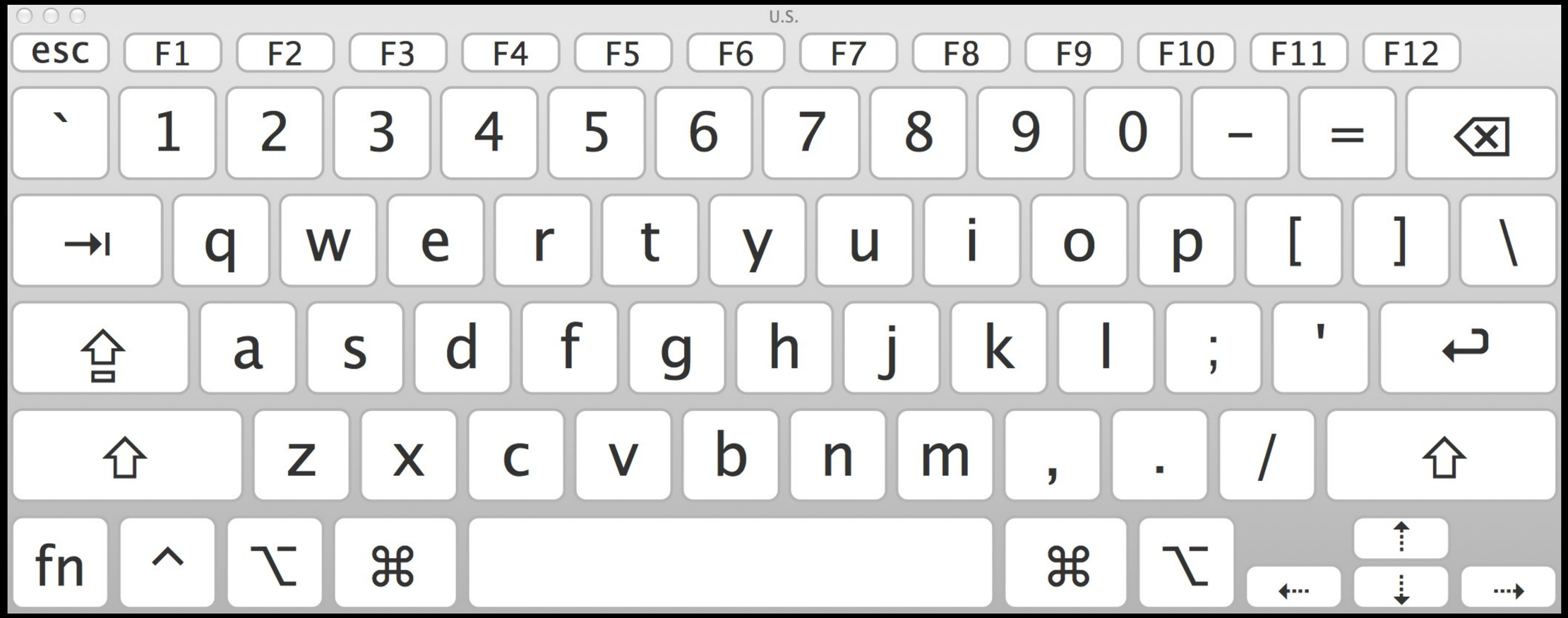


Customize the Character Viewer



What I enable (see next screen for text list)

I enable these: Emoji • Unicode • Arrows • Bullets & Stars • Currency Symbols • Latin • Math Symbols • Pictographs • Digits - All • Letterlike Symbols - All • Enclosed Characters • Musical Symbols • Parentheses - All • Geometrical Shapes • Ideographical Characters • Punctuation - All • Signs & Standard Symbols • Technical Symbols • Divination Symbols • Dingbats

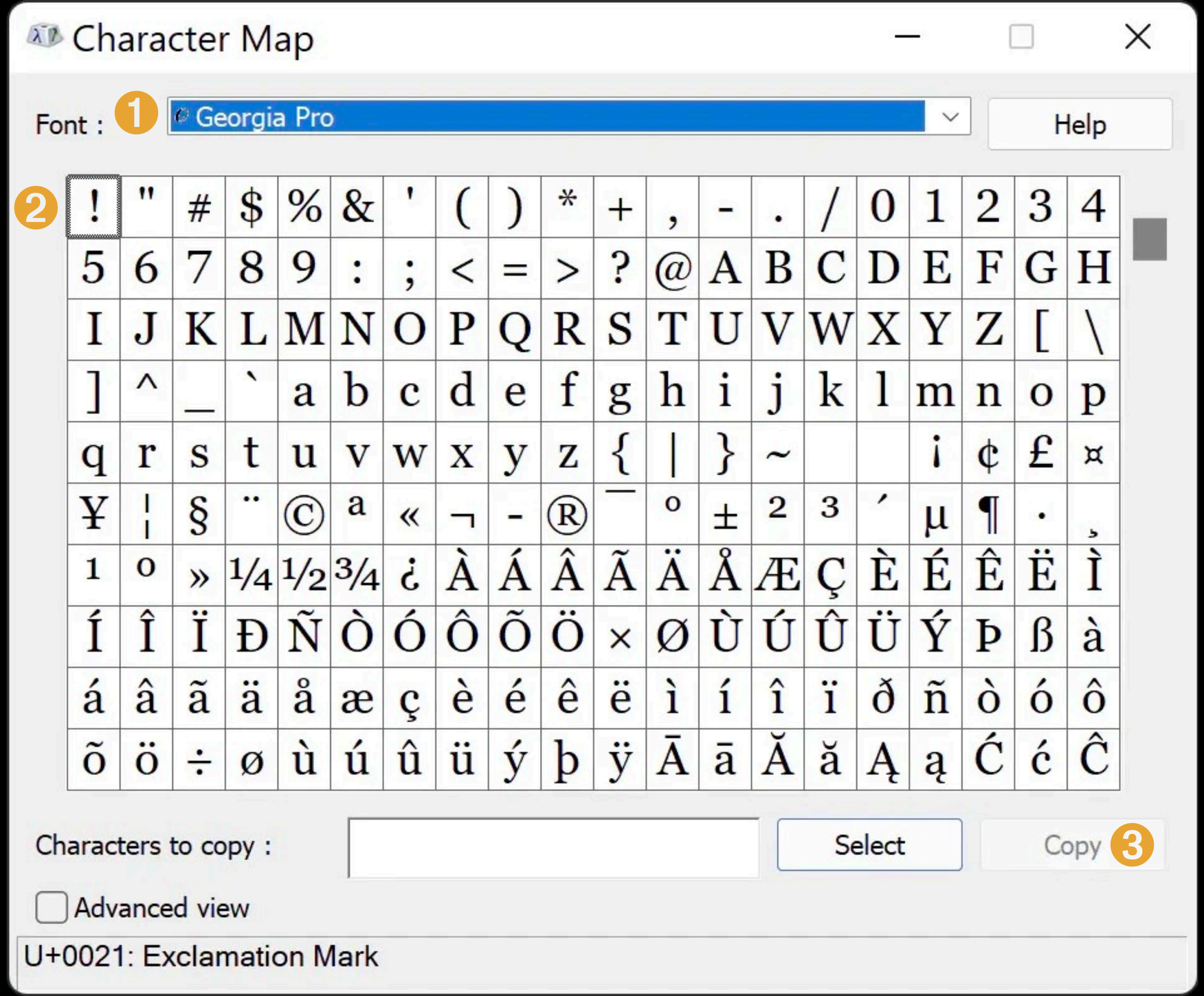


Keyboard Viewer

Keyboard Viewer with ⌥ pressed

Keyboard Viewer with ⌥⇧ pressed

Start/⊞Win+Q > Search for `Character Map`



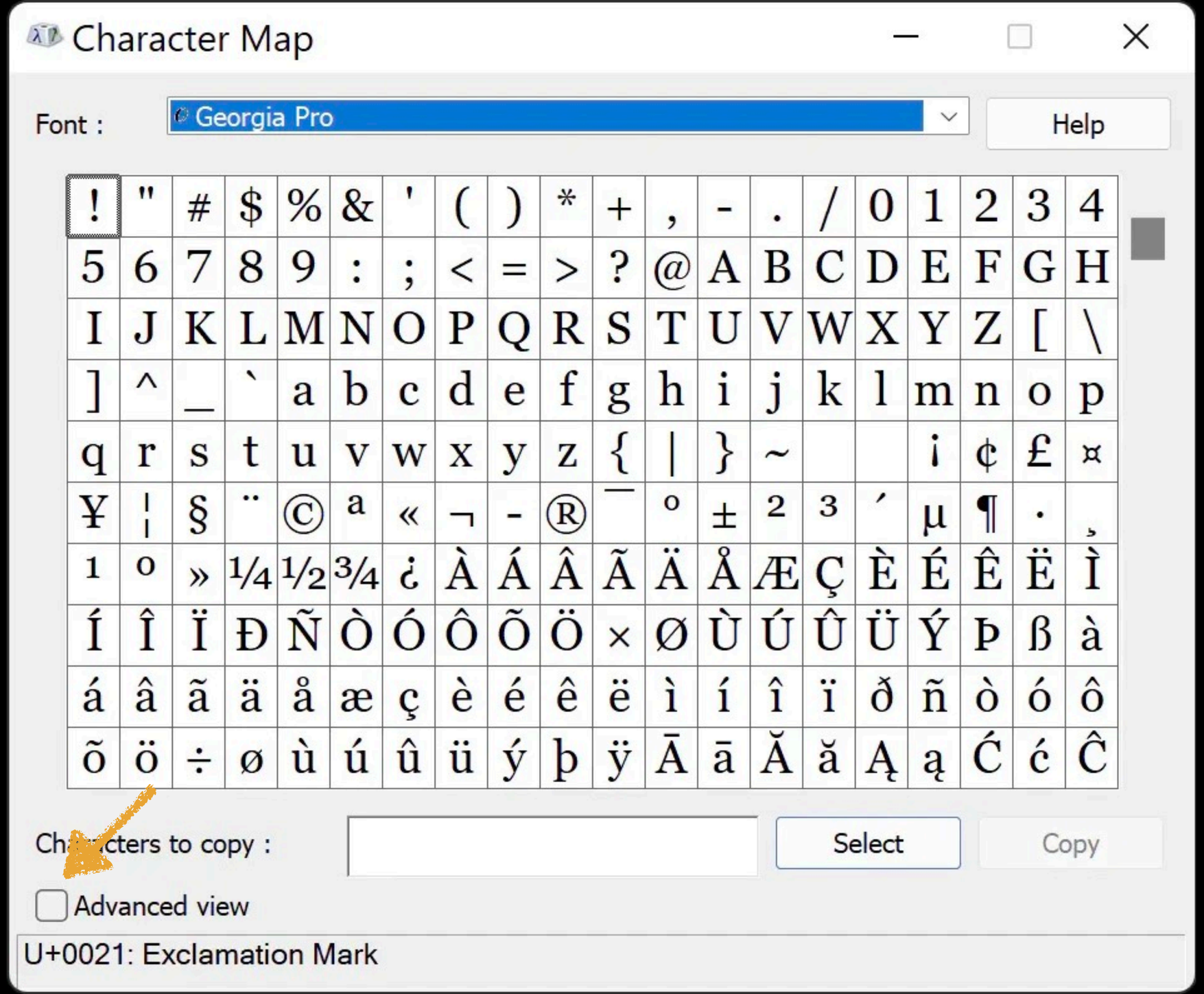
Character Map (which dates back to 1993!)

Multiple steps

1. Select font
2. Double-click on character
3. Click Copy

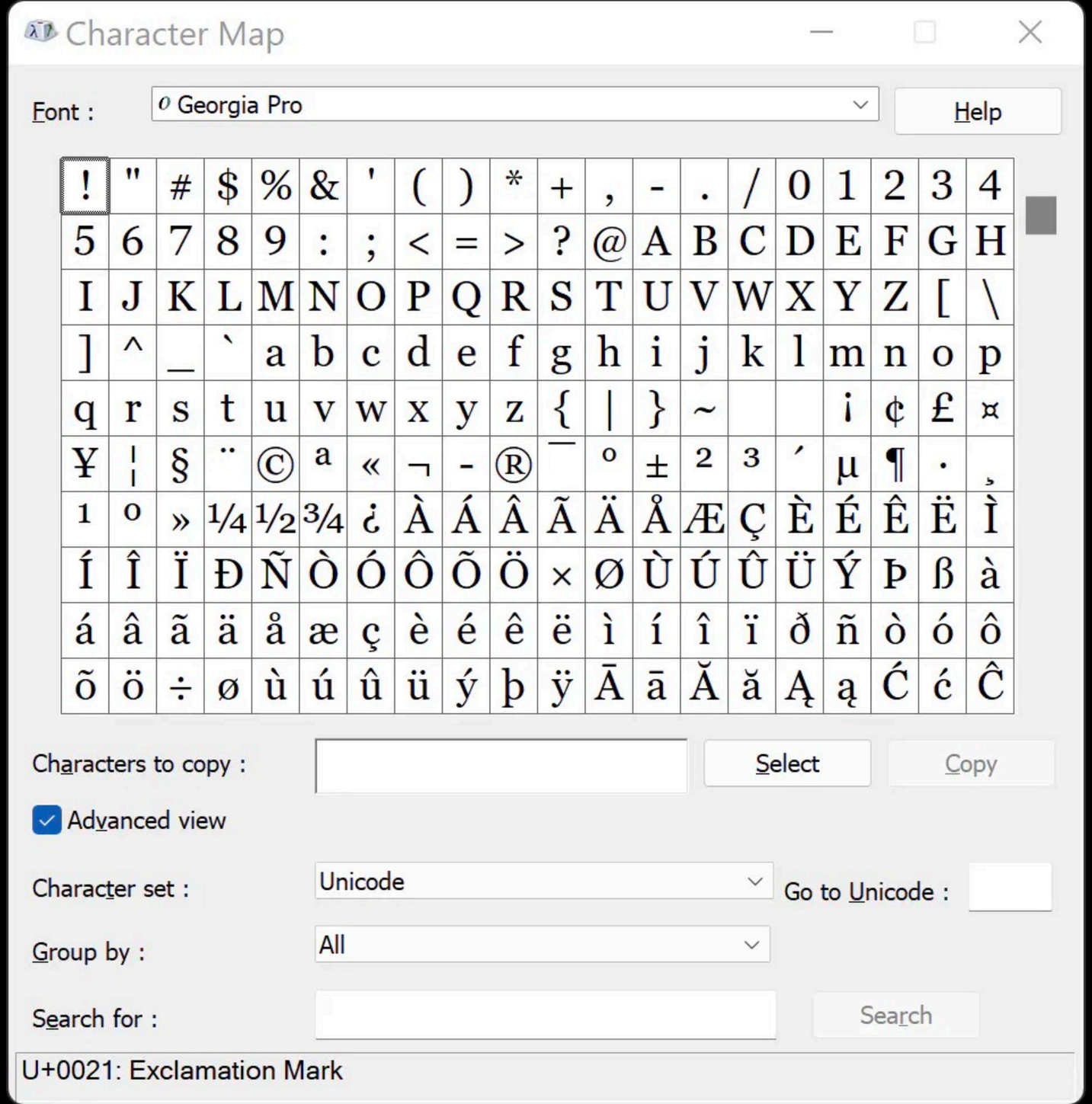
There's no search!

Wait a second… 🤔

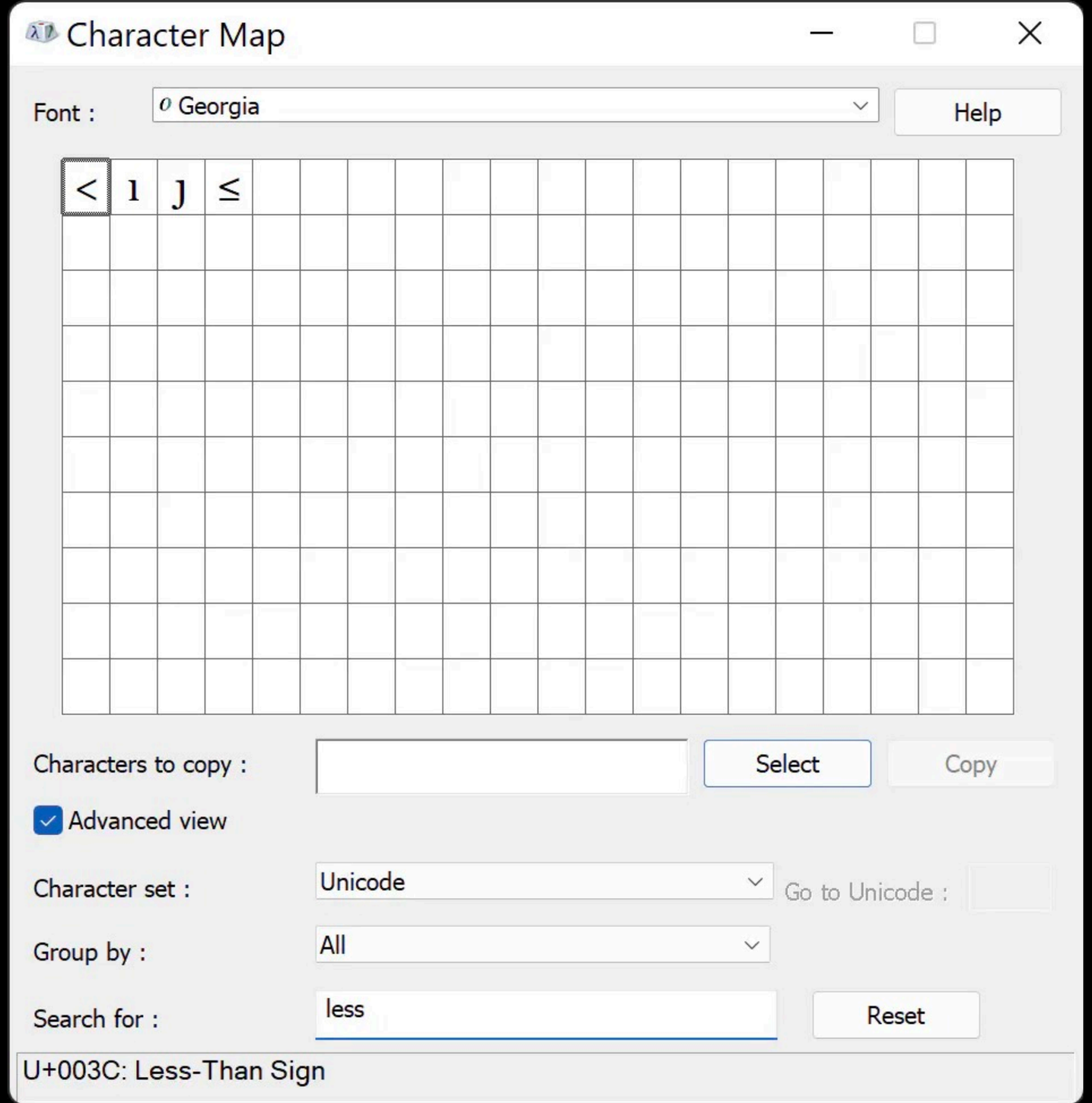


There's no search!

Wait a second… 🤔

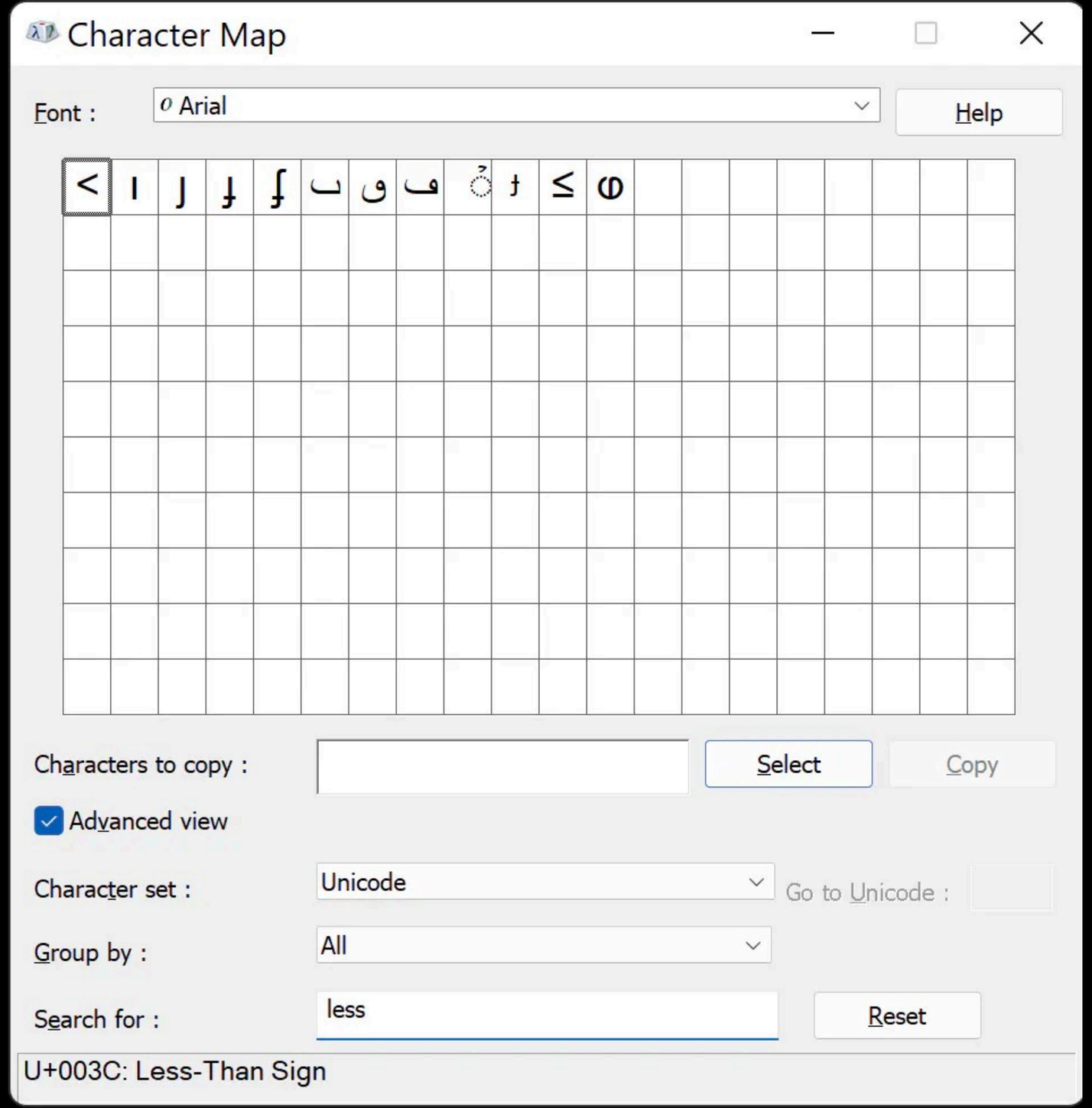


Nice of Microsoft to hide Search unless you check the box for Advanced View



Let's try a search for `less` using the Georgia font, which is very common & has been around since the '90s

4?!



How about Arial?

From 4 to 12 — pretty unspec-tacular

What about on the Mac Character Viewer?

Character Viewer

less

- Frequently Used
- Favorites
- Search Results
- Emoji
- Unicode
- Arrows
- Bullets & Stars
- Currency Symbols
- Latin
- Math Symbols
- Pictographs
- Digits - All
- Letterlike Symbols - All
- Enclosed Characters
- Musical Symbols
- Parentheses - All
- Geometrical Shapes
- Ideographi.... Characters
- Punctuation - All
- Signs & Sta...rd Symbols
- Technical Symbols
- Divination Symbols
- Dingbats

Character

l e s s

Unicode Name

LESS-THAN SIGN

Unicode U+003C

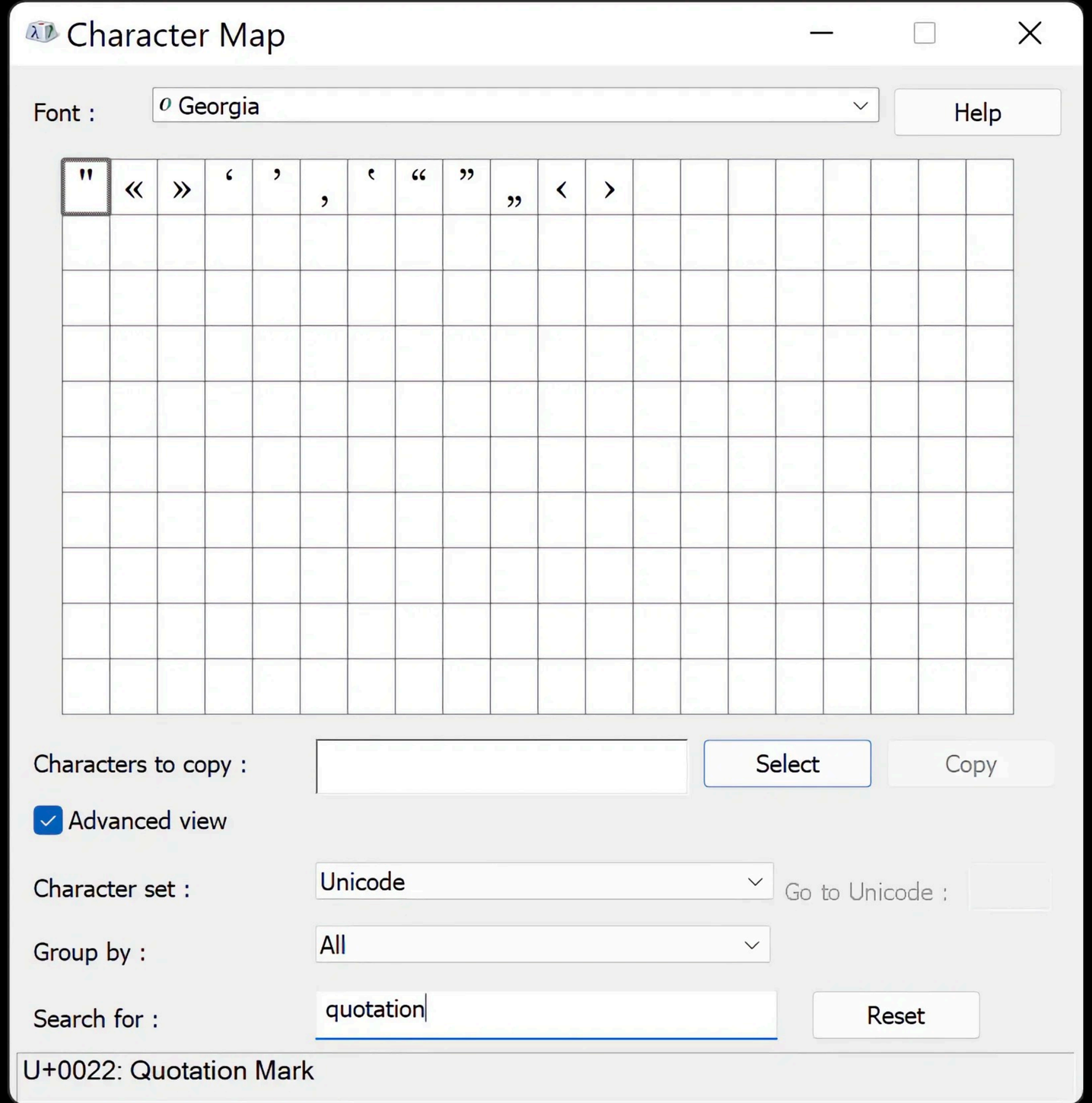
UTF-8 3C

Add to Favorites

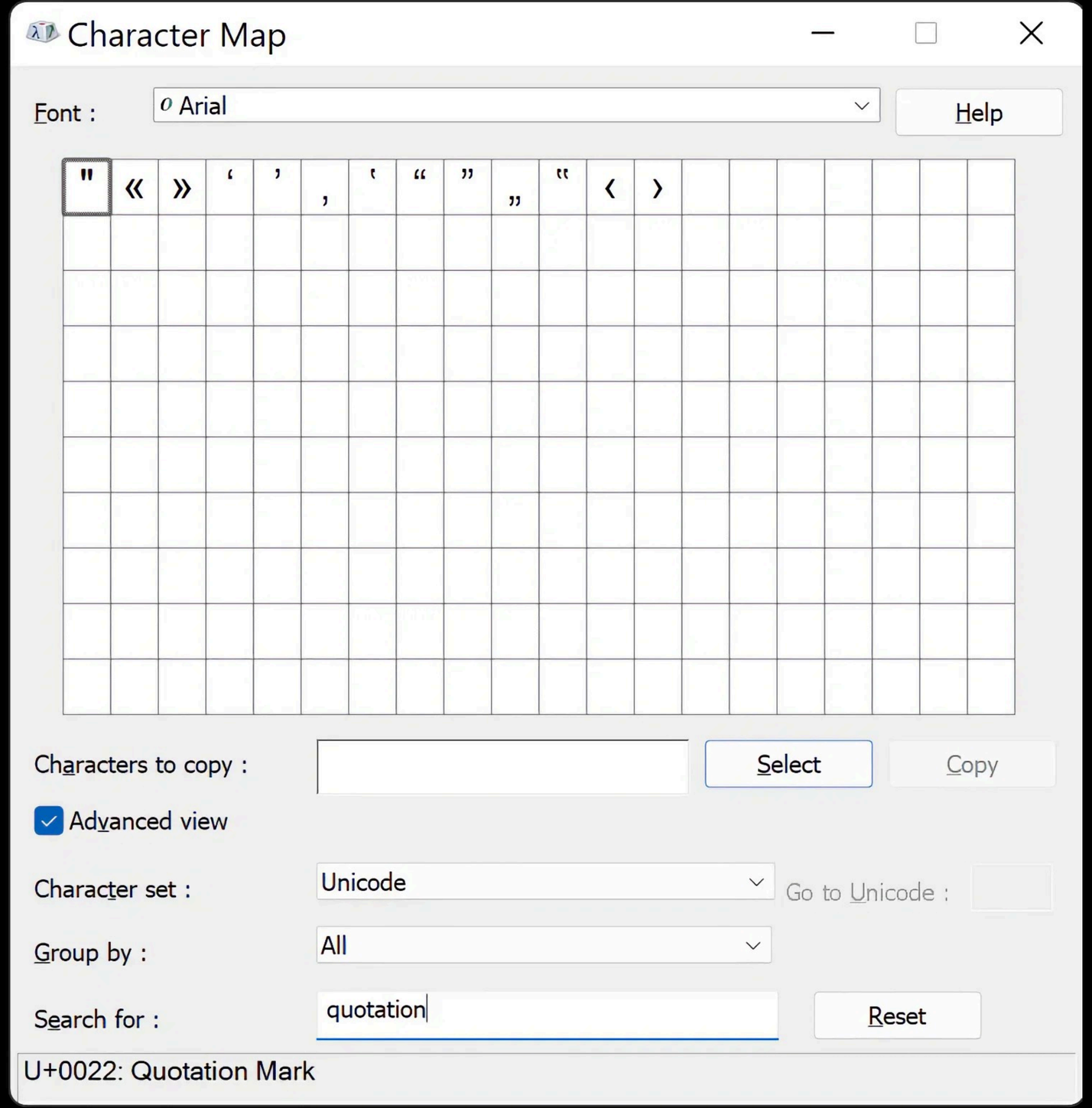
Related Characters

Font Variation

76 results!



How about quotation using Georgia?



How about `quotation` using Arial?

12 to 13 🙄

Let's look at the Mac Character Viewer to compare...

Character Viewer

quotation

- Frequently Used
- Favorites
- Search Results
- Emoji
- Unicode
- Arrows
- Bullets & Stars
- Currency Symbols
- Latin
- Math Symbols
- Pictographs
- Digits - All
- Letterlike Symbols - All
- Enclosed Characters
- Musical Symbols
- Parentheses - All
- Geometrical Shapes
- Ideographi.... Characters
- Punctuation - All
- Signs & Sta...rd Symbols
- Technical Symbols
- Divination Symbols
- Dingbats

Character

q u o t a t i o n

Unicode Name

" « » ‘ ’ ‚ ‛ “ ” „ ‟ ‹ › ❛ ❜ ❝ ❞ ❮ ❯ ❟ ❠ ❡ ❢ ❣ ❤ ❥ ❦ ❧ ❨ ❩ ❪ ❫ ❬ ❭ ❮ ❯

LATIN SMALL LETTER Q

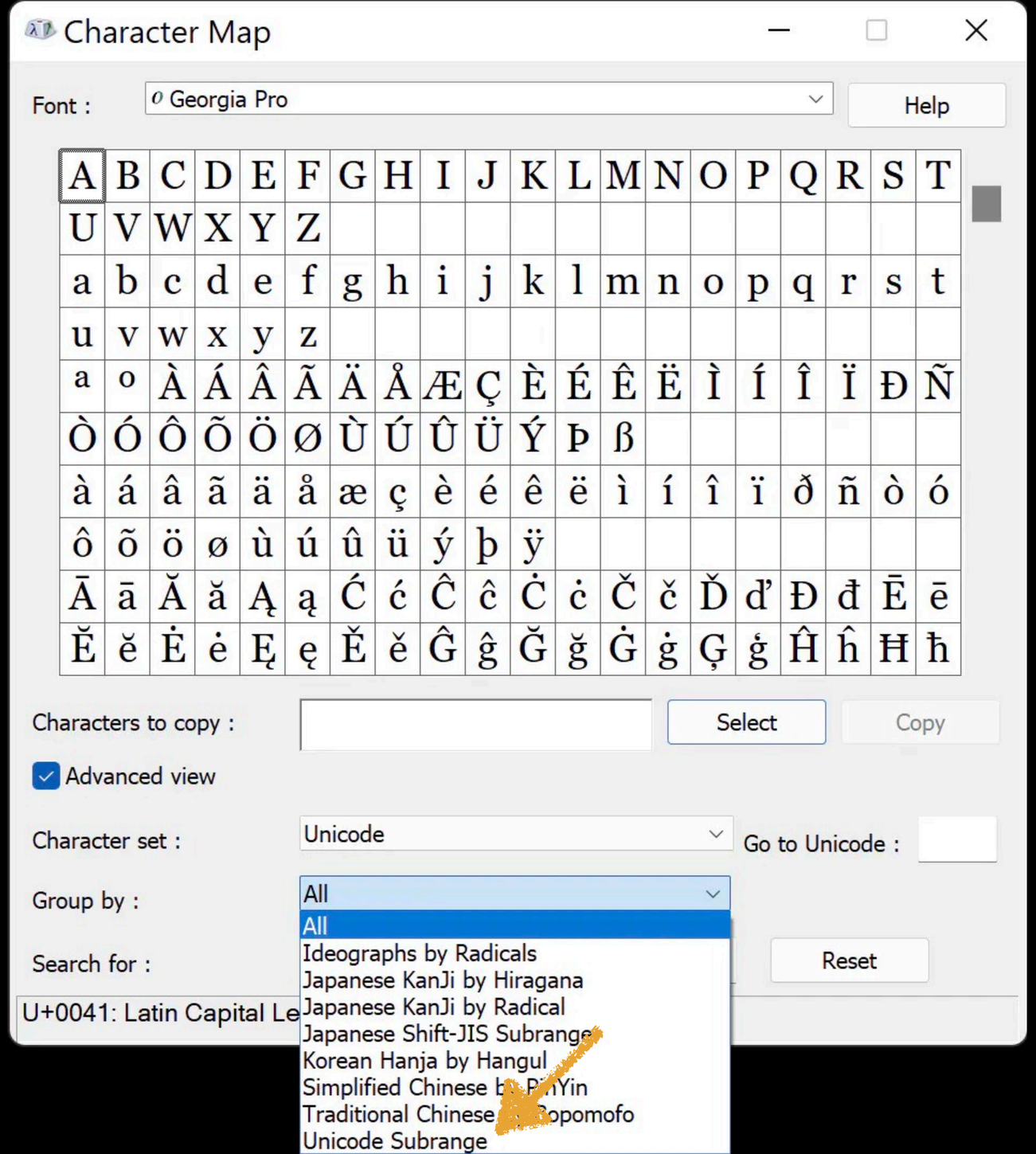
Unicode U+0071
UTF-8 71

Add to Favorites

Related Characters

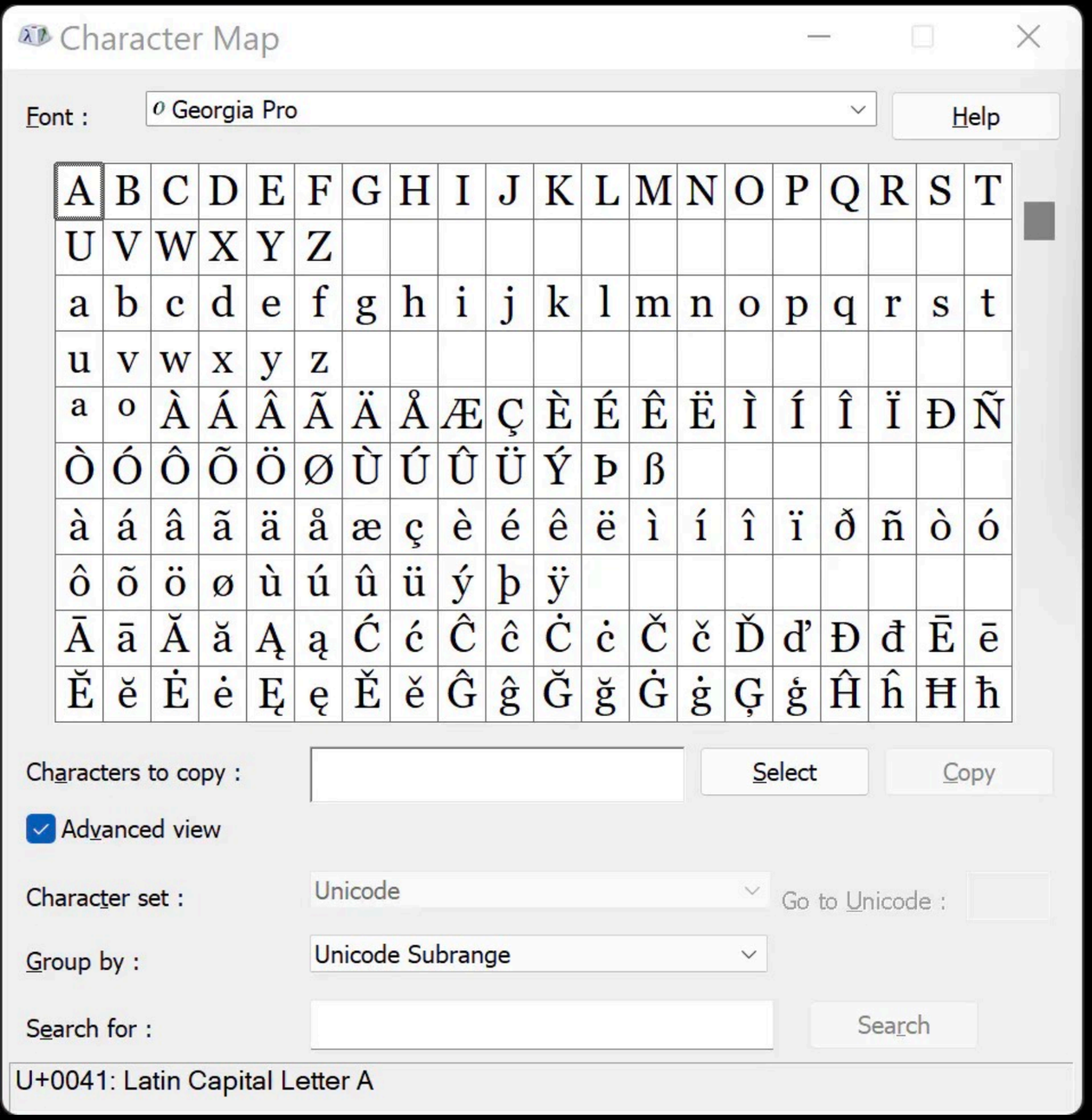
Q Ⓠ ⒬ ⒭ ⓠ ⓆⓆ ⓠ Q Q Q q Q q Q Q q Q q Q q Q q

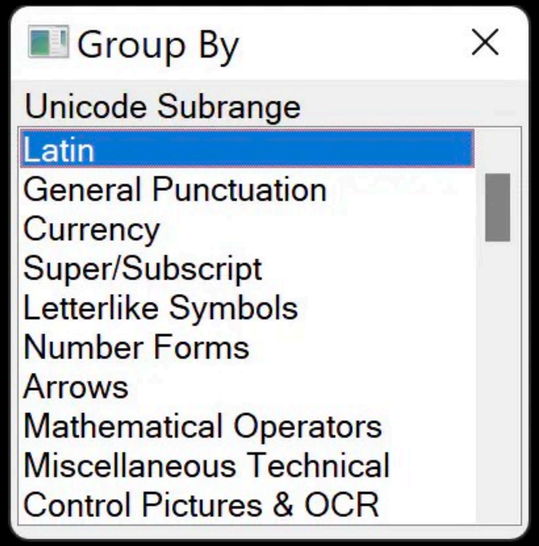
29 results — Character Map seems a bit outclassed



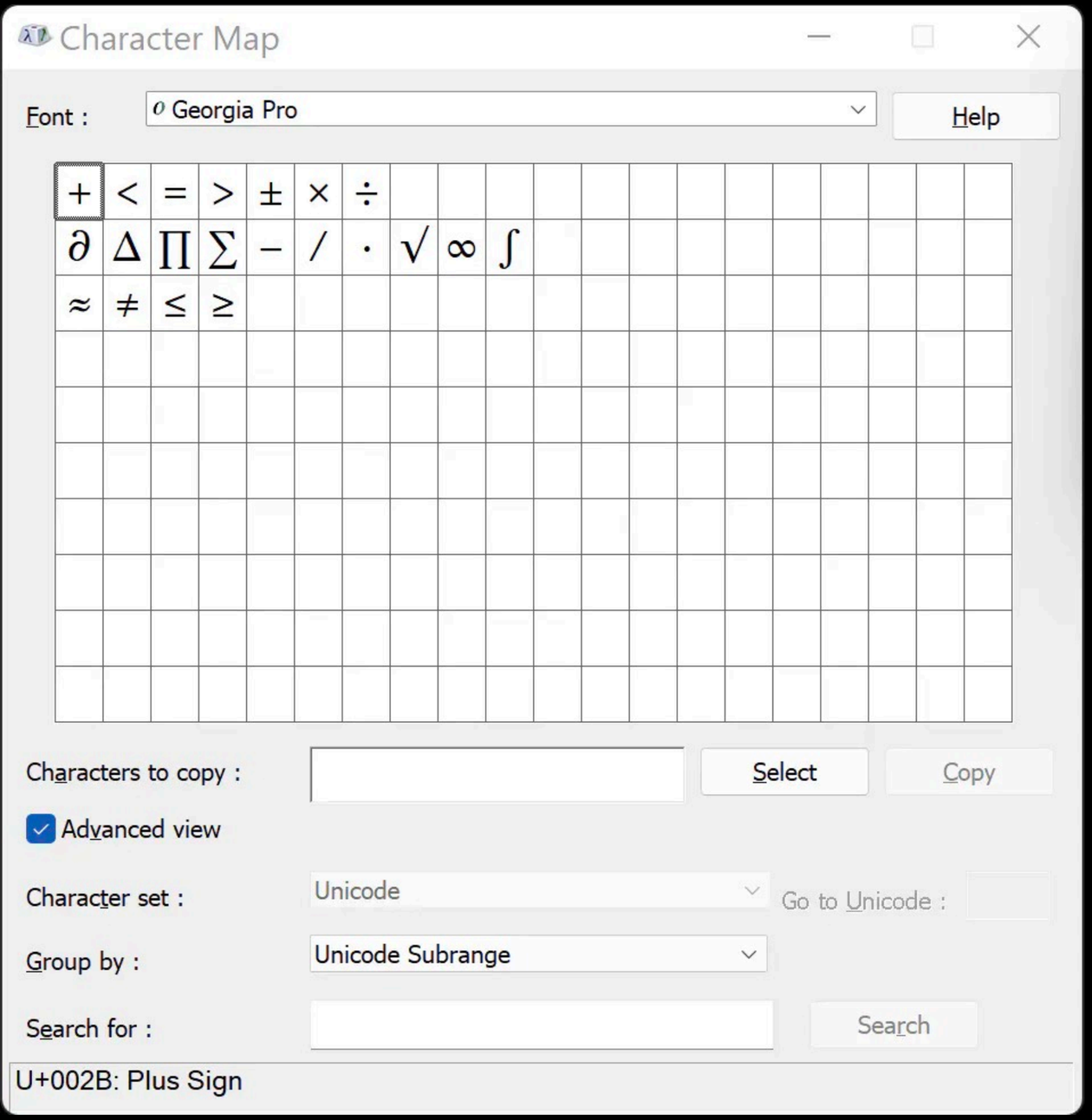
Look at the bottom: *Unicode Subrange*

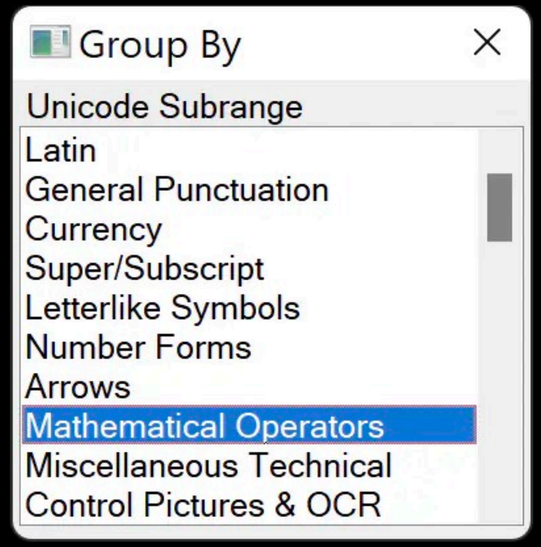
I wonder... 🤔





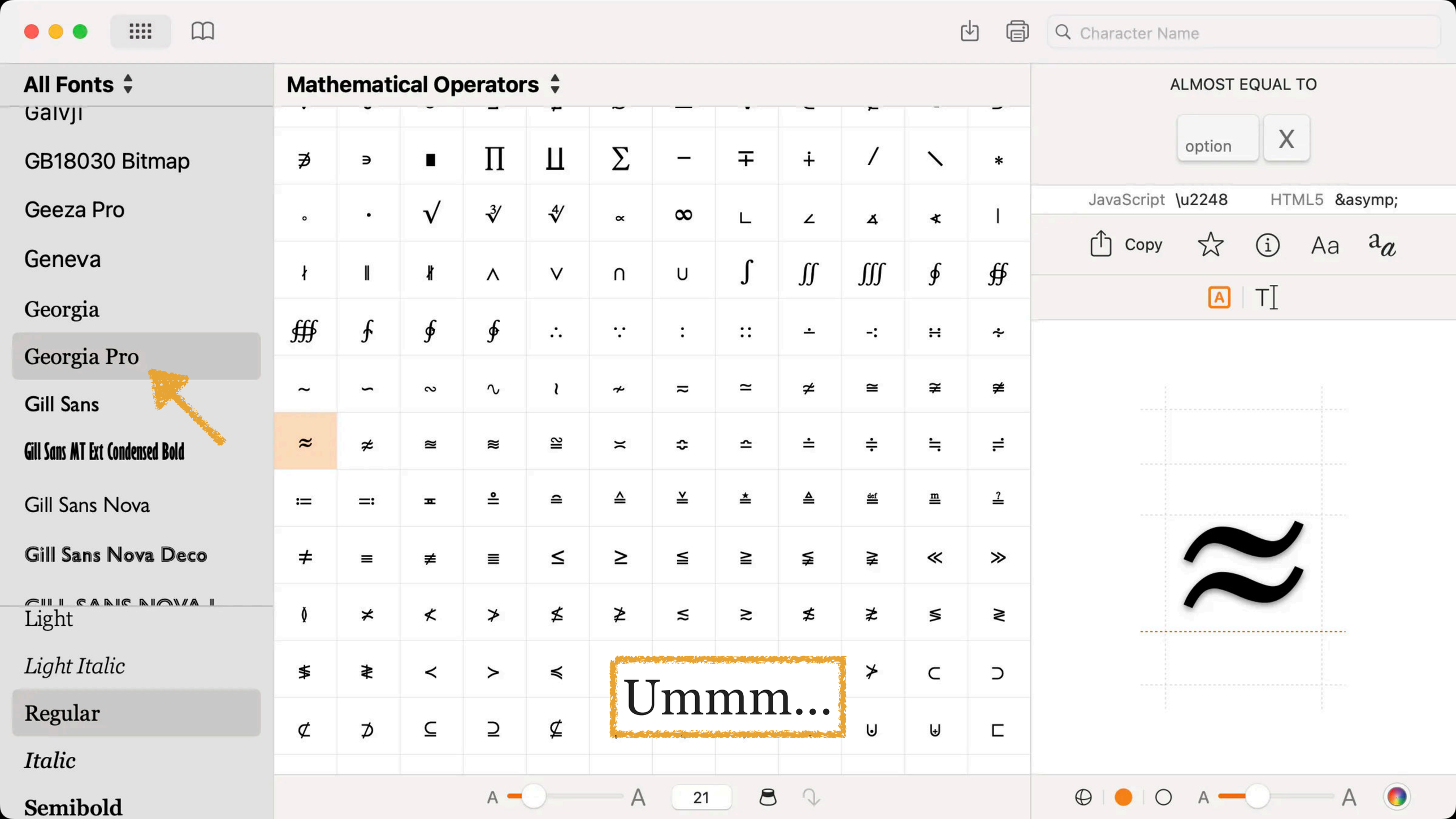
Yay! Unicode blocks!

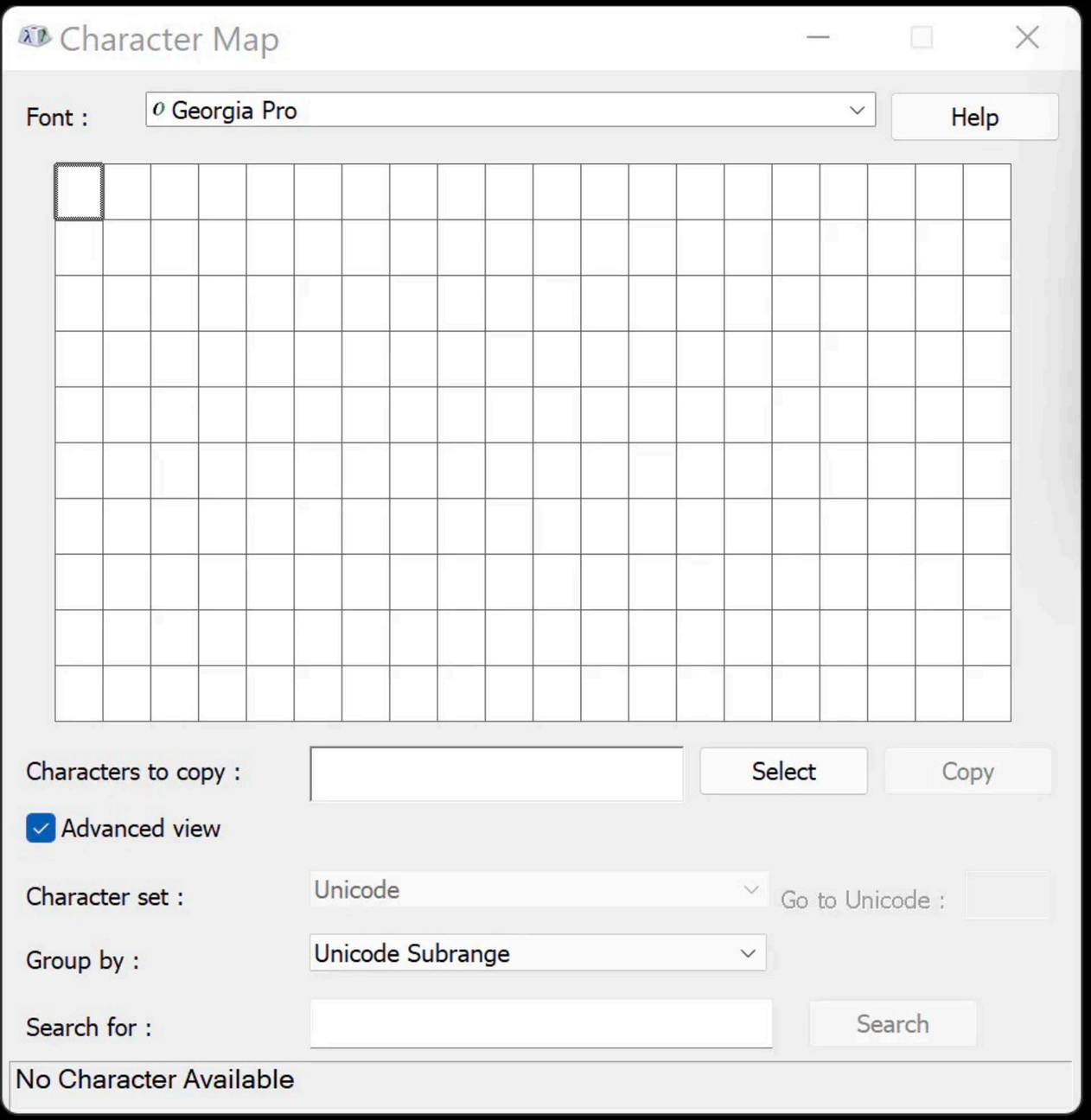


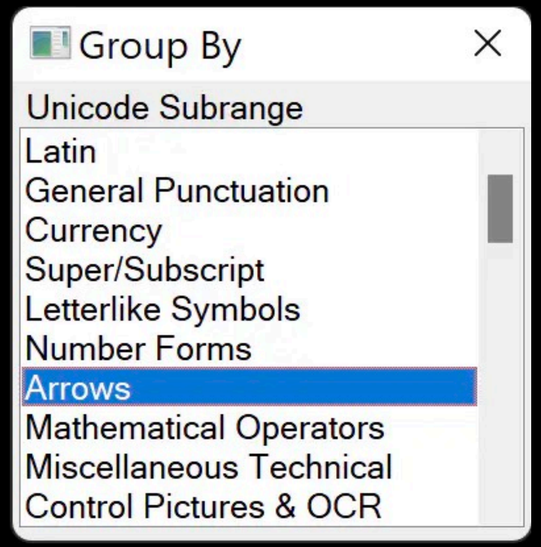


Wait — I know Georgia Pro has more math symbols than those

Let's look on my Mac at a 3rd-party program called *Ultra Character Map*


Character Name
All Fonts
Mathematical Operators
ALMOST EQUAL TO
option
X
JavaScript \u2248
HTML5 ≈
Copy
Aa
Galvji
GB18030 Bitmap
Geeza Pro
Geneva
Georgia
Georgia Pro
Gill Sans
Gill Sans MT Ext Condensed Bold
Gill Sans Nova
Gill Sans Nova Deco
Light
Light Italic
Regular
Italic
Semibold
Ummm...
21





No arrows?! What is going on here?

Back to Ultra Character Map on my Mac!

Character Name

All Fonts

Galvji

GB18030 Bitmap

Geeza Pro

Geneva

Georgia

Georgia Pro

Gill Sans

Gill Sans MT Ext Condensed Bold

Gill Sans Nova

Gill Sans Nova Deco

GILL SANS NOVA L

Light

Light Italic

Regular

Italic

Semibold

Arrows

← ↑ → ↓ ↔ ↕ ↖ ↗ ↘ ↙ ↚ ↛

↜ ↝ ↞ ↟ ↠ ↡ ↢ ↣ ↤ ↥ ↦ ↧

↨ ↩ ↪ ↫ ↬ ↭ ↮ ↯ ↰ ↱ ↲ ↳

↴ ↵ ↶ ↷ ↸ ↹ ↺ ↻ ↼ ↽ ↾ ↿

⇀ ⇁ ⇂ ⇃ ⇄ ⇅ ⇆ ⇇ ⇈ ⇉ ⇊ ⇋

⇌ ⇍ ⇎ ⇏ ⇐ ⇑ ⇒ ⇓ ⇔ ⇕ ⇖ ⇗

⇘ ⇙ ⇚ ⇛ ⇜ ⇝ ⇞ ⇟ ⇠ ⇡ ⇢ ⇣

⇤ ⇥ ⇦ ⇧ ⇨ ⇩ ⇪ ⇫ ⇬ ⇭ ⇮ ⇯

⇰ ⇱ ⇲ ⇳ ⇴ ⇵ ⇶ ⇷ ⇸ ⇹ ⇺ ⇻

⇼ ⇽ ⇾ ⇿

A 21 A

LEFTWARDS ARROW

JavaScript \u2190 HTML5 ←

Copy Aa

A A

“…[Character Map] still only supports code points on plane 0 (between U+0000 and U+FFFF). Additionally, it does not display certain characters in that range for reasons unexplained.” —Wikipedia

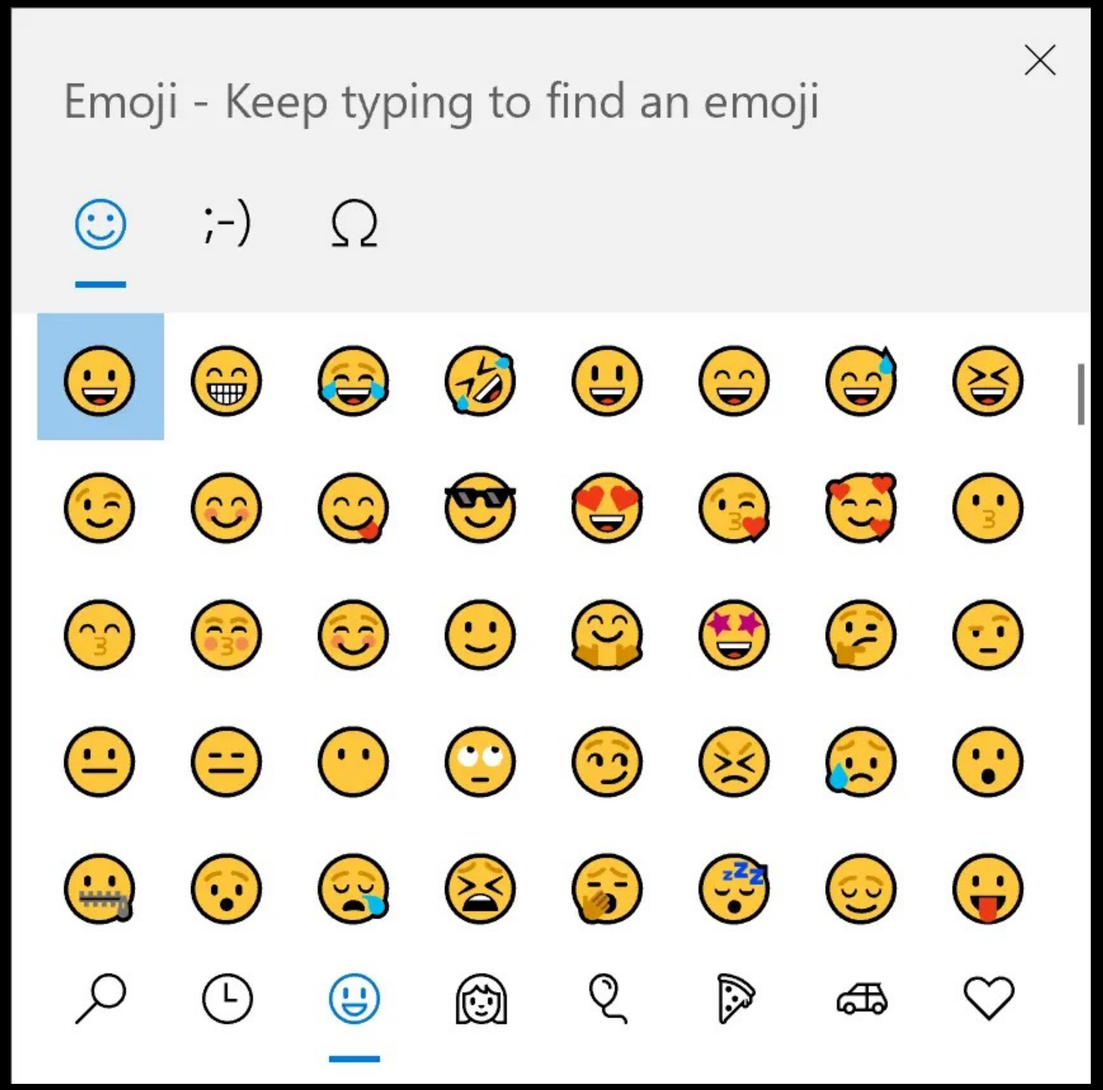
Let’s face it — Character Map sucks

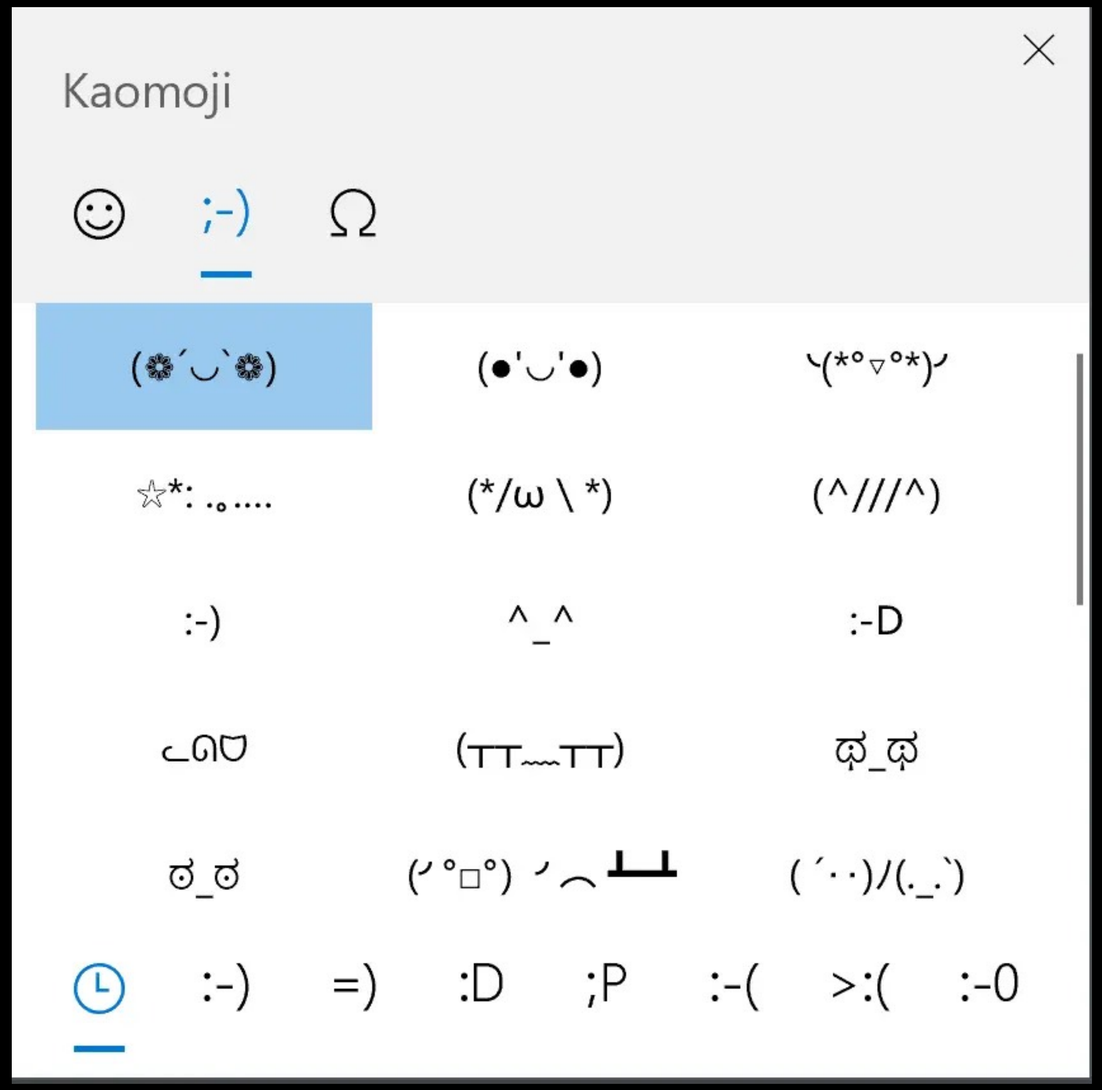
“…[Character Map] still only supports code points on plane 0 (between U+0000 and U+FFFF). Additionally, it does not display certain characters in that range for reasons unexplained.” —Wikipedia

Let’s face it — Character Map sucks

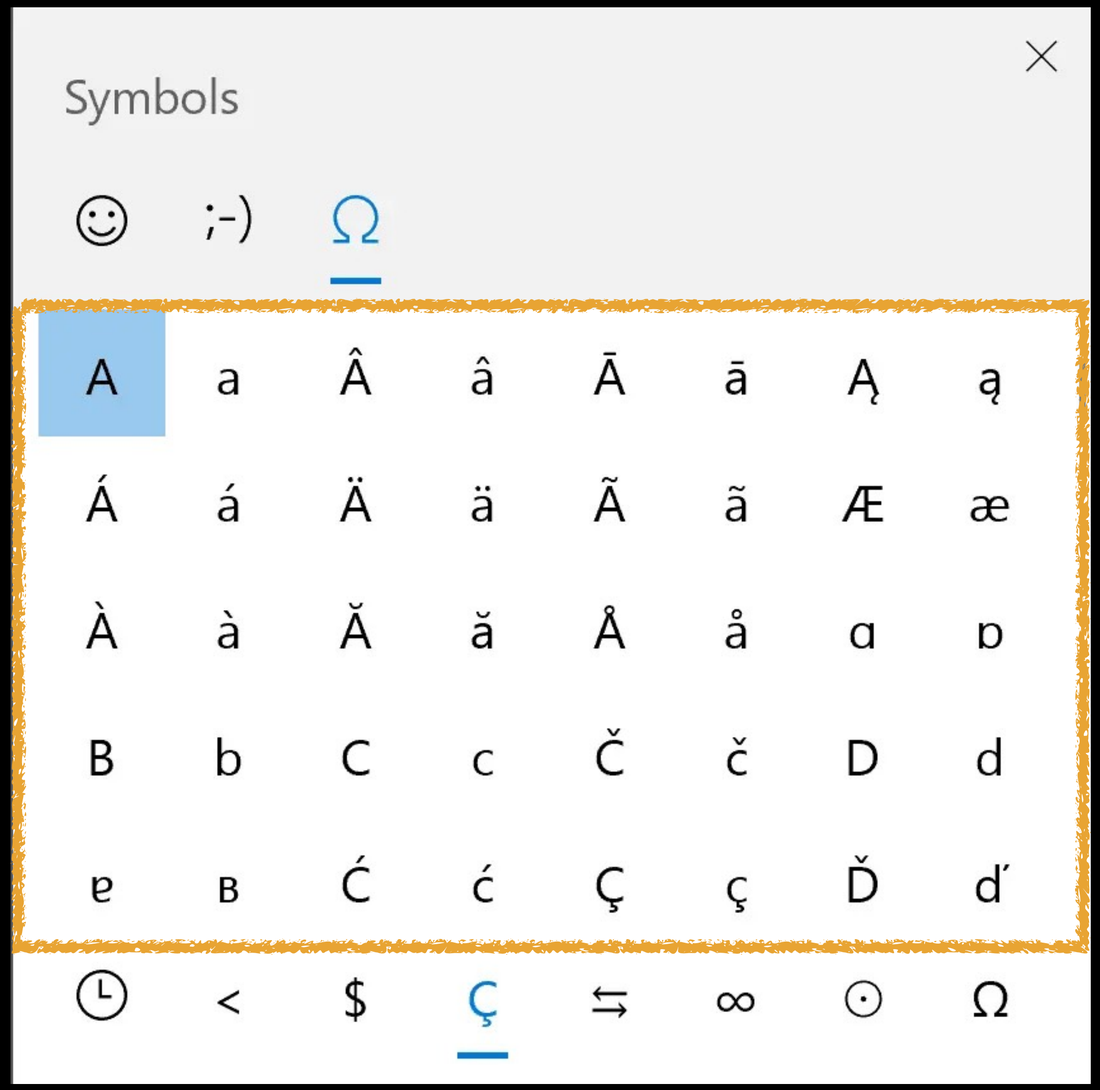
🤢🔥

⊞Win+./⊞Win+; opens the Emoji Keyboard on Windows 10 & above

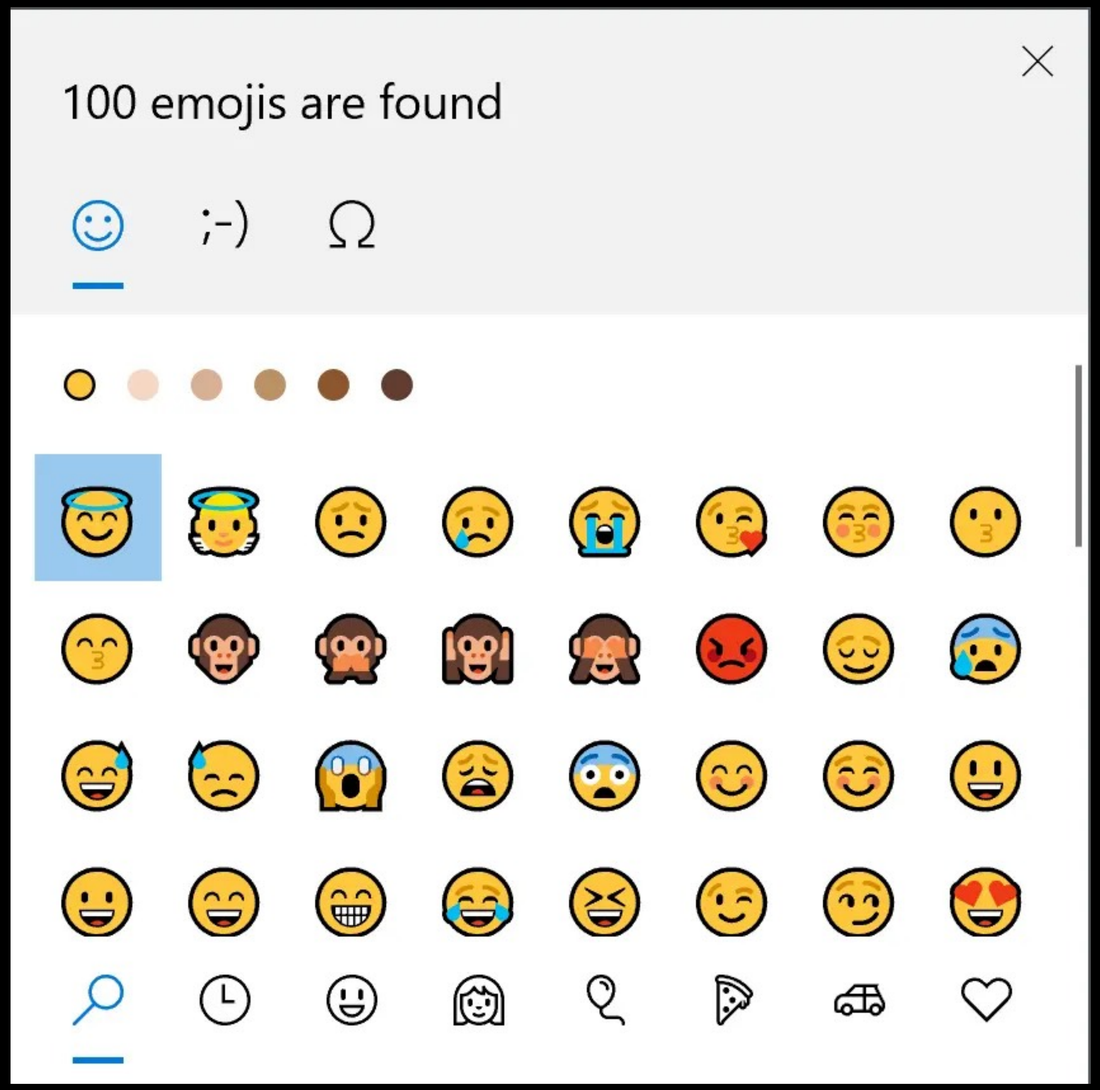

Emoji - Keep typing to find an emoji
;-)
Ω


Kaomoji
;-)
Ω
(•'◡'•)
(*/ω \ *)
(^///^)
:-)
^_^
:-D
(ㅠㅠ〰ㅠㅠ)
ಥ_ಥ
ಠ_ಠ
(´··)/(._.`)
:-)
=)
:D
;P
:-(
>:(
:-0

Windows 10



This window is not re-sizable, so you get to scroll with only 5 lines visible at a time 🙄



In Windows 10, you just start typing when the window opens to filter the emoji

However, *nowhere* does it show you what you are typing! Ridiculous!

Here, for instance, I was typing letters to search for *fruit* — any idea where I am in that? Me neither!

In Windows 10, you just start typing when the window opens to filter the emoji

However, *nowhere* does it show you what you are typing! Ridiculous!

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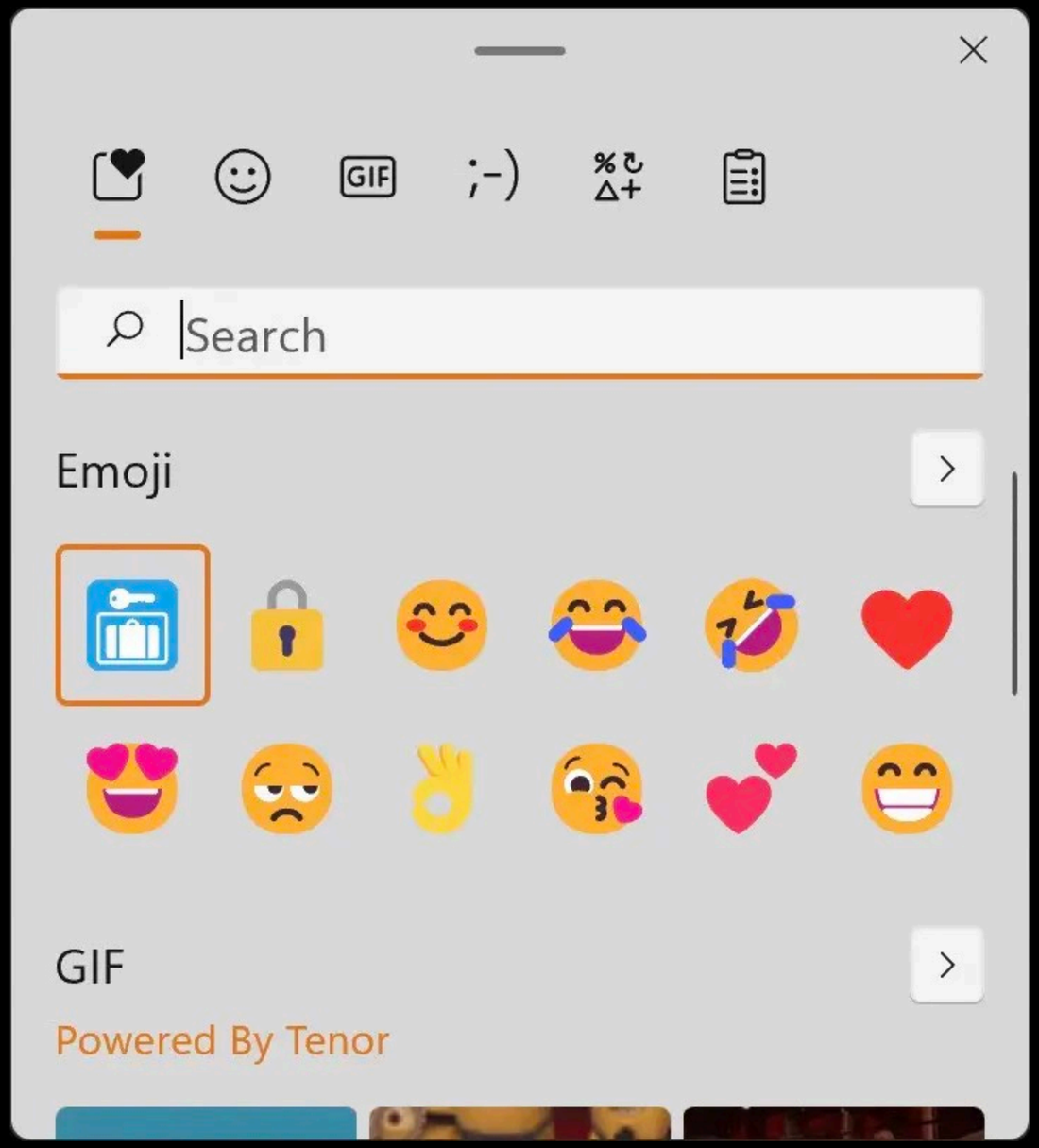
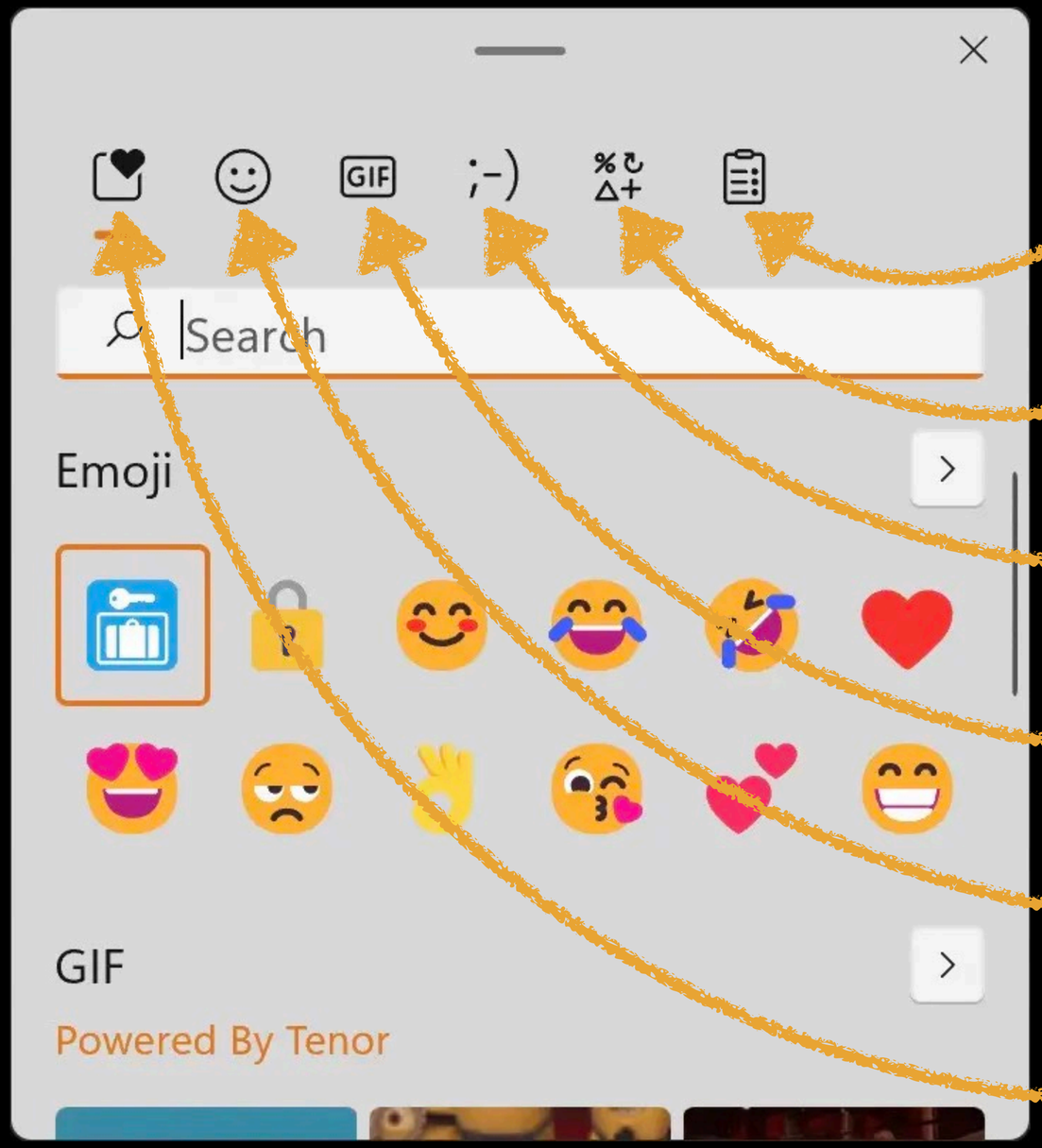


It sucks in Windows 11 too



Clipboard history

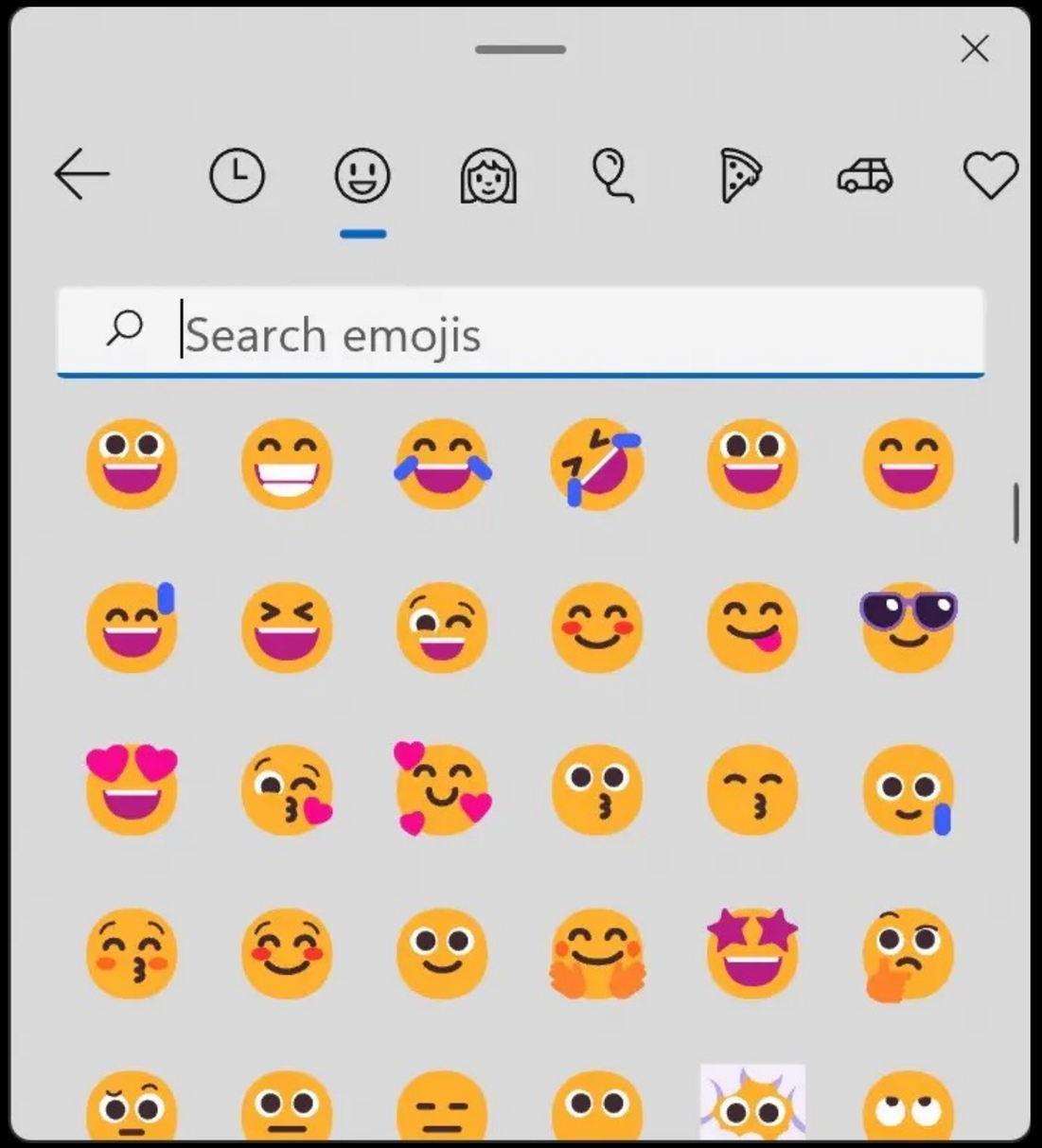
Symbols

Kaomoji

GIF

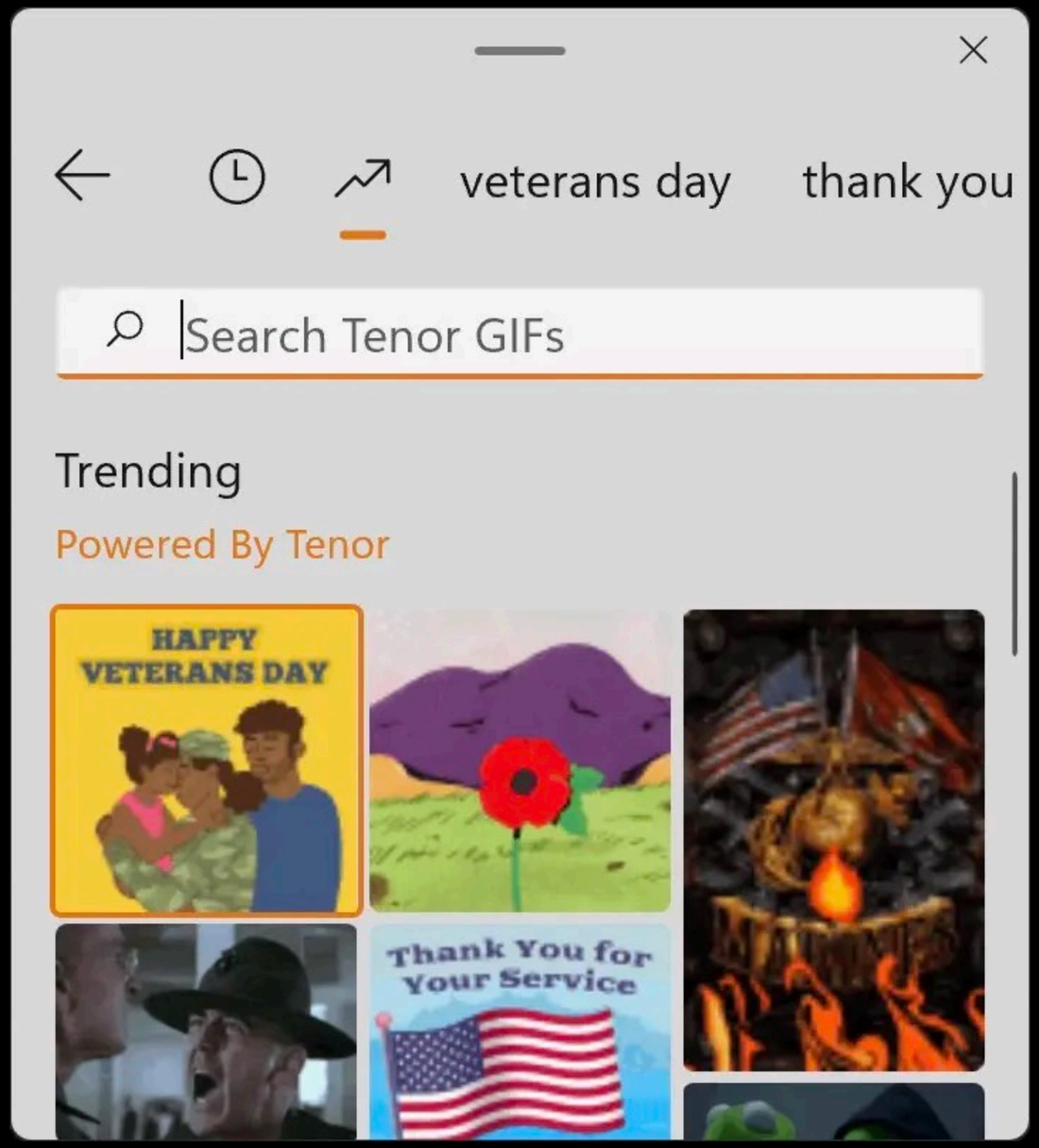
Emoji

Most recently used

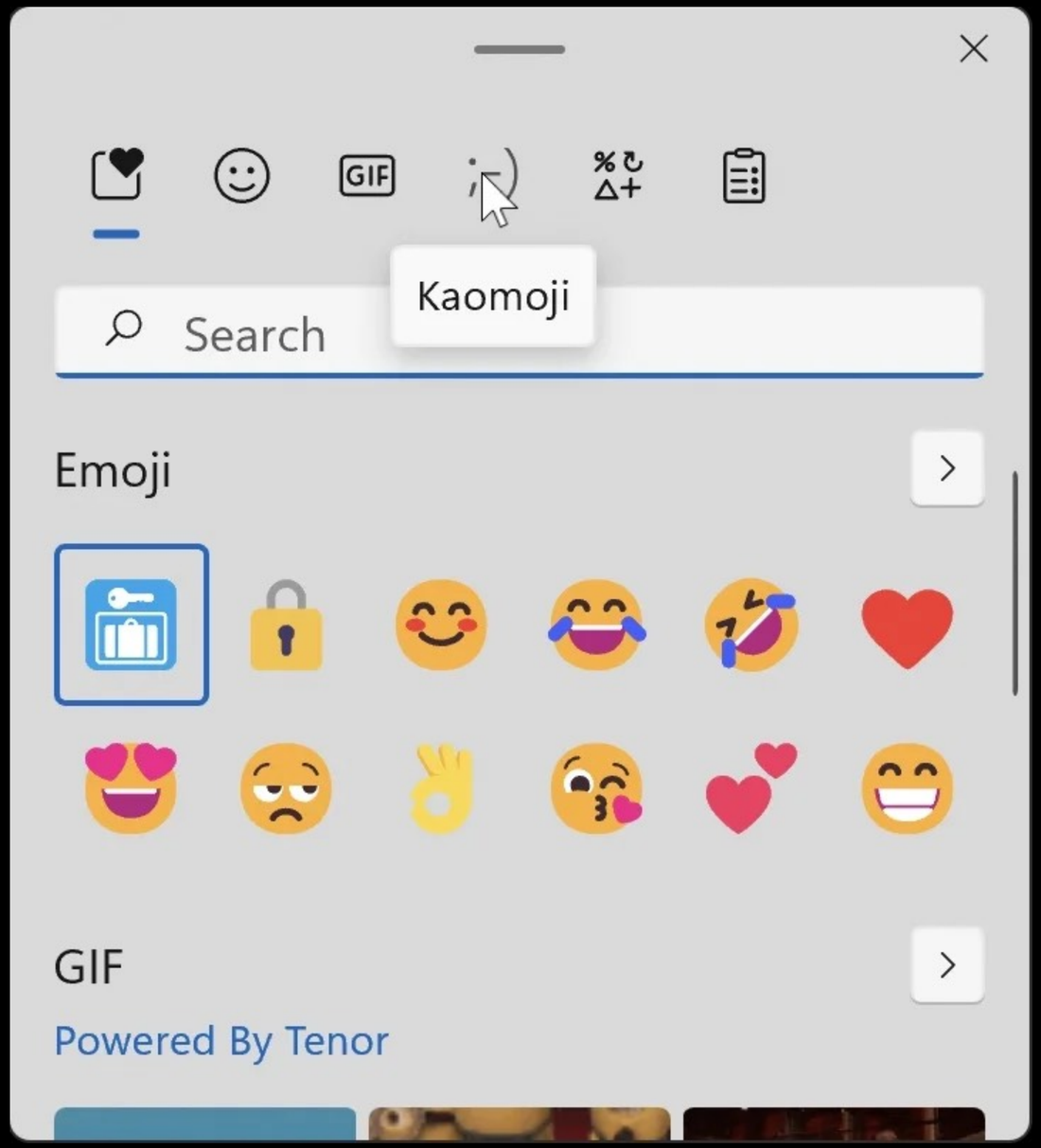


You *still* only see 5 lines at a time, & you cannot resize the window!

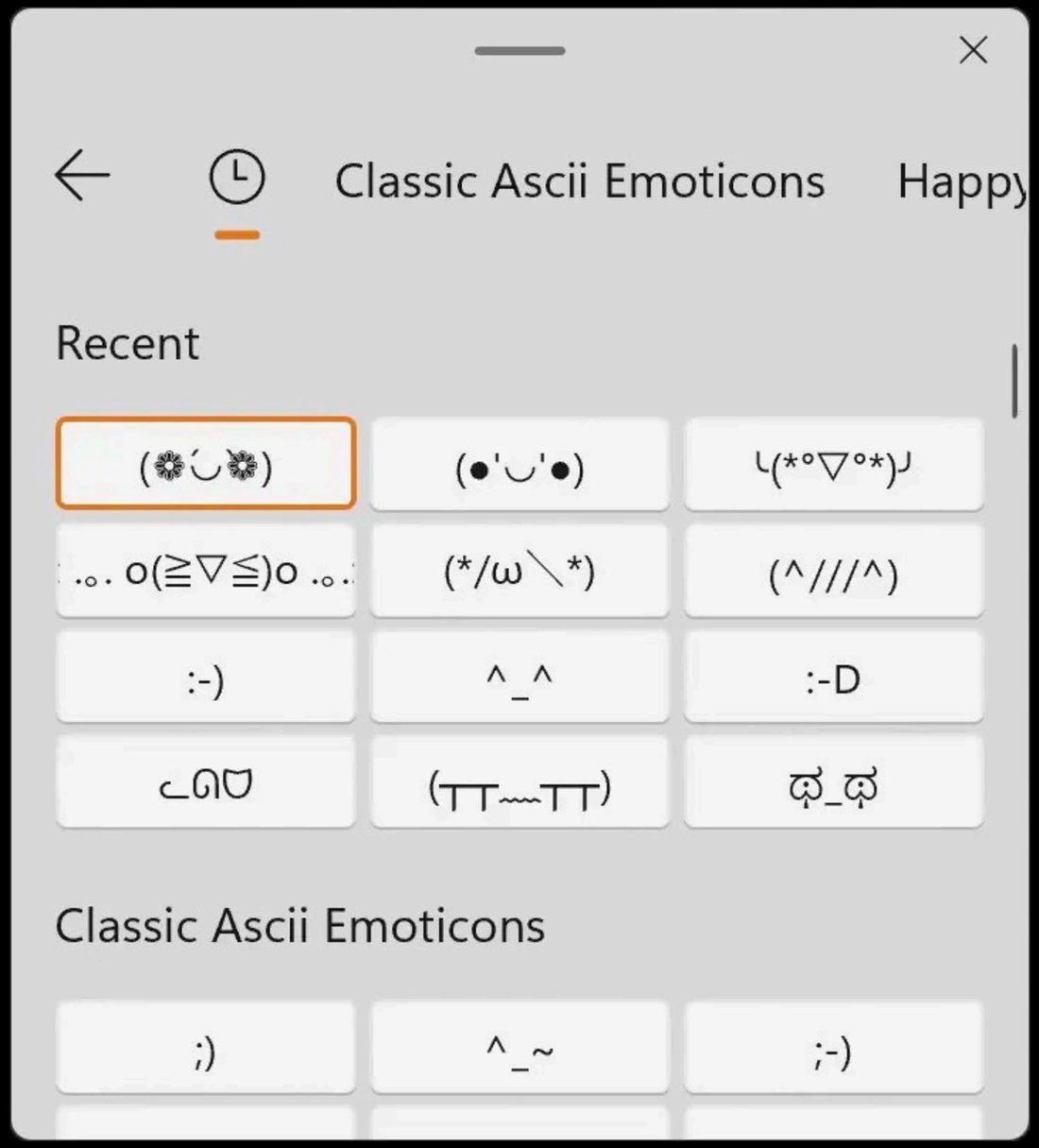
(Not to mention that they are ugggggggggly)



Great — we can search for crappy GIFs



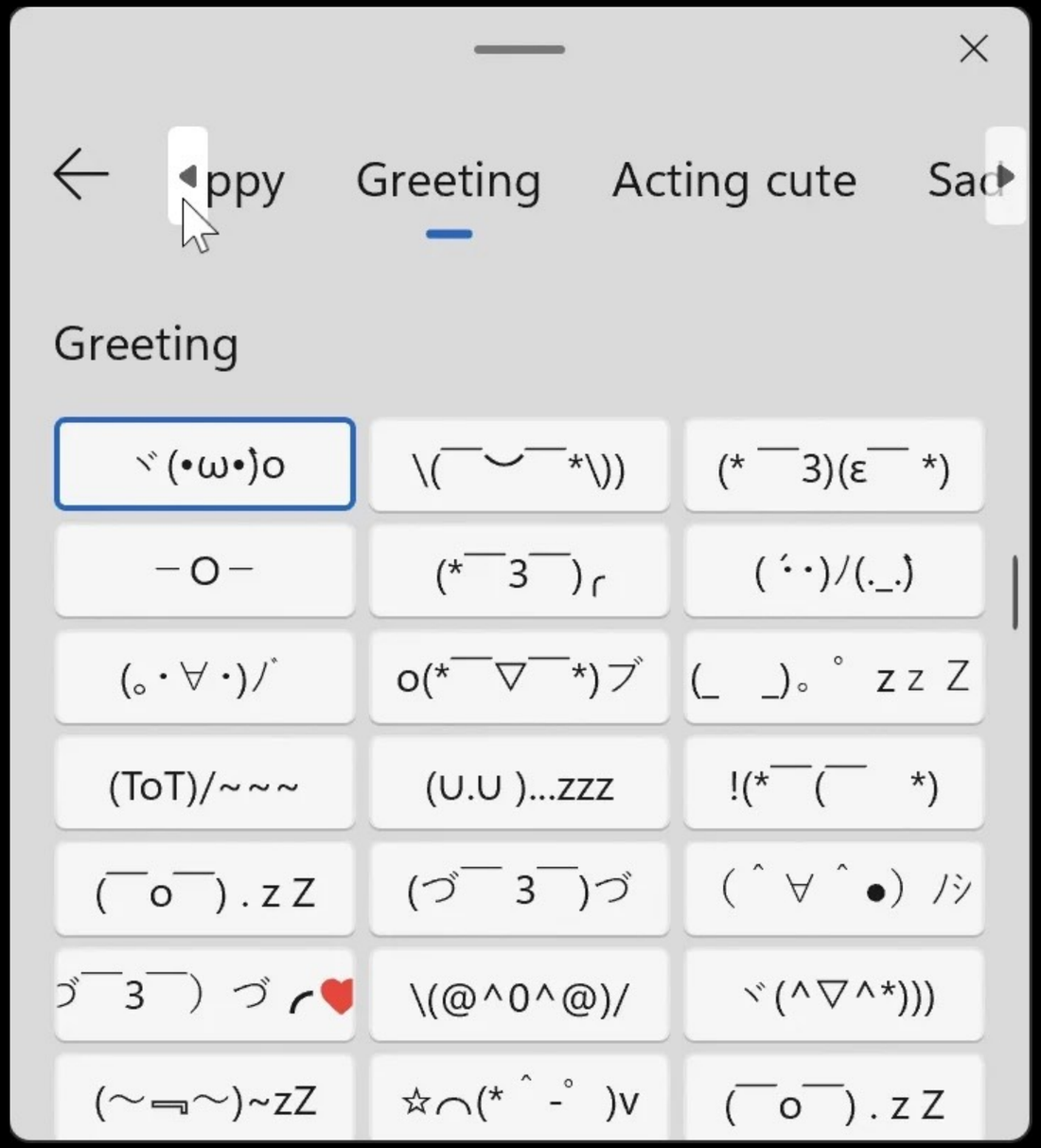
It’s labeled as Kaomoji…



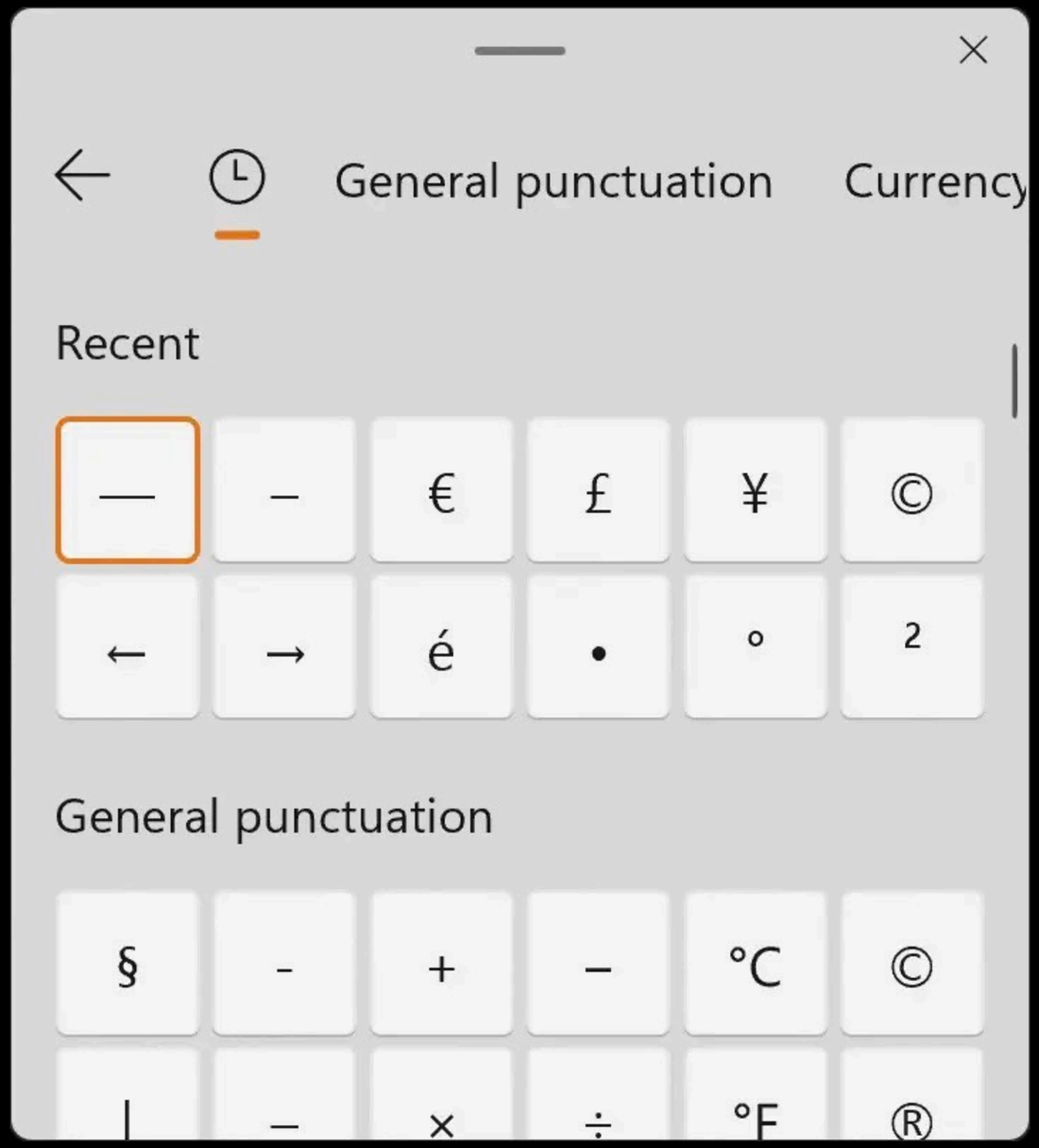
...but on the actual screen Windows refer to them as "Ascii Emoticons"

Kaomoji are a specific type of emoticon, but nowhere else on this screen is the word *kaomoji* ever used

And it's ASCII, not Ascii!



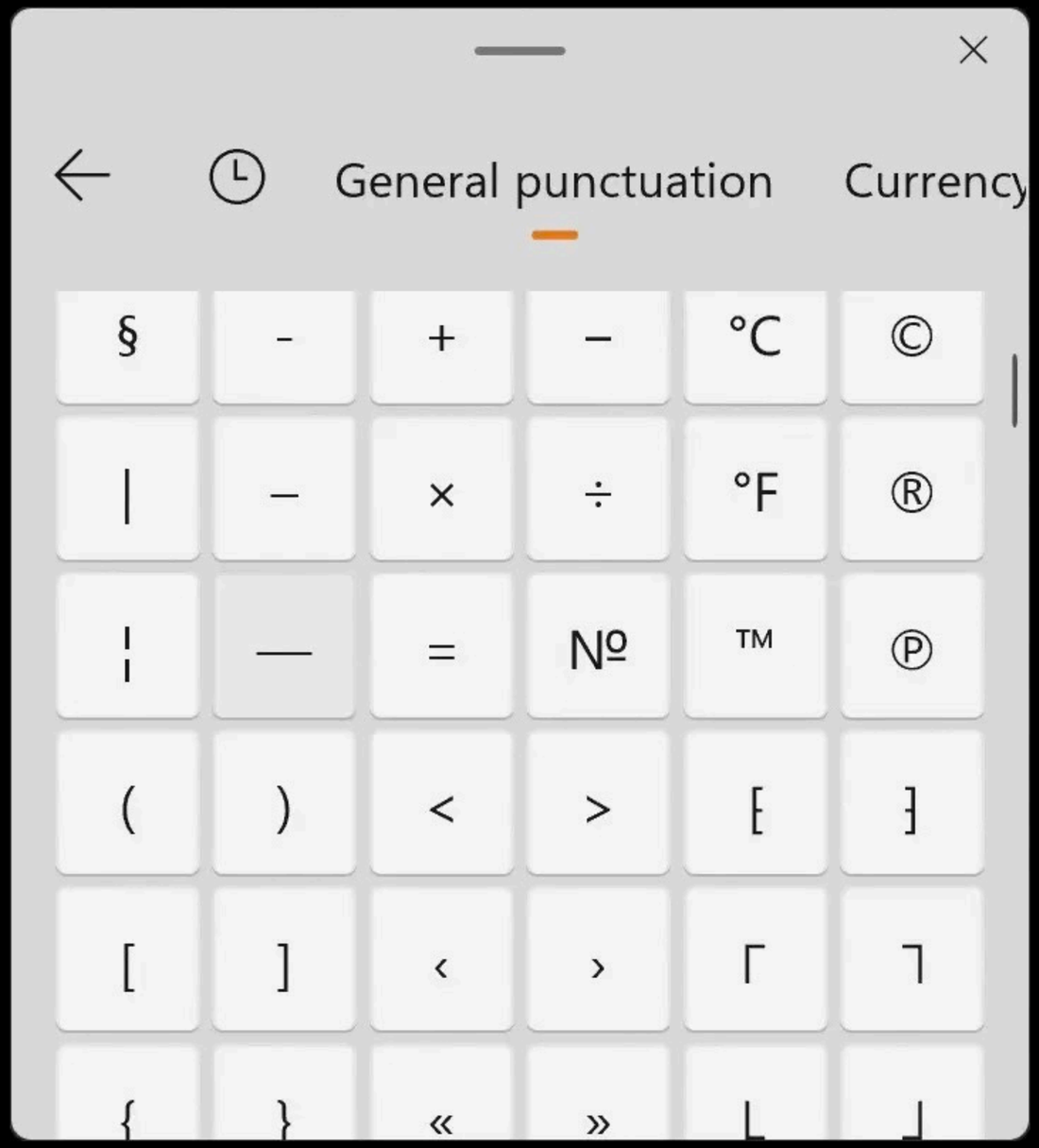
You have to horizontally scroll to see the groups?!?



What about Symbols?

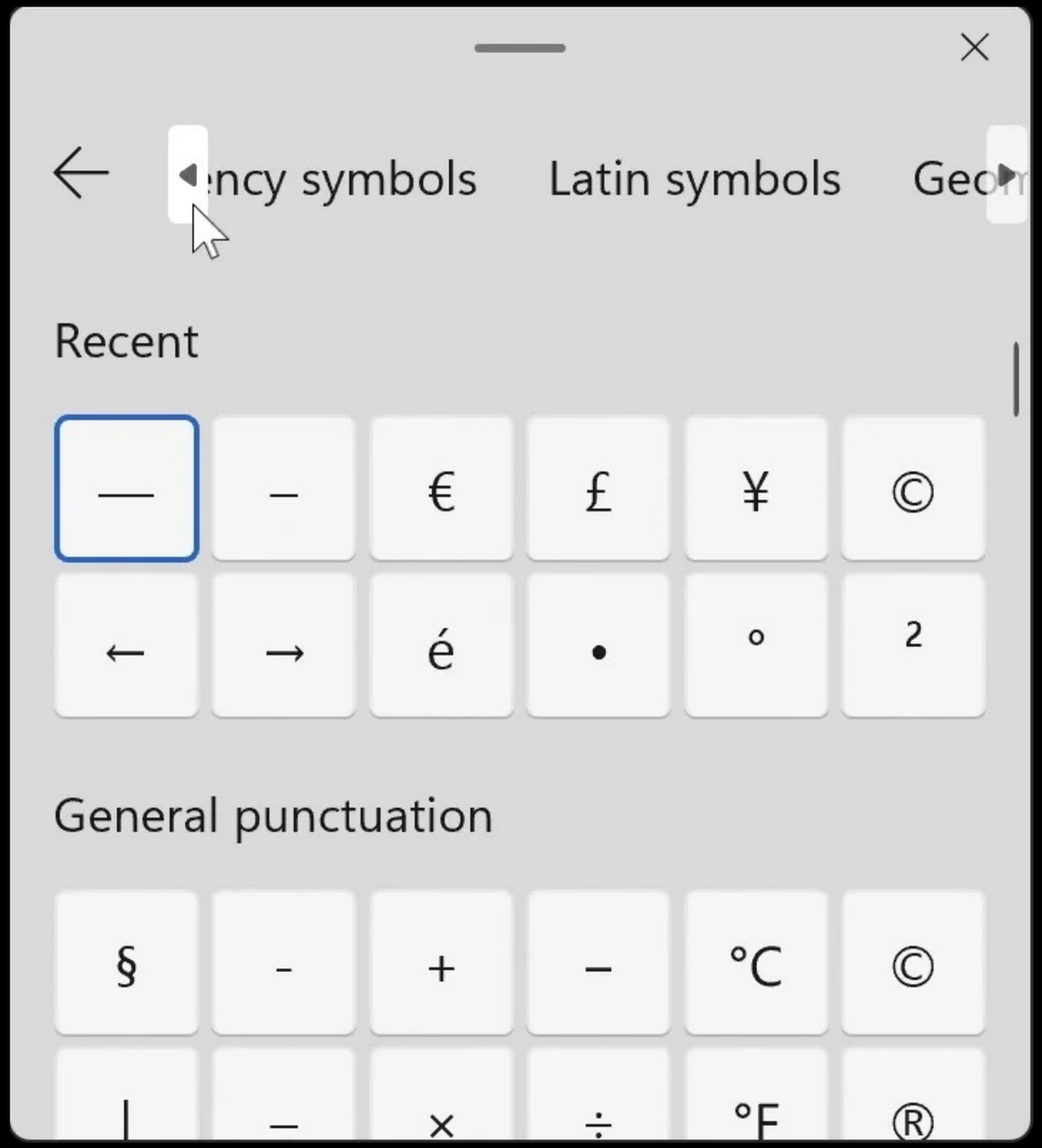
There are thousands of symbols on this screen

No search! Useless!

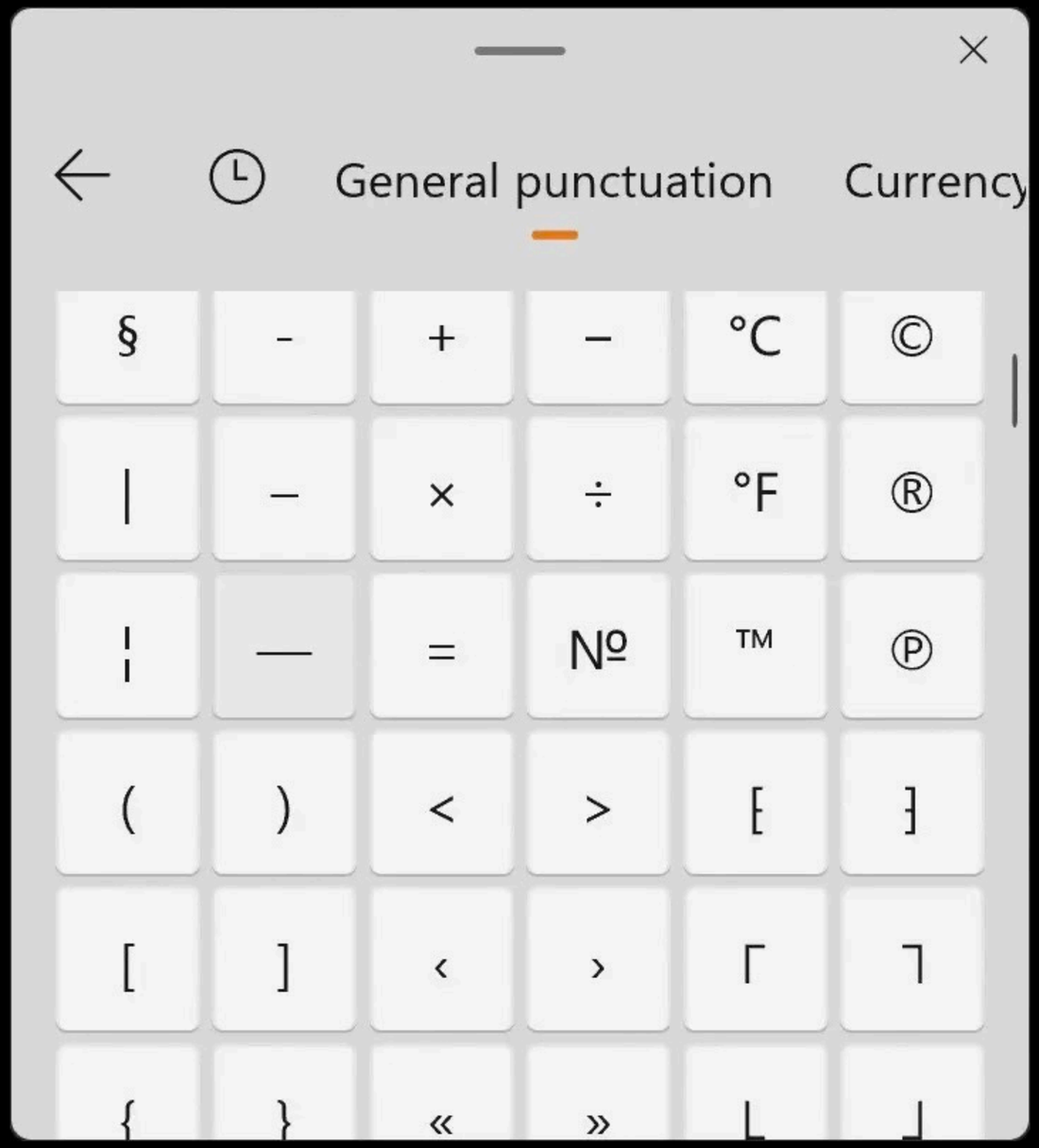


It’s so helpful to let us see 6 (kind of) lines at a time to get through those 1000s of symbols

And remember — you cannot resize the window 😡

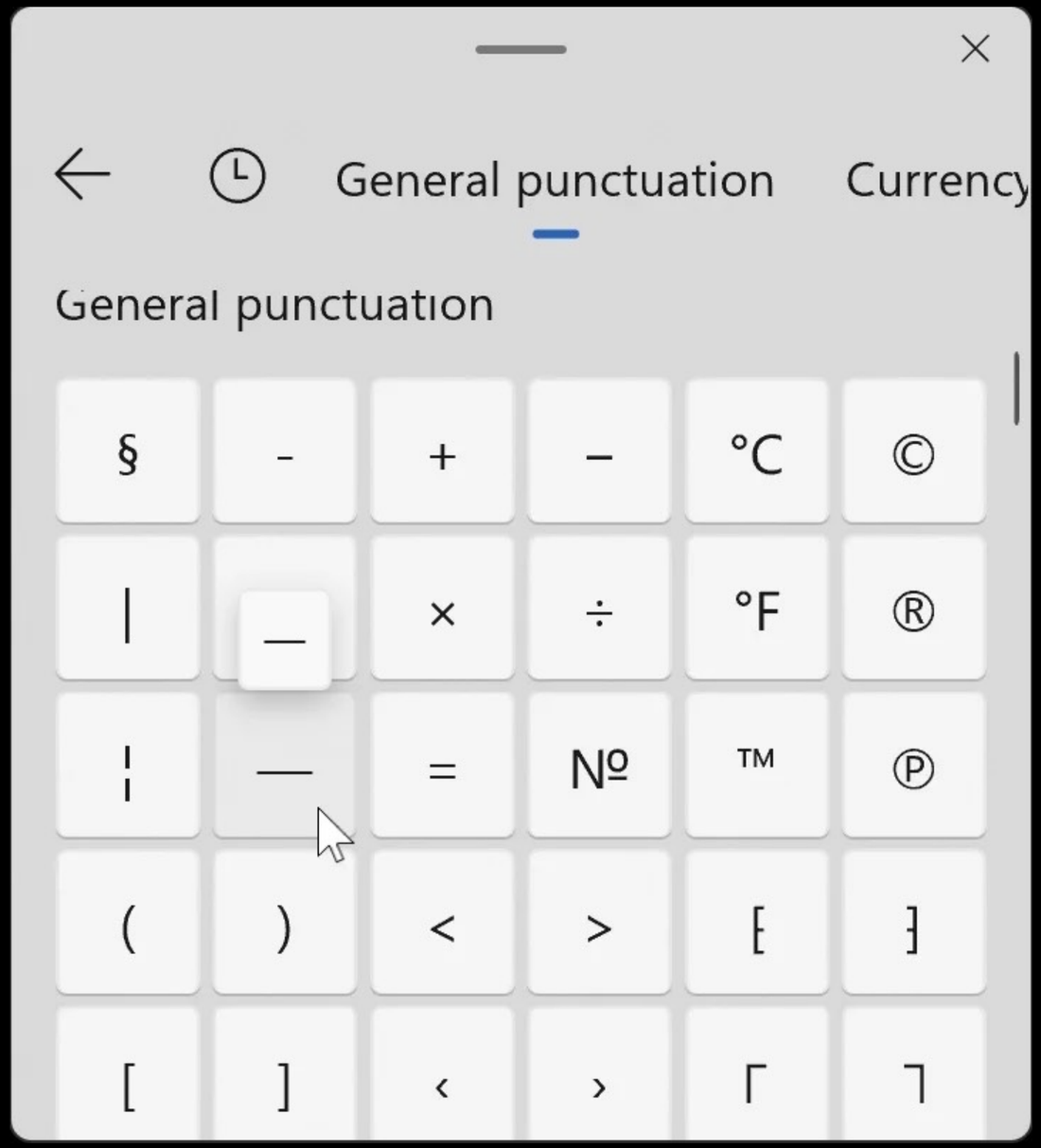


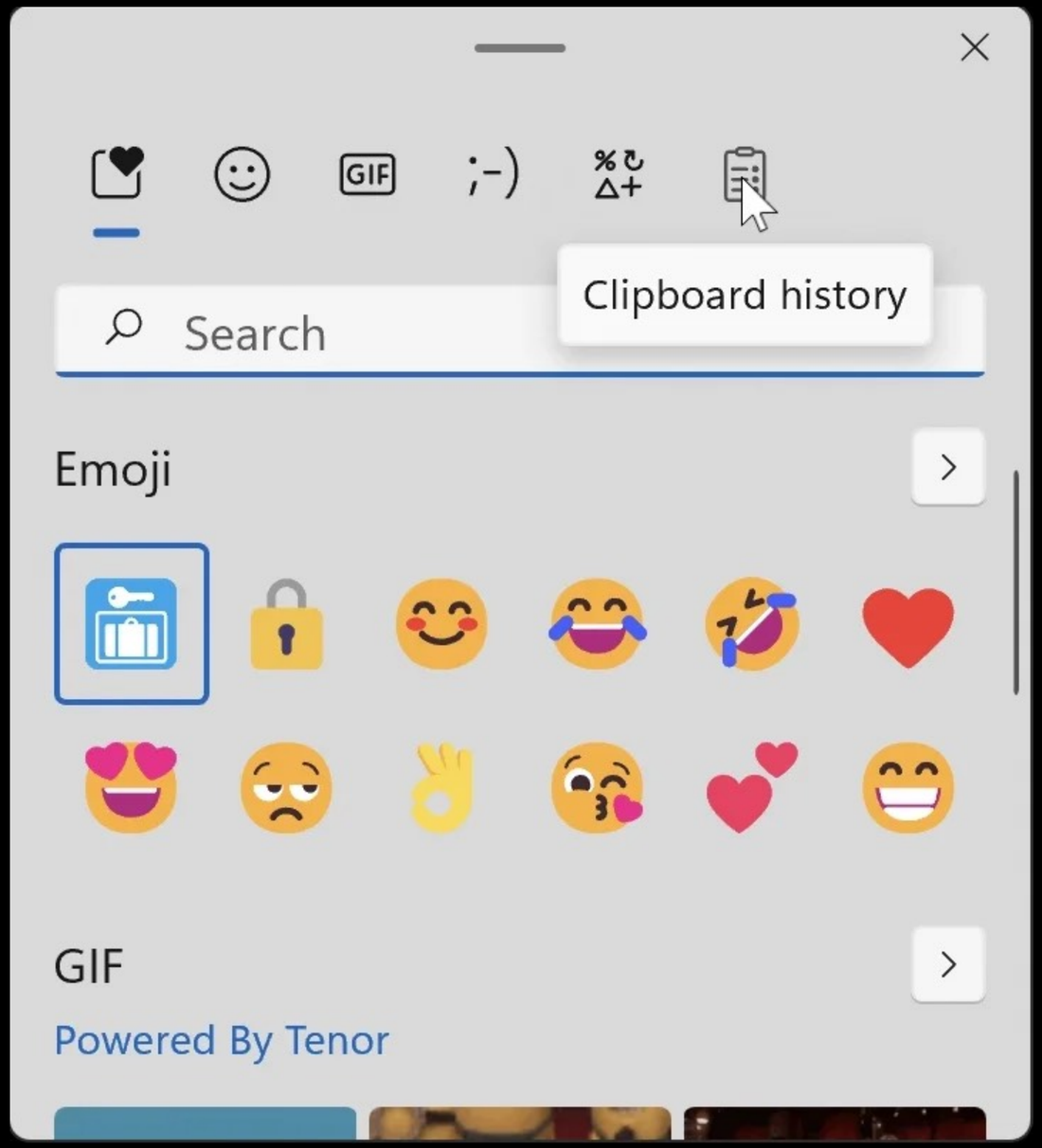
We do get the stupid horizontal scrolling thing at the top though



What if you want to learn the name of a symbol? Or learn the number you need to type it out on the number keypad?

Just hover over the symbol, right? Right?


General punctuation
Currency
General punctuation
§ - + – °C ©
| _ × ÷ °F ®
¦ — = № ™ ℗
( ) < > ⁅ ⁆
[ ] ‹ › ⌈ ⌉



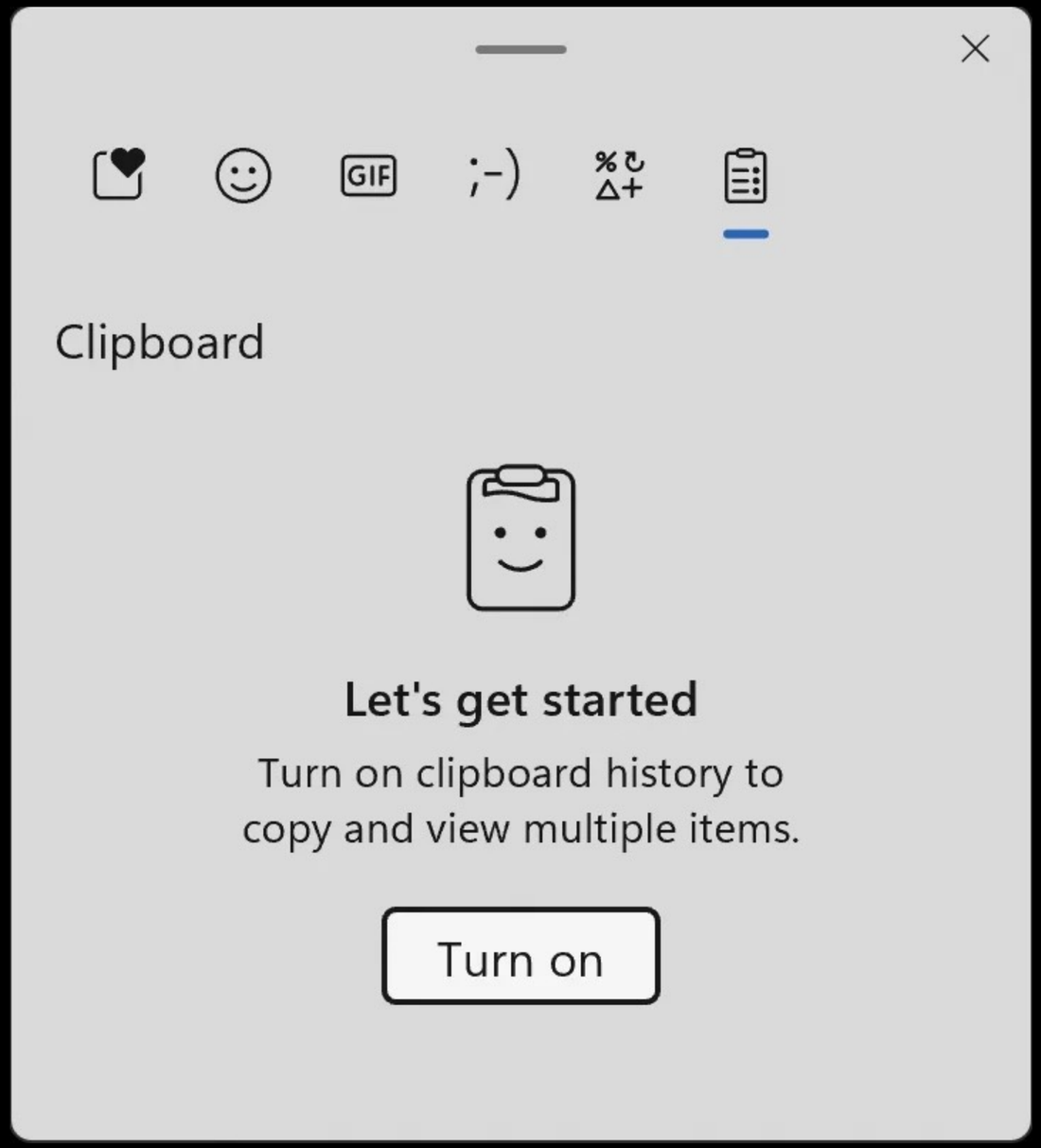
Oh, a clipboard manager!
Those are great!

✏️ SIDE NOTE

What's a *clipboard manager*?

It saves everything you cut or copy for a period of time (e.g., 1 week or 1 month), so you can recall anything to paste it

Once you start using one, you won't know how you lived without it before



Do not enable this

It is awful

There are much better 3rd-party clipboard managers that don’t suck like this one

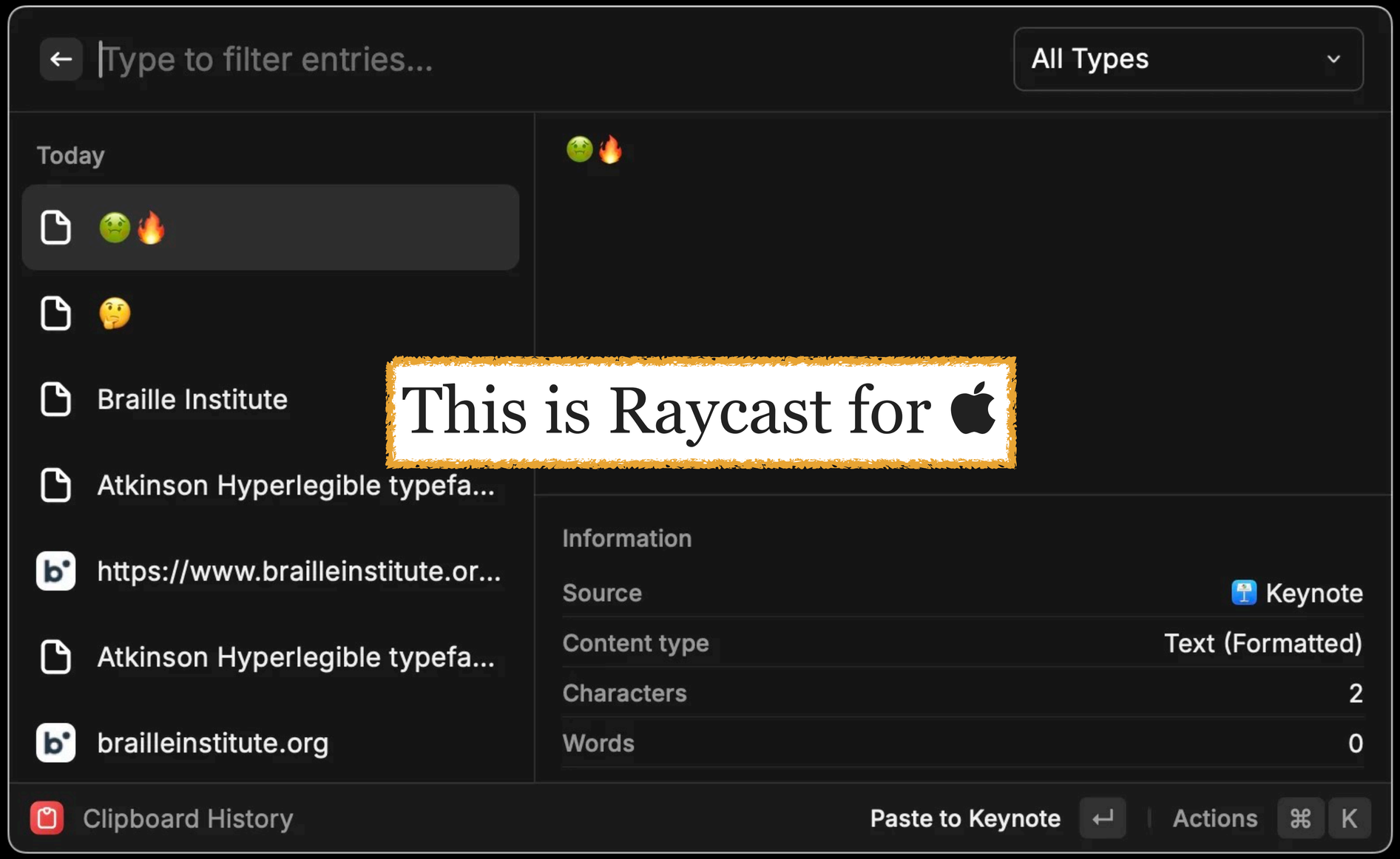
✏️ SIDE NOTE

There are many good clipboard managers

: Raycast ($0) or Alfred ($42)

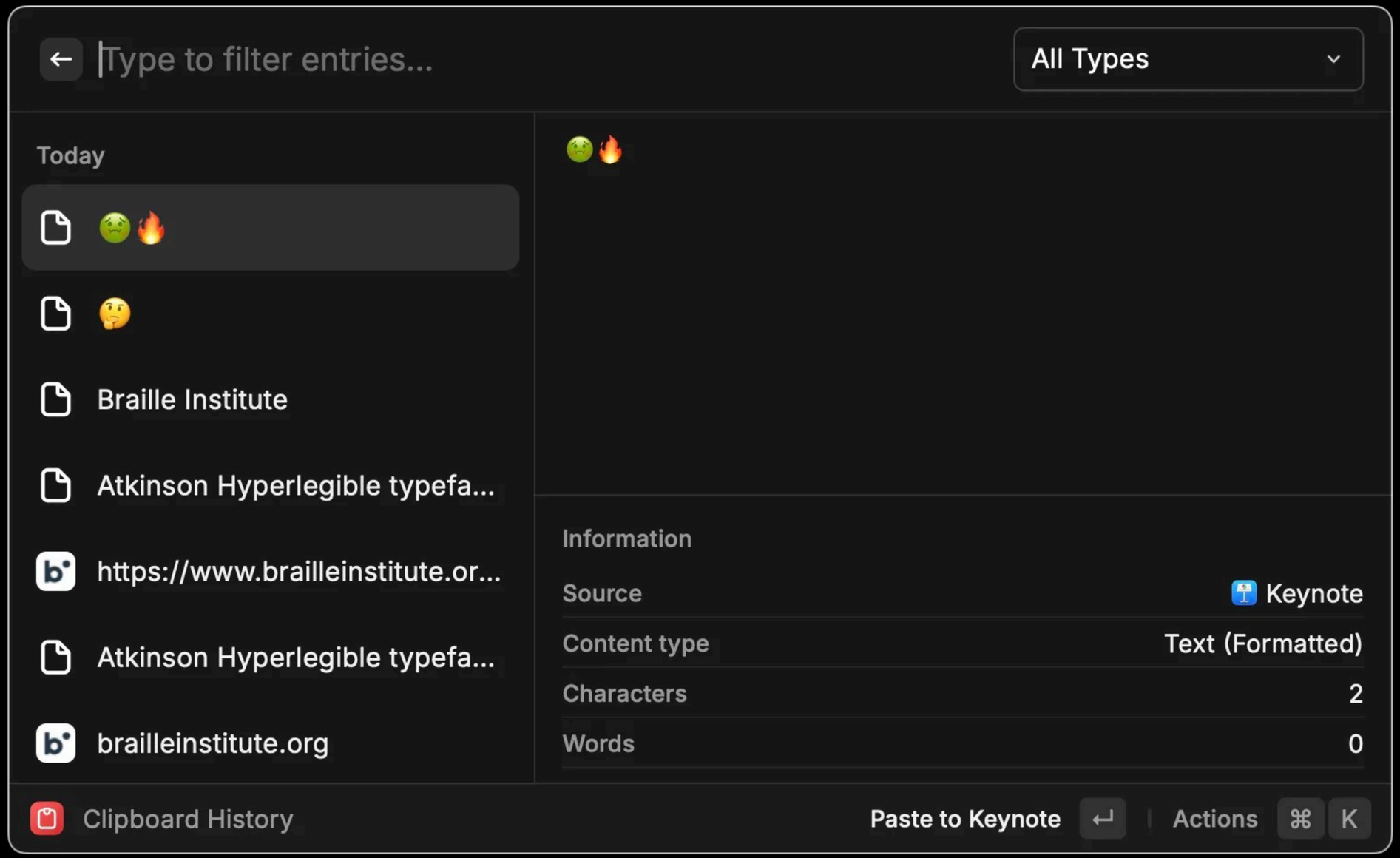
⊞: Clipboard Fusion ($0)

✏️ SIDE NOTE



This is Raycast for

✏️ SIDE NOTE


Type to filter entries...
All Types
Today
🤢🔥
🤔
Braille Institute
Atkinson Hyperlegible typefa...
https://www.brailleinstitute.or...
Atkinson Hyperlegible typefa...
brailleinstitute.org
🤢🔥
Information
Source
Keynote
Content type
Text (Formatted)
Characters
2
Words
0
Clipboard History
Paste to Keynote
Actions
⌘
K

✏️ SIDE NOTE

braille

All Types

Today

- Braille Institute
- Atkinson Hyperlegible typefa...
- https://www.brailleinstitute.or...
- Atkinson Hyperlegible typefa...
- brailleinstitute.org

Braille Institute®

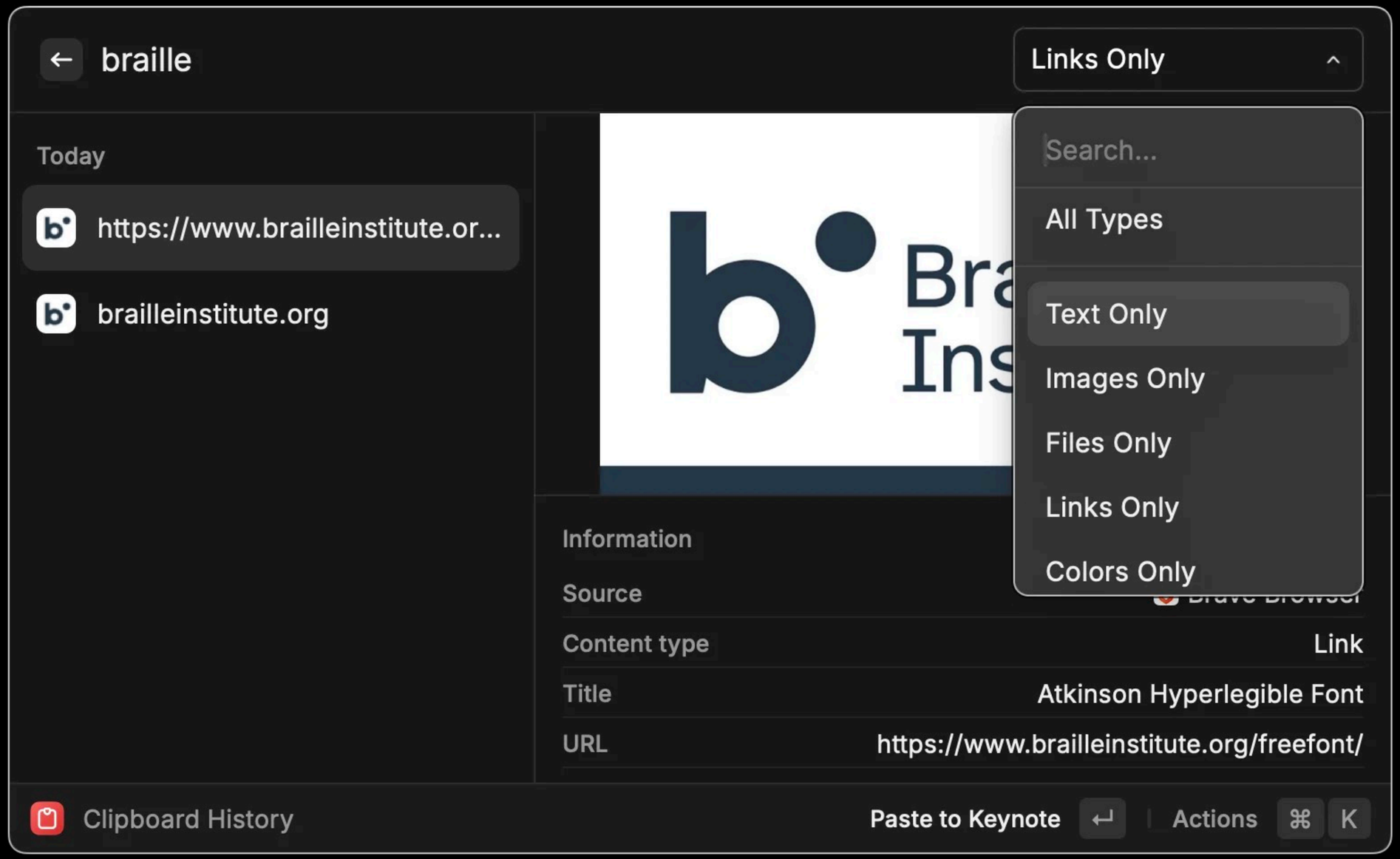
Information

Source	Brave Browser
Content type	Link
Title	Atkinson Hyperlegible Font
URL	https://www.brailleinstitute.org/freefont/

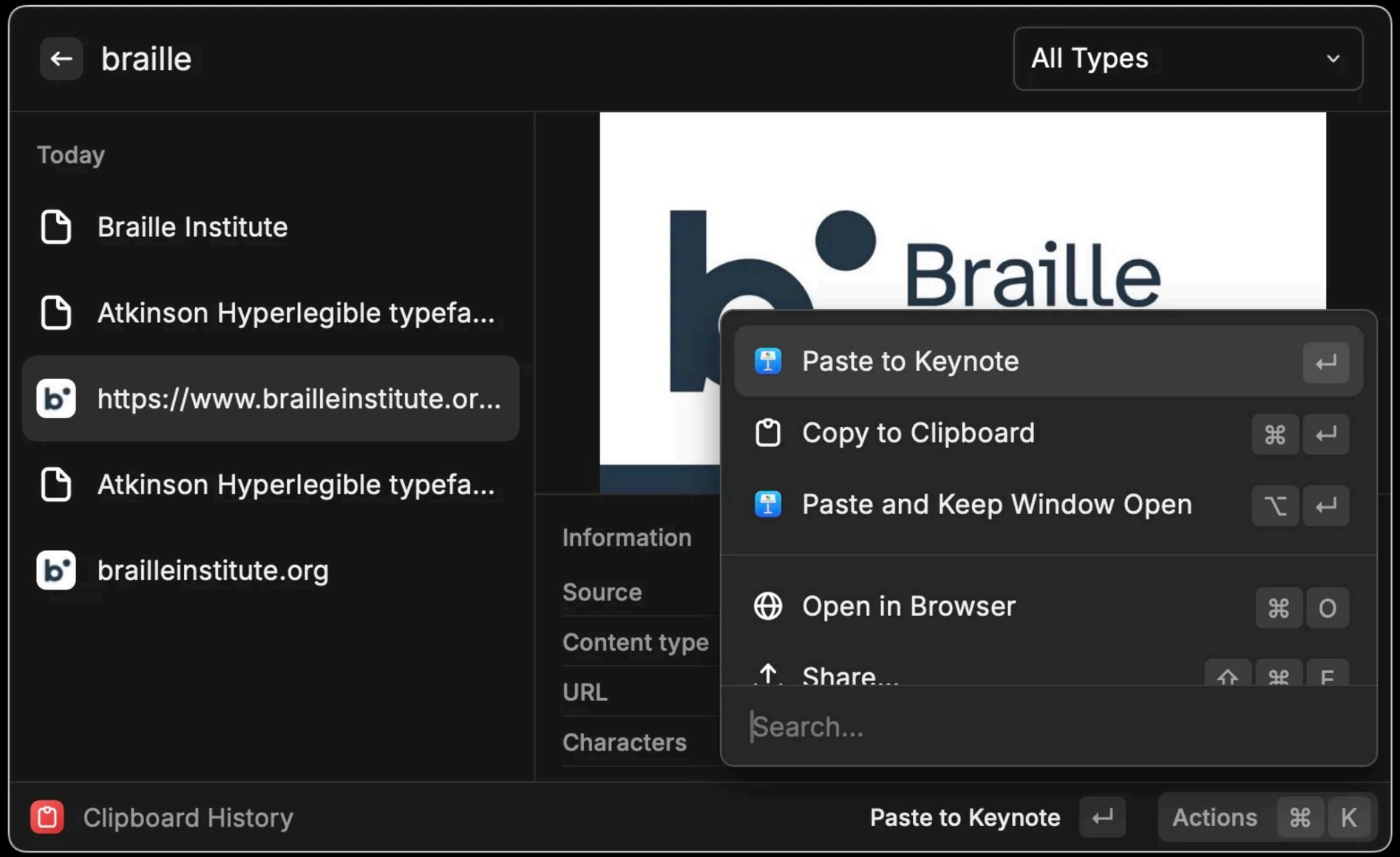
Clipboard History

Paste to Keynote ↵ | Actions ⌘ K

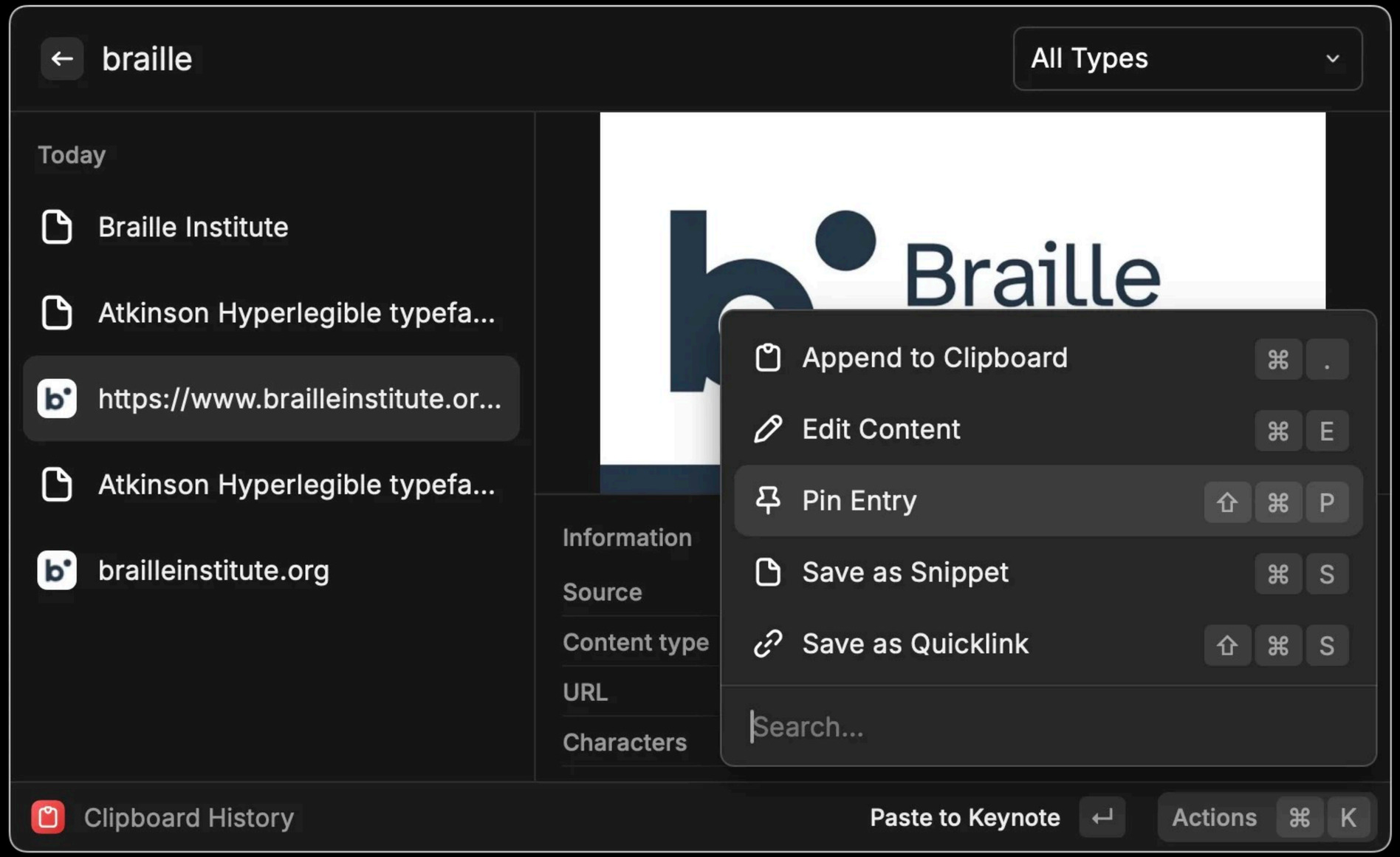
✏️ SIDE NOTE

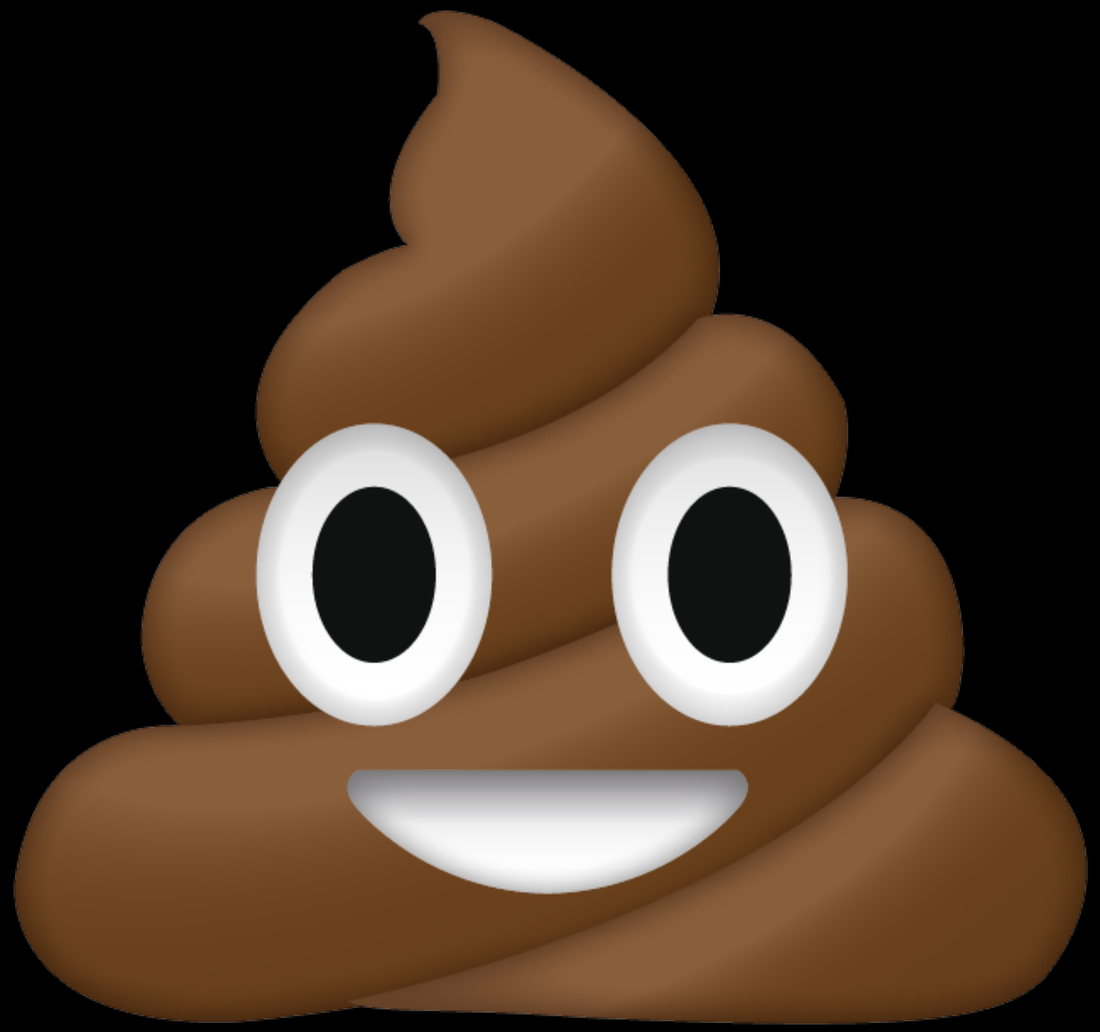

braille
Links Only
Today
https://www.brailleinstitute.or...
brailleinstitute.org
Search...
All Types
Text Only
Images Only
Files Only
Links Only
Colors Only
Information
Source
Content type
Link
Title
Atkinson Hyperlegible Font
URL
https://www.brailleinstitute.org/freefont/
Clipboard History
Paste to Keynote
Actions
⌘
K

✏️ SIDE NOTE

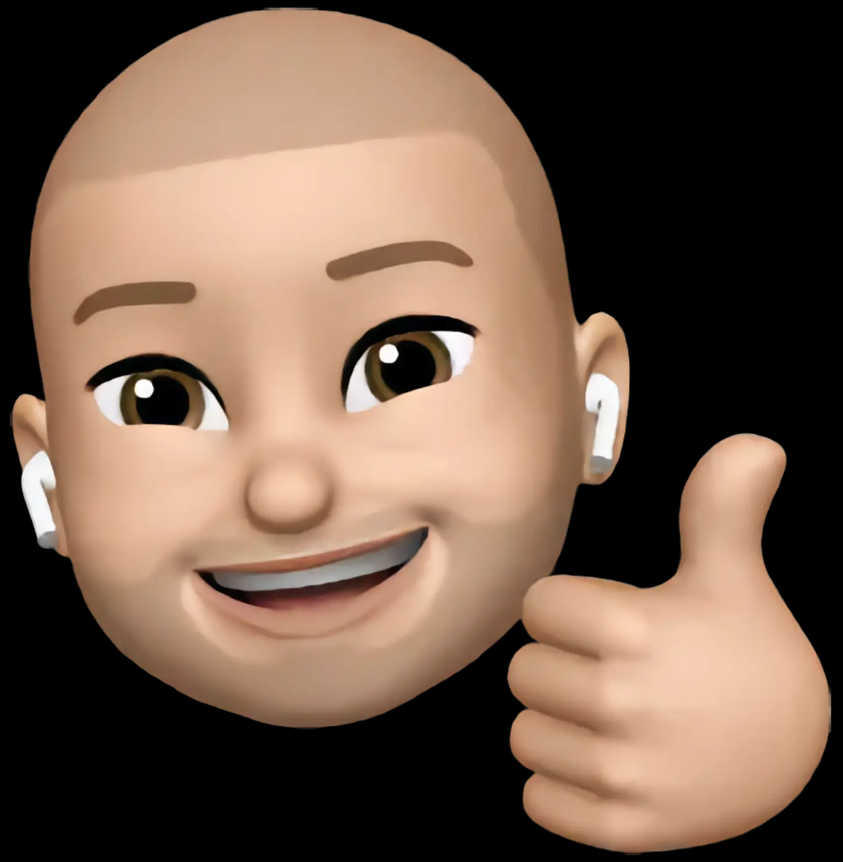

braille
All Types
Today
Braille Institute
Atkinson Hyperlegible typefa...
https://www.brailleinstitute.or...
Atkinson Hyperlegible typefa...
brailleinstitute.org
Braille
Information
Source
Content type
URL
Characters
Paste to Keynote
Copy to Clipboard
Paste and Keep Window Open
Open in Browser
Share...
Search...
Clipboard History
Paste to Keynote
Actions

✏️ SIDE NOTE


braille
All Types
Today
Braille Institute
Atkinson Hyperlegible typefa...
https://www.brailleinstitute.or...
Atkinson Hyperlegible typefa...
brailleinstitute.org
Braille
Information
Source
Content type
URL
Characters
Append to Clipboard ⌘ .
Edit Content ⌘ E
Pin Entry ⇧ ⌘ P
Save as Snippet ⌘ S
Save as Quicklink ⇧ ⌘ S
Search...
Clipboard History
Paste to Keynote ↵
Actions ⌘ K



Windows 10 AND Windows 11 Emoji Pickers



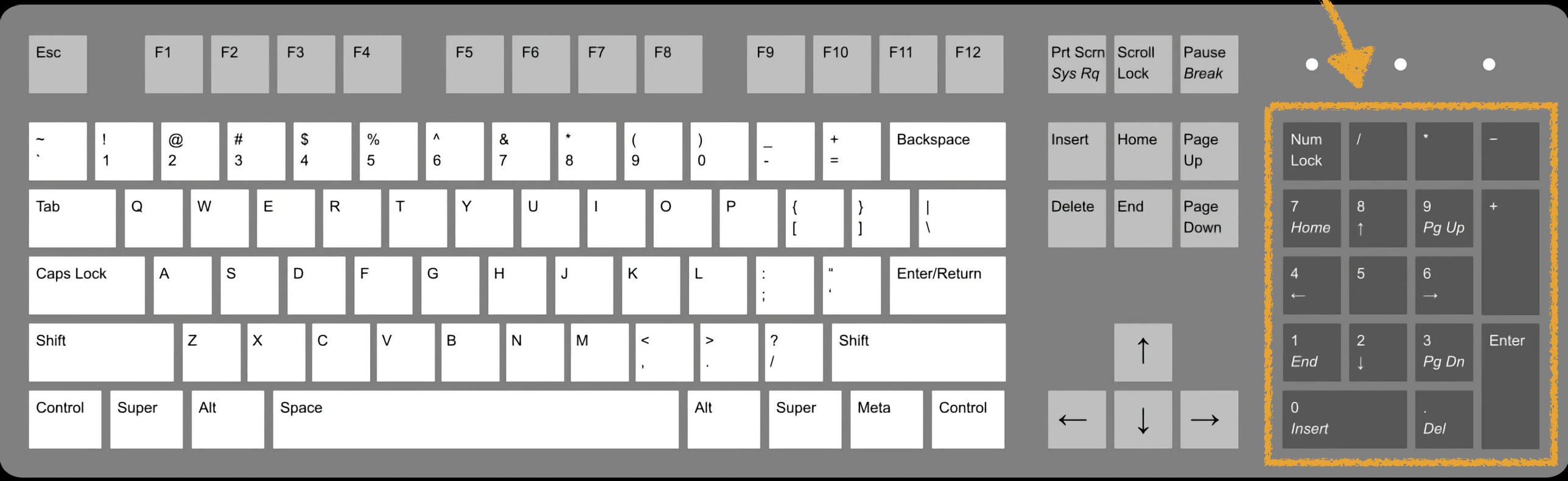
But hey, there’s always Windows 12, amirite?

(Sigh.)

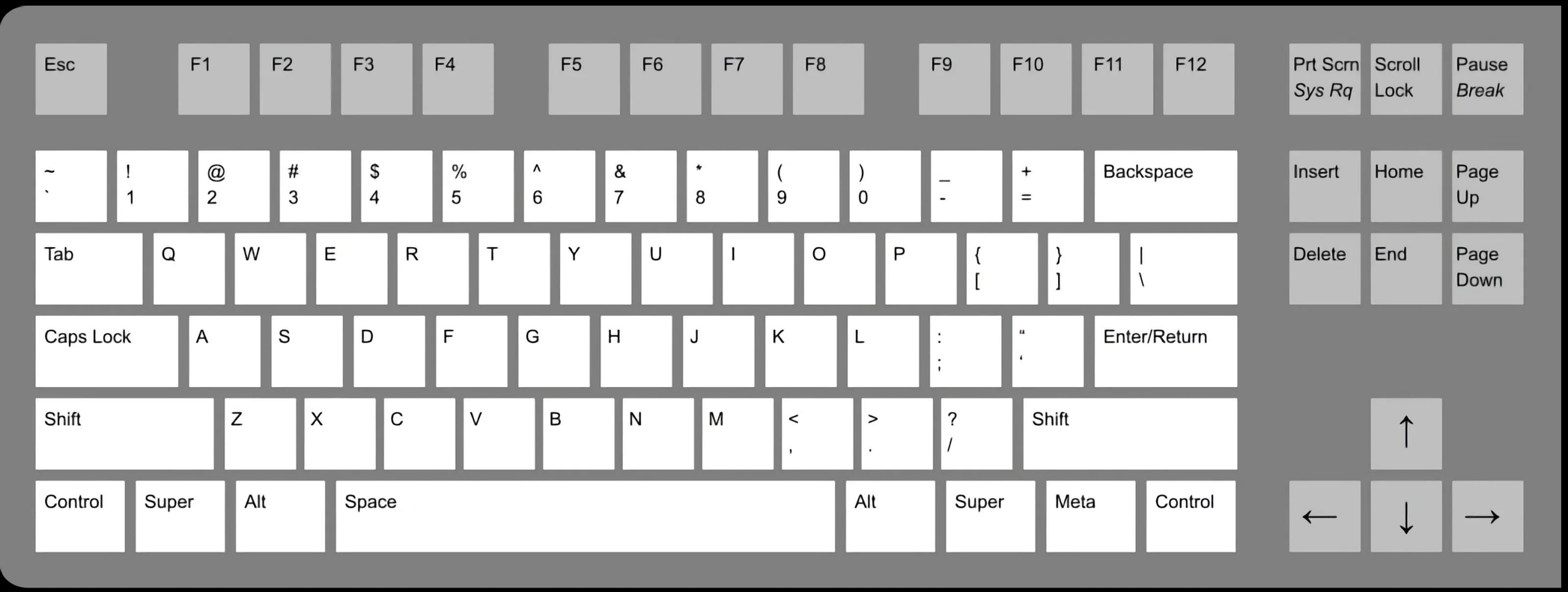
©	⌥G	Alt+0169
—	⌥⇧-	Alt+0151
é	⌥e, e	Alt+0233
€	⌥⇧2	Alt+0128
…	⌥;	Alt+0133

Windows key codes require a numeric keypad or you *must* use Character Map

Numeric keypad



You must use a keyboard like this to enter key codes



You *cannot* use a keyboard like this to enter key codes

Even with UTF-8, you *must* use these 3 character references

`<`	<
`&`	& (only if it's ambiguous)
` `	[non-breaking space]

Just type in all other characters (or use Character Viewer or ⊞ Character Map/Emoji Picker)

✏️ SIDE NOTE

Use hyphens & dashes correctly

✏️ SIDE NOTE

Hyphen	-	Join words	Kareem Abdul-Jabbar Jay-Z 3-hour tour
En dash	–	Range	June–August 7–9 p.m.
Em dash	—	Parenthetical Inverted colon Interruption	Oh no—he thought—it's her! Beer & brats—a great breakfast. I lo—no, I'll say it later.
Minus	–	Math	$i^2 = -1$

✏️ SIDE NOTE

-- or --- is *not* an en or em dash!

"Those who don't know better might use two successive hyphens to indicate an em dash-like interruption. In her book, *Type Rules!*, Ilene Strizver describes this as a 'typographically incorrect and downright ugly practice.'" —Kate Mooney

✏️ SIDE NOTE

Hyphen	-	-	-
En dash	–	: ⌥- ⊞: Alt+0150	`–`
Em dash	—	: ⇧⌥- ⊞: Alt+0151	`—`
Minus	−	: ^⌘␣ & search for “minus” ⊞: (Really, just use a hyphen)	`−`

Grouping

<hr>

<blockquote>

<main>

`<hr>`

Horizontal rule

HTML5: indicates “paragraph-level thematic break” between topics & scenes

HTML

```html
<p>
  I had but little notion of how the thought-impressions would, if successfully conveyed, arouse an intelligent response in my brain; but I felt certain that I could detect and interpret them. Accordingly I continued my experiments, though informing no one of their nature.
</p>
<hr>
<p>
  It was on the twenty-first of February, 1901, that the thing finally occurred. As I look back across the years I realise how unreal it seems; and sometimes half wonder if old Dr. Fenton was not right when he charged it all to my excited imagination.
</p>
<p>
  From H. P. Lovecraft's "Beyond the Wall of Sleep"
</p>
```

CSS

JS

I had but little notion of how the thought-impressions would, if successfully conveyed, arouse an intelligent response in my brain; but I felt certain that I could detect and interpret them. Accordingly I continued my experiments, though informing no one of their nature.

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From H. P. Lovecraft's "Beyond the Wall of Sleep"

Use `<hr>` sparingly, as they are very “heavy” on the page

You often do not need `<hr>` & can instead use:

- `<h2>`, `<h3>`, & `<h4>`
- CSS `border` property, which gives more control over thickness, color, & style (e.g., —, •••, ---)

`<blockquote>` … `</blockquote>`

For *long or multi-paragraph quotations from another source*

Browser styles increase margin equally on the right & left

You do not have to use `<p>`, but it's good practice to always do so

HTML

```html
<p>
  H.P. Lovecraft describes an eerie landscape that appears overnight in “Dagon”, found in his <i>Collected Short Stories</i>:
</p>

<blockquote>
  <p>↔</p>
  <p>↔</p>
</blockquote>

<p>
  This description comports with the central story of Lovecraft’s Cthulhu Mythos, detailed in the 1928 story “The Call of Cthulhu”, describing how “The great stone city R’lyeh, with its monoliths and sepulchers, had sunk beneath the waves; and the deep waters”.
</p>
```

CSS (SCSS)

JS

H.P. Lovecraft describes an eerie landscape that appears overnight in “Dagon”, found in his *Collected Short Stories*:

> Through some unprecedented volcanic upheaval, a portion of the ocean floor must have been thrown to the surface, exposing regions which for innumerable millions of years had lain hidden under unfathomable watery depths. …
>
> For several hours I sat thinking or brooding in the boat, which lay upon its side and afforded a slight shade as the sun moved across the heavens. As the day progressed, the ground lost some of its stickiness, and seemed likely to dry sufficiently for travelling purposes in a short time.

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  <p>↔</p>
  <p>↔</p>
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```

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>
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This description comports with the central story of Lovecraft’s Cthulhu M
Cthulhu”,
monoliths
deep water

By putting in a background color, you can see the margins

Designers can really have fun styling `<blockquote>`

> It may have been only imagination and it may have been only echoes which induced one of the men, an excitable Spaniard, to fancy he heard antiphonal responses to the ritual from some far and unillumined spot deeper within the wood of ancient legendry and horror. This man, *Joseph D. Galvez*, I later met and questioned; and he proved distractingly imaginative.

HTML

```
consectetur adipisicing elit.
Amet neque hic, incidunt
mollitia. Eius autem, asperiores
velit, quaerat blanditiis
ratione.</p>
  <blockquote cite="Tim Berners-
Lee">The Semantic Web is not a
separate Web but an extension of
the current one, in which
information is given well-defined
meaning, better enabling
computers and people to work in
cooperation.</blockquote>
  <p>Lorem ipsum dolor sit amet,
consectetur adipisicing elit.
Numquam quam, dignissimos
voluptas, vel provident delectus
blanditiis assumenda sunt
tenetur, cupiditate adipisci
```

CSS

JS

adipisicing elit. Amet neque hic, incidunt mollitia. Eius autem, asperiores velit, quaerat blanditiis ratione.

> The Semantic Web is not a separate Web but an extension of the current one, in which information is given well-defined meaning, better enabling computers and people to work in cooperation.
>
> —Tim Berners-Lee

Lorem ipsum dolor sit amet, consectetur adipisicing elit. Numquam quam, dignissimos voluptas, vel provident delectus blanditiis assumenda sunt tenetur, cupiditate adipisci tempora beatae quibusdam quisquam nemo

HTML

```html
<blockquote>
  Creativity is just connecting things. When you ask creative people how they did something, they feel a little guilty because they didn't really do it, they just saw something. It seemed obvious to them after a while. That's because they were able to connect experiences they've had and synthesize new things.
  <span>Steve Jobs</span>
</blockquote>
```

CSS

JS

> *Creativity is just connecting things. When you ask creative people how they did something, they feel a little guilty because they didn't really do it, they just saw something. It seemed obvious to them after a while. That's because they were able to connect experiences they've had and synthesize new things.*
>
> *Steve Jobs*

HTML CSS JS Result

Love Thy Neighbor (on This Planet)

Throughout history thinkers and artists, from Pythagoras to Paul McCartney, were concerned not only by the way we treat each other, but also how we treat our fellow animals.

> *I have from an early age abjured the use of meat, and the time will come when men such as I will look upon the murder of animals as they now look upon the murder of men.*
>
> LEONARDO DA VINCI

We do not like to think about what we eat and where our food comes from.

And though we may hide the suffering behind thick walls of the slaughter-houses, but this won't make it disappear.

HTML

```html
<blockquote class="ofsted-excerpt">
  <p><span class="ofsted-excerpt__quote">&ldquo;</span>The College provides outstanding education and training and fulfils its mission to inspire learners to achieve success. Leadership and management are outstanding and are focused on ensuring that all learners fulfil their potential.</p>
  <cite><a href="#">From our latest Ofsted report</a></cite>
</blockquote>
```

CSS (SCSS)

JS

> “The College provides outstanding education and training and fulfils its mission to inspire learners to achieve success. Leadership and management are outstanding and are focused on ensuring that all learners fulfil their potential.

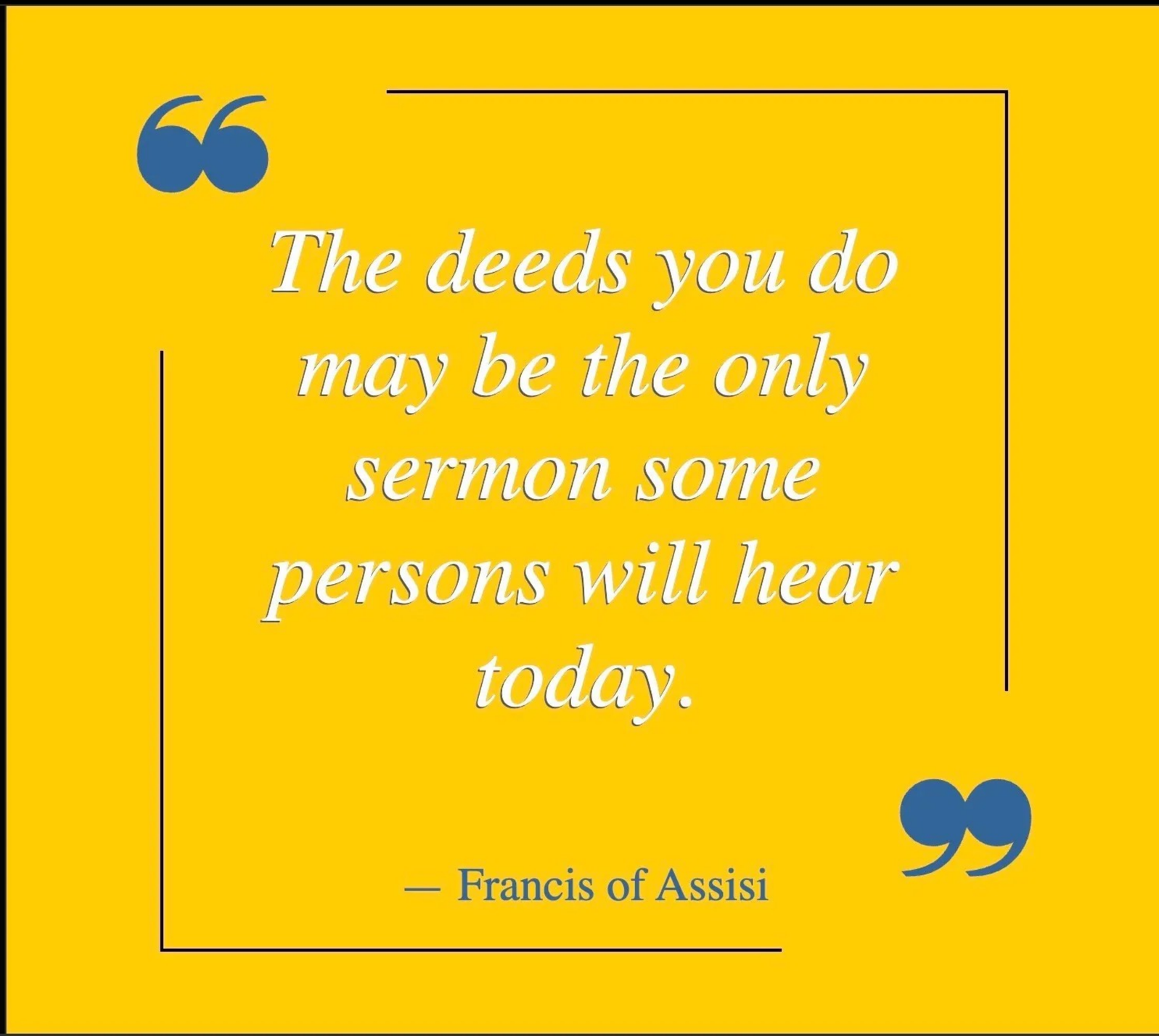
From our latest Ofsted report

HTML

```html
<div class="quote">
  <span class="left">“</span>
  <blockquote>
    The deeds you do may be the only sermon some persons will hear today.
  </blockquote>
  <small>Francis of Assisi</small>
  <span class="right">”</span>
</div>
```

CSS (SCSS)

JS



HTML

```html
<blockquote>
  &ldquo;Perhaps the greatest single gift she gave me was self-confidence. It's what I've looked for in and tried to build in every executive who has ever worked with me. Confidence gives you the courage and extends your reach. It let's you take greater risks and achieve far more than you ever thought possible. Building self-confidence in others is a huge part of leadership. It comes from providing opportunities and challenges for people to do things they never imagined they could do - rewarding them after each
```

CSS (SCSS)

JS

> “Perhaps the greatest single gift she gave me was self-confidence. It's what I've looked for in and tried to build in every executive who has ever worked with me. Confidence gives you the courage and extends your reach. It let's you take greater risks and achieve far more than you ever thought possible. Building self-confidence in others is a huge part of leadership. It comes from providing opportunities and challenges for people to do things they never imagined they could do - rewarding them after each success in every way possible.”

Jack Welch
Former General Electric CEO

HTML

```html
8       <blockquote class="speechbubble speechbubble--teal speechbubble--left">
9         <p class="speechbubble__quote">“Technology is nothing. What’s important is that you have a faith in people, that they’re basically good and smart, and if you give them tools, they’ll do wonderful things with them.”</p>
10        <footer>
11          <cite class="speechbubble__source">-Steve Jobs</cite>
12        </footer>
13      </blockquote>
```

CSS (SCSS)

JS

“Technology is nothing. What’s important is that you have a faith in people, that they’re basically good and smart, and if you give them tools, they’ll do wonderful things with them.”

–Steve Jobs

📦 FORMATTING GUIDE

How rendering engines display white space

The rule: *multiple white spaces in code are rendered as 1 space in the viewport*

Type 100 spaces? Browser shows 1 space

Type 100 tabs? Browser shows 1 space

Type 100 returns? Browser shows 1 space

`<main>` … `</main>`

Dominant contents of a webpage or app

`<main>` is not required by the specs, but you should always use it, if for accessibility alone (more on that later)

Should only appear once per page!

Should *not* include content repeated across webpages:

- `<nav>`
- `<header>`
- `<footer>`
- Sidebars in `<aside>` (maybe, maybe not)
- Logos
- Search forms (unless you are Kagi, DuckDuckGo, or Google!)

This is a big caveat: only parents allowed for `<main>` are `<body>` & `<div>`*

* Also custom elements & `<form>` in some special cases

```
<body>
  <header></header>
  <nav></nav>
  <main>
    <article>
      <header></header>
      <footer></footer>
    </article>
    <aside></aside>
  </main>
  <footer></footer>
</body>
```

					iOS		
`<main>`	–	12	21	7	7.1	26	4.4

David O'Brien
@se_davidobrien@mastodon.scot

Saying "No-one using our service has accessibility needs" is a bit like saying "We don't need a ramp, no-one in a wheelchair has ever come up the stairs".

#accessibility #A11y

Mar 14, 2025, 10:42 AM · · Web

47 boosts · **76** favorites

Attributes & Values

`<h1 align="center">` … `</h1>`

`h1` is an *tag name* (but many people call it an *element*)

`align` is an *attribute*

`center` is a *value*

`align="center"` is an *attribute-value pair*

We group attributes into these 3 categories

- Global
- Limited
- Custom

Global Attributes

Global attributes are attributes common to all elements (even those on which they have no effect!)

As of April 2021, there are 24 global attributes, *plus* 47 `aria-*` attributes for accessibility & 70 JavaScript event handlers

Let’s look at two of the simpler global attributes now

The rest will have info about them in the *Bonus* section at the end of these slides, or will be covered in other presentations

`class=""`

Assign *CSS class(es)* to the element

Covered later when we get to CSS

Note: also used with JavaScript

```
title=""
```

Advisory or descriptive information about the element, e.g.:

» Description of link
» Credits for image
» Footnote
» Information about author

Usually displayed as a tooltip

HTML

```html
<figure title="One of my favorite pictures of Libby as a puppy">
  <img src="https://s3-us-west-2.amazonaws.com/s.cdpn.io/122116/Libby.nov98.jpg" width="500" height="363" alt="Libby at 8 weeks old">
  <figcaption>Source: <a href="http://granneman.com" title="Taken by Scott Granneman">Scott Granneman</a></figcaption>
</figure>
```

CSS

JS

Source: Scott Granneman

Browser support is problematic!

No default visual indicator that they're available

Tooltips render with small, bad fonts & ugly boxes, & they are un-stylable with CSS so you can't fix them

Lack of consistency — default tooltips are displayed differently depending upon browser & operating system

Biggest problem is on mobile

By default, the `title` attribute doesn’t display anything on mobile devices, because there’s no hover!

💡 PRO TIP

As you will see, `title` *is* needed in a few cases for accessibility

More later when we get to *landmarks* in *Sectioning*

Limited Attributes

Limited attributes are assigned to specific elements

Each element can *only* use global attributes + the attributes assigned to the element in the specs

§ 4.4.5 The `ol` element

✓ MDN

✓ MDN

Categories:

Flow content.

If the element's children include at least one `li` element: Palpable content.

Contexts in which this element can be used:

Where flow content is expected.

Content model:

Zero or more `li` and script-supporting elements.

Tag omission in text/html:

Neither tag is omissible.

Content attributes:

Global attributes

`reversed` — Number the list backwards

`start` — Starting value of the list

`type` — Kind of list marker

`<ol>` supports global attributes + `reversed`, `start`, & `type`

Accessibility considerations:

For authors.

For implementers.

DOM interface:

IDL

```
[Exposed=Window]
interface HTMLOListElement : HTMLElement {
  [HTMLConstructor] constructor();
```

File an issue about the selected text

Content attributes:

Global attributes
`accept` — Hint for expected file type in file upload controls
`alt` — Replacement text for use when images are not available
`autocomplete` — Hint for form autofill feature
`checked` — Whether the control is checked
`dirname` — Name of form control to use for sending the element's directionality in form submission
`disabled` — Whether the form control is disabled
`form` — Associates the element with a `form` element
`formaction` — URL to use for form submission
`formenctype` — Entry list encoding type to use for form submission
`formmethod` — Variant to use for form submission
`formnovalidate` — Bypass form control validation for form submission
`formtarget` — Browsing context for form submission
`height` — Vertical dimension
`list` — List of autocomplete options
`max` — Maximum value
`maxlength` — Maximum length of value
`min` — Minimum value
`minlength` — Minimum length of value
`multiple` — Whether to allow multiple values
`name` — Name of the element to use for form submission and in the `form.elements` API
`pattern` — Pattern to be matched by the form control's value
`placeholder` — User-visible label to be placed within the form control
`readonly` — Whether to allow the value to be edited by the user
`required` — Whether the control is required for form submission
`size` — Size of the control
`src` — Address of the resource
`step` — Granularity to be matched by the form control's value
`type` — Type of form control
`value` — Value of the form control
`width` — Horizontal dimension

`<input>` supports global attributes
+ 30 more!

Also, the `title` attribute has special semantics on this element: Description of pattern (when used with `pattern` attribute).

File an issue about the selected text

Custom Attributes

What if you have a great idea for an attribute that doesn’t exist yet?

It’s easy!

Just convince the WHATWG to look into it → ⏰ wait for them to decide to add it → ⏰ wait for it to go through the long process of approval → ⏰ wait for the browsers to add it…

In other words, just wait 📅 a decade or more!

`data-*=""`

Developers can create *custom attributes that work only with their websites*, but the new attribute names must always start with `data-`

For example, WebSanity created `data-display` & `data-pattern` to use with FormSanity, our form system

So while `data-*` is a global attribute, it's unique from the others

`<h1 align="center">` … `</h1>`

`h1` is an *tag name* (not an *element*)

`align` is an *attribute*

`center` is a *value*

`align="center"` is an *attribute-value pair*

What about attribute *values*?

Attribute values are always *strings*, but we categorize those strings as follows:

1. Pre-defined
2. Open-ended
3. Boolean
4. Custom

Pre-Defined Attribute Values

Some values are pre-defined by the HTML spec

`<ol>`'s `type` attribute supports only these values: `1`, `a`, `A`, `i`, & `I`

However, `<ol>`'s `start` attribute supports any integer as a value, e.g., `-1000`, `1`, or `1000`

In both cases, those are the only values allowed for those attributes

Open-Ended Attribute Values

Instead of a pre-defined list of values or a range of values, open-ended values can be almost anything you want

`<ol>`'s global attribute `title` can have almost any UTF-8 character you want in the value (with certain restrictions)

`title="The Call of Cthulhu was published in 1928"` & `title="The ☎ of 🦑 was 📖 in 1928"` are both valid

Boolean Attribute Values

`<ol>`'s `reversed` attribute is a *boolean attribute*

A boolean attribute is *true* if any of these are true:

» It's present: `<ol … reversed>`
» It's value is an empty string: `<ol … reversed="">`
» It's value matches the attribute: `<ol … reversed="reversed">`

A boolean attribute is *false* if it doesn't appear at all

HTML

```html
<p>
  All these are equivalent:
</p>

<p>
  <label><input type="checkbox" checked name="Cthulhu" required> Cthulhu</label>
</p>
<p>
  <label><input type="checkbox" checked="checked" name="Cthulhu" required="required"> Cthulhu</label>
</p>
<p>
  <label><input type="checkbox" checked="" name="Cthulhu" required=""> Cthulhu</label>
</p>
```

CSS (SCSS)

JS

All these are equivalent:

- [x] Cthulhu
- [x] Cthulhu
- [x] Cthulhu

The 1st example uses `checked`

The 2nd uses `checked="checked"`

The 3rd uses `checked=""`

All do the same thing

`autoplay` • `checked` • `controls` • `default` • `disabled` • `hidden` • `loop` • `multiple` • `muted` • `open` • `playsinline` • `readonly` • `required` • `reversed` • `selected`

Some of the boolean attributes used in HTML

Custom Attribute Values

If you make a custom attribute using `data-` then you also need to define custom values

For instance, `data-lovecraft` can have 3 possible values: `cthulhu`, `yog-sothoth`, or `nyarlathotep`

Why? Because I made it, so I say so!

✏️ SIDE NOTE

Some attributes can contain multiple values — in `class="foo bar"`, `foo` & `bar` are separate values

`class="foo" class="bar"` is *not* allowed because you cannot repeat attributes in a tag, so instead you combine the values together as `class="foo bar"`

Other attributes have single values that contain strings with spaces in them — in `title="The Call of Cthulhu"`, that value is a phrase that is taken as a whole

Semantic HTML

Remember the *separation of concerns*?

- HTML: structure & meaning
- CSS: appearance & layout
- JavaScript: behavior & interaction

We have already seen many HTML elements that are used for *structure* — e.g., `<p>`, `<ul>`, `<main>` — but what about *meaning*?

Remember the *separation of concerns*?

HTML	Structure & meaning
CSS	Presentation & layout
JavaScript	Behavior & interaction

We have already seen many HTML elements that are used for *structure* — e.g., `<p>`, `<ul>`, `<main>` — but what about *meaning*?

`<p>`, `<ul>`, & `<main>` all convey meaning too, as do all the other elements we've looked at

However, for a long time, the *meaning* part of HTML wasn't really emphasized

This has changed over the last decade as the W3C & WHATWG have focused much more on *semantic HTML*

Semantic HTML is based on the idea that HTML should better help search engines, screen readers, & parsers understand what content *means* on the webpage

Most HTML elements provide structure *and* carry a strong semantic meaning, e.g., `<p>`, `<ul>`, & `<strong>`

Others carry a (very) weak semantic meaning & are there for developer convenience, e.g., `<b>` & `<i>`

Further, 2 elements provide structure *without any meaning*: `<div>` & `<span>`

More on `<div>` & `<span>` in the *CSS Overview* slides

```
<article>
  <h2>Cthulhu</h2>
  <p>
    He began at once
to ply his informant
with questions.
  </p>
</article>
```

That's an `<article>`,
so it's important! 🤩

```
<article>
  <h2>Cthulhu</h2>
  <p>
    He began at once
to ply his informant
with questions.
  </p>
</article>
```

That's an `<article>`,
so it's important! 🤩

```
<div>
  <h2>Cthulhu</h2>
  <p>
    He began at once
to ply his informant
with questions.
  </p>
</div>
```

That's just a `<div>`,
so nothing special. 😘

```
<p>
  None of the
countryfolk seemed to
have died — but poor
Lavinia Whateley, the
twisted albino, was
<strong>never</strong>
seen again.
</p>
```

Very important
word there! 🤩

```
<p>
  None of the
countryfolk seemed to
have died — but poor
Lavinia Whateley, the
twisted albino, was
<strong>never</strong>
seen again.
</p>
```

Very important word there! 🤩

```
<p>
  None of the
countryfolk seemed to
have died — but poor
<b>Lavinia Whateley
</b>, the twisted
albino, was never seen
again.
</p>
```

That is bold. Yawn. So? 😐

```
<p>
  Both the Eskimo
wizards <em>and</em>
the Louisiana swamp-
priests had chanted to
their kindred idols.
</p>
```

That word is
emphasized! 🤩

```
<p>
  Both the Eskimo
wizards <em>and</em>
the Louisiana swamp-
priests had chanted to
their kindred idols.
</p>
```

That word is emphasized! 🤩

```
<p>
  Both the Eskimo
wizards <i>and</i> the
Louisiana swamp-
priests had chanted to
their kindred idols.
</p>
```

That is italicized. Big deal. 😐

```
<nav>
  <ul>
    <li>Cthulhu</li>
    <li>Azathoth</li>
    <li>Hastur</li>
  </ul>
</nav>
```

That’s site navigation! 🤩

```
<nav>
  <ul>
    <li>Cthulhu</li>
    <li>Azathoth</li>
    <li>Hastur</li>
  </ul>
</nav>
```

That's site navigation! 🤩

```
<ul>
  <li>Cthulhu</li>
  <li>Azathoth</li>
  <li>Hastur</li>
</ul>
```

That's just a list.
¯_(ツ)_/¯

Developer convenience? Which is more convenient, quicker, & easier?

```
<p>
  <b>Look out!</b> It’s Cthulhu!
</p>
```

Or this?

HTML: `<p><span class="attention">Look out! </span> It’s Cthulhu!</p>`

CSS: `.attention {font-weight: bold;}`

Developer convenience? Which is more convenient, quicker, & easier?

```
<p>
  <b>Look out!</b> It’s Cthulhu!
</p>
```

Or this?

HTML: `<p><span class="attention">Look out! </span> It’s Cthulhu!</p>`

CSS: `.attention {font-weight: bold;}`

Developer convenience? Which is more convenient, quicker, & easier?

```
<p>
  <b>Look out!</b> It’s Cthulhu!
</p>
```

← Short! Easy!

Or this?

HTML: `<p><span class="attention">Look out! </span> It’s Cthulhu!</p>`

CSS: `.attention {font-weight: bold;}`

Semantic 👍

```
<p>
  Shoggoth
</p>
<p>
  Shub-Niggurath
</p>
```

These are 2 paragraphs

Works with CSS

Not semantic 👎

```
<p>
  Shoggoth
<br>
<br>
  Shub-Niggurath
</p>
```

This is 1 paragraph, not 2!

Will cause CSS problems

2
s in the middle of a <p> is not the same thing as 2 <p>s in terms of

» appearance, or
» how CSS works with <p>

CSS (SCSS)

```
p {
  margin-bottom: 1em;
  background-color: orange;
}
```

JS

Semantic

Shoggoth

Shub-Niggurath

```
<p>
  Shoggoth
</p>
<p>
  Shub-Niggurath
</p>
```

2 paragraphs, so CSS works correctly

Not Semantic

Shoggoth

Shub-Niggurath

```
<p>
  Shoggoth
<br>
<br>
  Shub-Niggurath
</p>
```

1 paragraph only, so CSS won't work as expected

Semantic 👍

```
<h4>
  Shoggoth
</h4>
<p>
  Shub-Niggurath
</p>
```

A real heading + a `<p>`

Works with CSS & SEO

Not semantic 👎

```
<p>
  <b>Shoggoth</b>
</p>
<p>
  Shub-Niggurath
</p>
```

Fake heading `<p>` + a `<p>`

CSS & SEO problems!

HTML

```html
<div>
  <h2>Semantic</h2>
  <h4>
    Shoggoth
  </h4>
  <p>
    Shub-Niggurath
  </p>
</div>
```

CSS (SCSS)

```scss
h4 {
  border-bottom: 1px solid gray;
}
```

JS

Semantic

Shoggoth

Shub-Niggurath

The CSS matches the `<h4>` & is applied

HTML

```html
<div>
  <h2>Semantic</h2>
  <h4>
    Shoggoth
  </h4>
  <p>
    Shub-Niggurath
  </p>
</div>
<div>
  <h2>Not Semantic</h2>
  <p>
    <b>Shoggoth</b>
  </p>
  <p>
    Shub-Niggurath
  </p>
</div>
```

CSS (SCSS)

```scss
h4 {
  border-bottom: 1px solid gray;
}
```

JS

Semantic

Shoggoth

Shub-Niggurath

Not Semantic

Shoggoth

Shub-Niggurath

No `<h4>`, so the CSS doesn't match

```
<h4>
  Shoggoth
</h4>
<p>
  Shub-Niggurath
</p>
```

Shoggoth is important — it's a heading!

```
<p>
  <b>Shoggoth</b>
</p>
<p>
  Shub-Niggurath
</p>
```

Shoggoth is just another paragraph

Why use semantic HTML?

» It’s correct
» Better accessibility
» Easier to read the code
» Helps CSS work correctly
» Search engines & assistive tools like it

```
<article>
<aside>
<figure>
<footer>
<header>
<nav>
```

```
<section>
<details>
<summary>
<time>
<search>
```

HTML5 added many new semantic elements

One of the goals of HTML 5: “paving the cowpaths” or “following the desire lines”

Planned pathways & roads

Desire lines

In June 2007, my brother Gus & I
visited the Badlands in South Dakota

Gus walks back to the car

My brother walking on a desire line
Paved path

```
<!DOCTYPE html>
<html lang="en">
▶ <head> ··· </head>
▼ <body>
  ▼ <div id="not_footer">
    ▼ <div id="header">
      ▶ <div id="header_content"> ··· </div>
    </div>
    ▼ <div id="site_nav">
      ▶ <div id="site_nav_menu"> ··· </div>
    </div>
    ▼ <div id="page">
      ▶ <div id="page_content" class="home_page"> ··· </div>
    </div>
    <div id="footroom"></div>
  </div>
  ▶ <div id="footer"> ··· </div>
```

This code is from ~2014, before HTML5 was widely used

`<div>` means nothing — it just draws an invisible box

Not semantic!

```
<!DOCTYPE html>
<html lang="en">
▶ <head> ··· </head>
▼ <body>
  ▼ <div id="not_footer">
    ▼ <div id="header">
      ▶ <div id="header_content"> ··· </div>
    </div>
    ▼ <div id="site_nav">
      ▶ <div id="site_nav_menu"> ··· </div>
    </div>
    ▼ <div id="page">
      ▶ <div id="page_content" class="home_page"> ··· </div>
    </div>
    <div id="footroom"></div>
  </div>
  ▶ <div id="footer"> ··· </div>
```

This code is from ~2014, before HTML5 was widely used

`<div>` means nothing — it just draws an invisible box

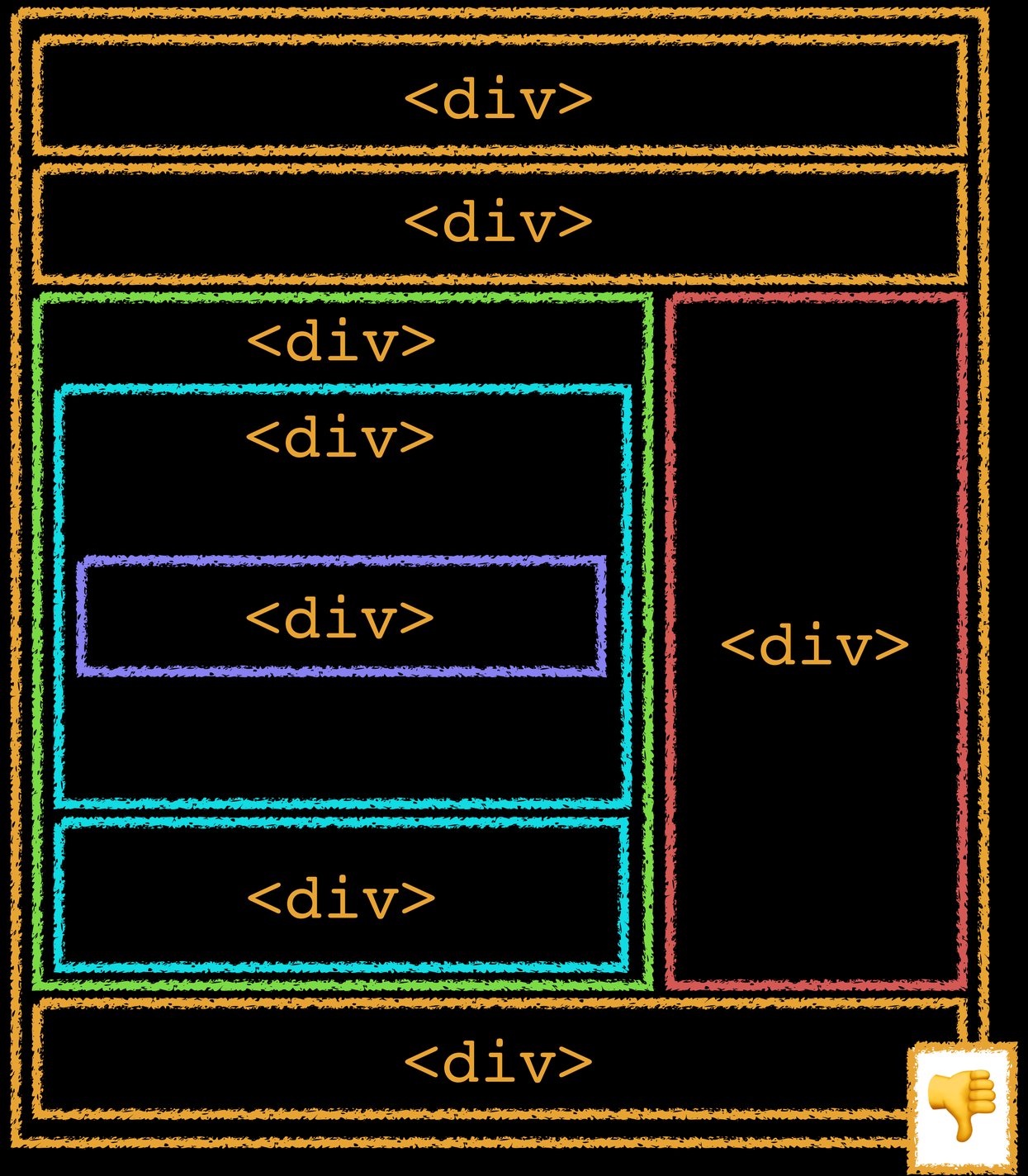
Not semantic!

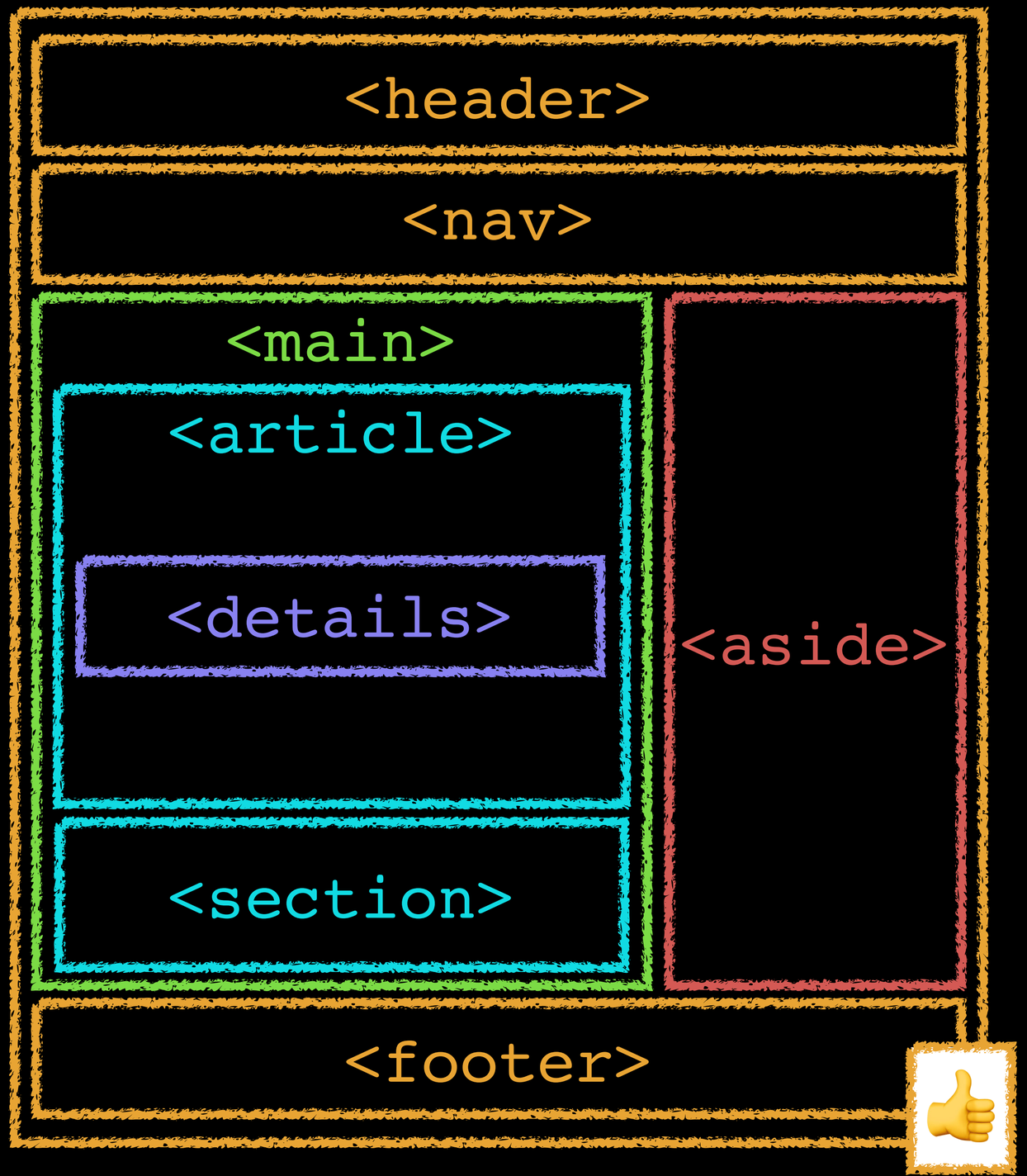
You might know what those `id`s mean, but search engines don't

```
<div id="not_footer"
  <div id="header">
    <div id="header_content">
  </div>
  <div id="site_nav">
    <div id="site_nav_menu"></div>
  </div>
  <div id="page">
      <div id="page_content"></div>
  </div>
  <div id="footroom"></div>
</div>
<div id="footer"></div>
```

```
<header></header>
<nav>
  <menu></menu>
</nav>
<main></main>
<footer></footer>
```

From non-semantic to semantic




<header>
<nav>
<main>
<article>
<details>
<section>
<aside>
<footer>

HTML 4.01 Non-semantic	HTML5 Semantic
`<div class="header">`	`<header>`
`<div class="footer">`	`<footer>`
`<div id="nav">`	`<nav>`
`<div id="sidebar">`	`<aside>`
`<div id="main-content">`	`<main>`

Remember, `<div>` has no semantic meaning; for our purposes here, `class` & `id` are interchangeable

Marking Up Text

<address>

 &

<i> & <b>

<s>

<u> 👎

<small>

Contact Information

`<address>` … `</address>`

Contact information for a document or major part of a document (form, post, article)

Often at beginning or end

Changed in HTML5 — not supposed to be used for arbitrary postal info (but it will be anyway by people who don’t know better)

Innovation Opportunities 02/16/2023

What does a Product Manager Do at BCG?

What does a product manager do?Francis Labiran, a Senior Product Manager at BCGDV, discusses the ins and outs of his role and BCGDV. Learn more.

Francis Labiran (he/him)
Senior Product Manager

Life at BCG 02/10/2023

Beyond Benefits: Receiving Support in the Workplace

Josh Dembowitz, a Chicago-based consultant, shares his experience receiving support in the workplace during a challenging situation. Read more.

Josh Dembowitz (he/him)
Consultant

Career Growth 02/02/2023

Consulting to Knowledge Team: Internal Career Mobility at BCG

Katie Williams, Knowledge Senior Business Director for our TMT practice area, shares her positive experience with internal career mobility at BCG. Read more.

Katie Williams (she/her)
Knowledge Business Senior Director - Technology, Media & Telecom

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<address>

Adams, Tammy

1009 Rowan Cove

Ph: 534-0937

</address>

HTML

```html
by such layers of restless cloud,
might easily have supplied the rest
—and of course Danforth did not
hint any of those specific horrors
till after his memory had had a
chance to draw on his bygone
reading. He could never have seen
so much in one instantaneous
glance.
</p>
<p>
  At the time his shrieks were
confined to the repetition of a
single mad word of all too obvious
source:
</p>
<p>
  <i>“Tekeli-li! Tekeli-li!”</i>
</p>
<hr>
<address>
  H.P. Lovecraft
  <br>10 Barnes St.
  <br>Providence, RI 02906
</address>
```

CSS (SCSS)

JS

The higher sky, as we crossed the range, was surely vaporous and disturbed enough; and although I did not see the zenith I can well imagine that its swirls of ice-dust may have taken strange forms. Imagination, knowing how vividly distant scenes can sometimes be reflected, refracted, and magnified by such layers of restless cloud, might easily have supplied the rest—and of course Danforth did not hint any of those specific horrors till after his memory had had a chance to draw on his bygone reading. He could never have seen so much in one instantaneous glance.

At the time his shrieks were confined to the repetition of a single mad word of all too obvious source:

“Tekeli-li! Tekeli-li!”

H.P. Lovecraft
10 Barnes St.
Providence, RI 02906

HTML

```
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might easily have supplied the rest
—and of course Danforth did not
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</p>
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CSS (SCSS)

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The higher sky, as we crossed the range, was surely vaporous and disturbed enough; and although I did not see the zenith I can well imagine that its swirls of ice-dust may have taken strange forms. Imagination, knowing how vividly distant scenes can sometimes be reflected, refracted, and magnified by such layers of restless cloud, might easily have supplied the rest—and of course Danforth did not hint any of those specific horrors till after his memory had had a chance to draw on his bygone reading. He could never have seen so much in one instantaneous glance.

At the time his shrieks we
word of all too obvious so

“Tekeli-li! Tekeli-li!”

H.P. Lovecraft
10 Barnes St.
Providence, RI 02906

The previous slide had a `<p>` inside `<blockquote>` & this one does not

It’s up to you, but I prefer using a `<p>`

HTML

```html
by such layers of restless cloud,
might easily have supplied the rest
—and of course Danforth did not
hint any of those specific horrors
till after his memory had had a
chance to draw on his bygone
reading. He could never have seen
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<address>
  H.P. Lovecraft
  <br>10 Barnes St.
  <br>Providence, RI 02906
</address>
```

CSS (SCSS)

JS

The higher sky, as we crossed the range, was surely vaporous and disturbed enough; and although I did not see the zenith I can well imagine that its swirls of ice-dust may have taken strange forms. Imagination, knowing how vividly distant scenes can sometimes be reflected, refracted, and magnified by such layers of restless cloud, might easily have supplied the rest—and of course Danforth did not hint any of those specific horrors till after his memory had had a chance to draw on his bygone reading. He could never have seen so much in one instantaneous glance.

At the time his shrieks were confined to the repetition of a single mad word of all too obvious source:

“Tekeli-li! Tekeli-li!”

H.P. Lovecraft
10 Barnes St.
Providence, RI 02906

Browsers italicize text in `<address>` by default...

HTML

```html
instantaneous glance.
</p>
<p>
  At the time his shrieks were confined to the repetition of a single mad word of all too obvious source:
</p>
<p>
  <i>“Tekeli-li! Tekeli-li!”</i>
</p>
<hr>
<address>
  H.P. Lovecraft
  <br>10 Barnes St.
  <br>Providence, RI 02906
</address>
```

CSS (SCSS)

```scss
address {
  font-style: normal;
}
```

JS

The higher sky, as we crossed the range, was surely vaporous and disturbed enough; and although I did not see the zenith I can well imagine that its swirls of ice-dust may have taken strange forms. Imagination, knowing how vividly distant scenes can sometimes be reflected, refracted, and magnified by such layers of restless cloud, might easily have supplied the rest—and of course Danforth did not hint any of those specific horrors till after his memory had had a chance to draw on his bygone reading. He could never have seen so much in one instantaneous glance.

At the time his shrieks were confined to the repetition of a single mad word of all too obvious source:

“Tekeli-li! Tekeli-li!”

H.P. Lovecraft
10 Barnes St.
Providence, RI 02906

...but you can change that with CSS

📦 FORMATTING GUIDE

```
<address>
  <i>
    hp@lovecraft.com
  </i>
</address>
```

👎

.....

```
<address>
  hp@lovecraft.com
</address>
```

👍

HTML

```html
There had, as he had predicted,
been no need for acids. For like
his accursed picture a year before,
Joseph Curwen now lay scattered on
the floor as a thin coating of fine
bluish-grey dust.
</p>

<hr>

<address>
  <p>
    Full contact info at <a
href="http://www.josephcurwen.com/c
ontact">www.josephcurwen.com</a>.
  </p>
  <p>
    You may also want to visit us:
  </p>
  <p>
    Dr. Marinus Bicknell Willett
    <br>10 Barnes Street
    <br>Providence, RI 02906
  </p>
</address>
```

CSS

JS

But he did not faint, and that man of unholy centuries and forbidden secrets never troubled the world again. The madness out of time had subsided, and the case of Charles Dexter Ward was closed. Opening his eyes before staggering out of that room of horror, Dr. Willett saw that what he had kept in memory had not been kept amiss. There had, as he had predicted, been no need for acids. For like his accursed picture a year before, Joseph Curwen now lay scattered on the floor as a thin coating of fine bluish-grey dust.

Full contact info at www.josephcurwen.com.

You may also want to visit us:

Dr. Marinus Bicknell Willett
10 Barnes Street
Providence, RI 02906

`<address>` may contain other text as well

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```
<address>hp@lovecraft.com</address>
```

<address> should go on at least 3 lines

.....

```
<address>
  <p>
    hp@lovecraft.com
  </p>
</address>
```

Emphasis

 & <i>

 & <b>

<s>

<u> 👎

`<em> … </em>`

Text that has *stress emphasis* (that's stress as in *prominence*, not as in emotions)

Always italicized by browsers, but that's not in the spec

HTML

```html
<p>
  Who's going to eat you?
  <em>Cthulhu</em> is going to eat you.
</p>

<p>
  Am I really going to get eaten? Cthulhu
  <em>is</em> going to eat you.
</p>

<p>
  What's Cthulhu going to do to me?
  Cthulhu is going to <em>eat</em> you.
</p>

<p>
  Who's Cthulhu going to eat? Cthulhu is
  going to eat <em>you</em>.
</p>
```

CSS

JS

Who's going to eat you? *Cthulhu* is going to eat you.

Am I really going to get eaten? Cthulhu *is* going to eat you.

What's Cthulhu going to do to me? Cthulhu is going to *eat* you.

Who's Cthulhu going to eat? Cthulhu is going to eat *you*.

`<i> … </i>`

HTML 4: *Italicized text* (& deprecated!)

HTML5: “text in an *alternate voice* or mood, or … indicating a different quality of text”

Stylistically italic

HTML

```html
<h3>Taxonomic designation</h3>
<p>That, my friend, is a <i>Heterocephalus glaber</i>.</p>
<h3>Defined terms</h3>
<p><i>Terror</i> is a feeling of extreme fear.</p>
<h3>Idiomatic phrase from another language</h3>
<p>“Listen, <i>boychick</i>,” the Rabbi said, “you know <i>bupkes</i>.”</p>
<h3>Transliteration</h3>
<p>Achilles is driven by κλέος (<i lang="grc">kleos</i>).</p>
<h3>A thought</h3>
<p>And then it hit him: <i>I forgot to put on pants.</i></p>
<h3>Ship name</h3>
<p>The <i>Minnow</i> set sail in 1964.</p>
```

CSS

JS

Taxonomic designation

That, my friend, is a *Heterocephalus glaber*.

Defined terms

Terror is a feeling of extreme fear.

Idiomatic phrase from another language

“Listen, *boychick*,” the Rabbi said, “you know *bupkes*.”

Transliteration

Achilles is driven by κλέος (*kleos*).

A thought

And then it hit him: *I forgot to put on pants.*

Ship name

The *Minnow* set sail in 1964.

`<strong> … </strong>`

Strongly emphasized text

Text that shows “strong importance, seriousness, or urgency”

Always bolded by built-in browser styles, but that’s not in the spec

HTML

```html
<p>
  <strong>Warning</strong>: Do not feed the bears.
</p>

<p>
  Your papers are due no later than <strong>May 8</strong>.
</p>

<p>
  Come here <strong>now</strong>.
</p>
```

CSS

JS

Warning: Do not feed the bears.

Your papers are due no later than **May 8**.

Come here **now**.

`<b> … </b>`

HTML 4: *Bold text* (& deprecated!)

HTML5: “text to which attention is being drawn for utilitarian purposes without conveying any extra importance and with no implication of an alternate voice or mood”

Stylistically bold

HTML

```html
<h3>Key words in an abstract</h3>
<p>The <b>Heartbleed Bug</b> is a serious vulnerability in the popular <b>OpenSSL</b> cryptographic software library.</p>

<h3>Product names in a review</h3>
<p>The best password manager is <b>1Password</b>.</p>

<h3>Article or story lede</h3>
<p><b>I am forced into speech because men of science have refused to follow my advice without knowing why.</b> It is altogether against my will that I tell my reasons for opposing this contemplated invasion of the antarctic—with its vast fossil-hunt and its wholesale boring and melting of the ancient ice-cap—and I am the more reluctant because my warning may be in vain.</p>
```

CSS

JS

Key words in an abstract

The **Heartbleed Bug** is a serious vulnerability in the popular **OpenSSL** cryptographic software library.

Product names in a review

The best password manager is **1Password**.

Article or story lede

I am forced into speech because men of science have refused to follow my advice without knowing why. It is altogether against my will that I tell my reasons for opposing this contemplated invasion of the antarctic—with its vast fossil-hunt and its wholesale boring and melting of the ancient ice-cap—and I am the more reluctant because my warning may be in vain.

	Semantic	Lightly semantic
Italicized	`<em>`	`<i>`
Bolded	`<strong>`	`<b>`

~~<strike>~~ … ~~</strike>~~

<s> … </s>

Text displayed with *strikethrough*

Was only case in which 2 elements did the same thing

HTML 4: Deprecated

HTML5: “contents that are *no longer accurate or no longer relevant*”

HTML

```html
<p>
  Buy Cthulhu-Frosted Flakes for just
  $<s>10</s>5!
</p>
```

CSS

JS

Buy Cthulhu-Frosted Flakes for just $~~10~~5!

`<u> … </u>`

Underlined text

Never use this!

HTML 4: Deprecated

HTML5: “*unarticulated*, though explicitly rendered, non-textual annotation”

HTML

```html
<p>
  <u>I'm a link! Click me, by Cthulhu!</u>
</p>
```

CSS

JS

I'm a link! Click me, by Cthulhu!

Underlined text is associated with links

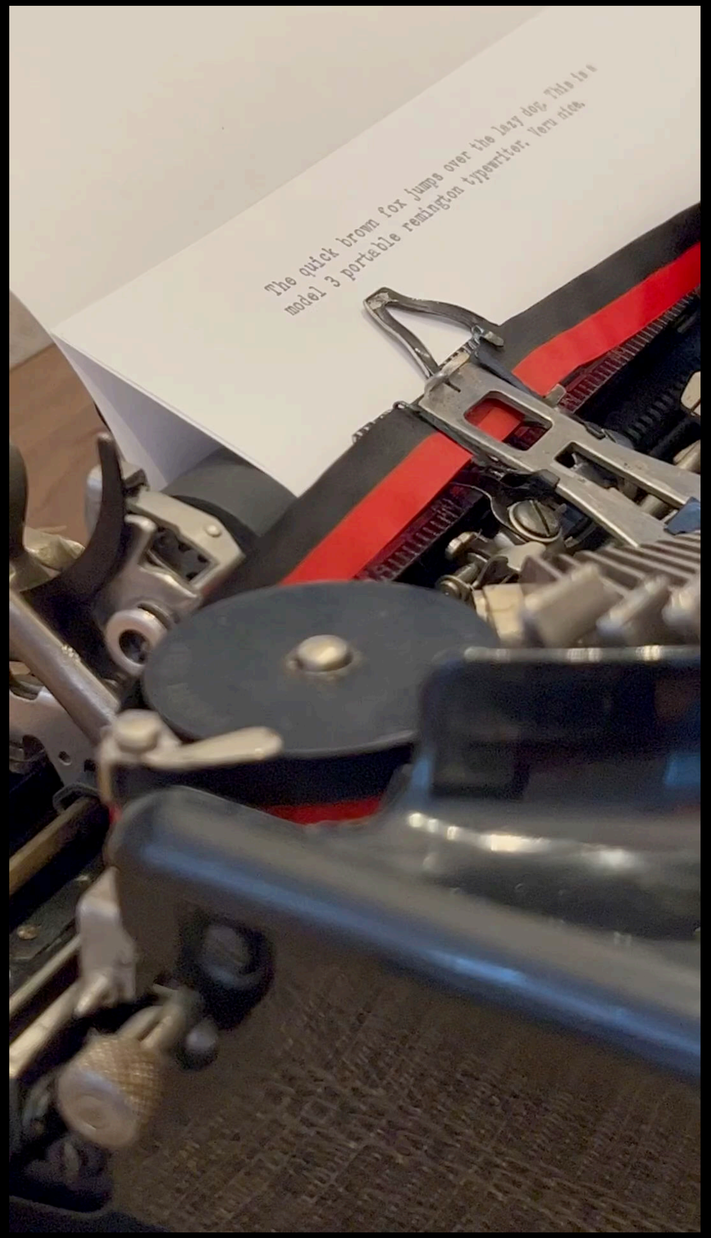
Why do we have underlines in the first place?

typewriter responds perfectly. Unwven touch and erratic thythm will cause a perfectly adjusted machie to skip, pile, crowd, or shadow. A flimsy or unéven desk will create a vibration that may result in any of these difficulties in a perfectly adjusted machine. An impro perly installed ribbon or ribbon sprool will create ribbon trouble and dim or unevenly typed impressions. Too often, because of some t of these defects of operation, a mechanic will attempg adjustments resulting in maladjusting the machine.

2. Purpose. It is the purpose of this manual to present proper me- thods of adjustment and repair for the benefit of all persanal en gaged in adjusting and repairing typewriters. Careful study of this manual will enable proper adjustments and repairs to be made with a minimum amount of time lost in such operations.

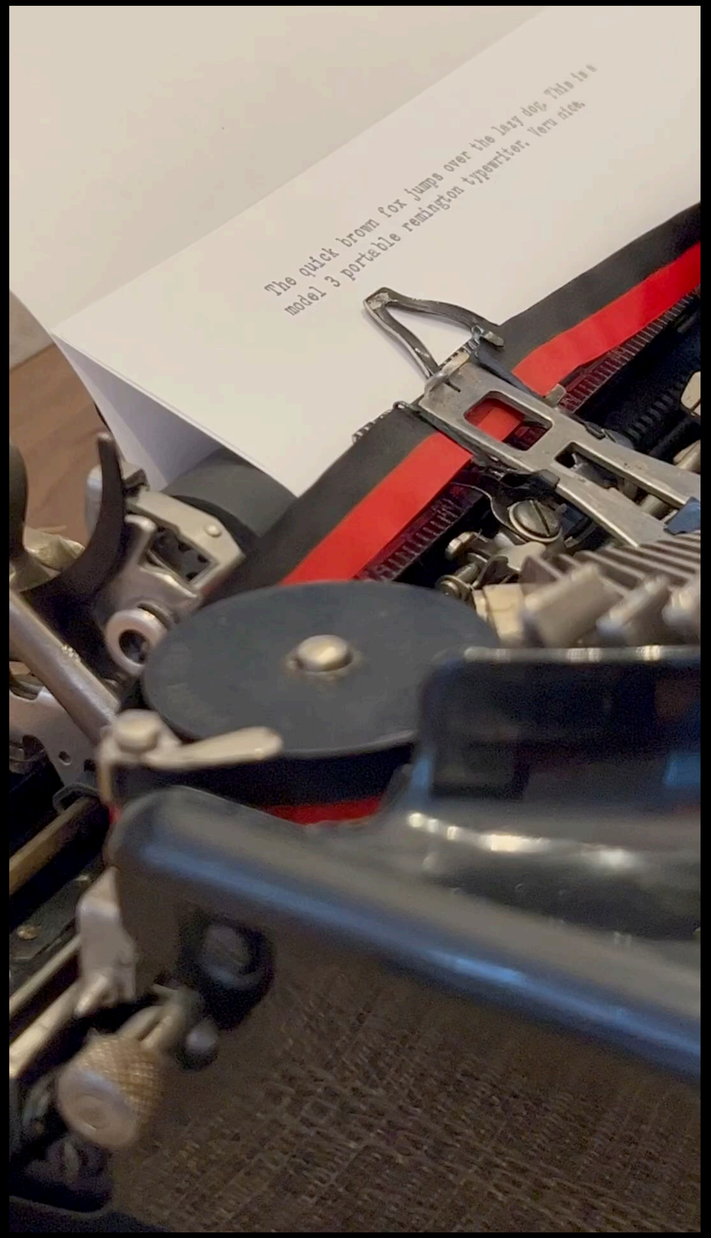
3. Method of presentation. Attempt has been made to consolidate into xeach ~~situation~~ section similar assemblies of all of the latest mo dels of all makes of non-portable typewriters. As nearly as possible, the material is presented in order of adjustments bo be made, so that adjustments, once made, will not be affected by subsequent adj justments to other assemblies. Sequence of Adjustments (see page) details the correct approach for adjusting each make of typewriter.

✏️ SIDE NOTE



From its beginning in 1874, typewriters used *typebars* to strike a ribbon that imprinted the character found on the key onto the paper

✏️ SIDE NOTE



From its beginning in 1874, typewriters used *typebars* to strike a ribbon that imprinted the character found on the key onto the paper

✏️ SIDE NOTE

In 1961, after 7 years of work, IBM introduced the *Selectric* typewriter, an instant must-have for offices

It's main feature: a golf-ball-sized *type head* (or *type ball*) that replaced the type bars

✏️ SIDE NOTE

The type ball eliminated jams & made it faster to type

The balls could be switched out, so it was possible to type using italics, scientific notation, other languages — & different fonts!

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```
<i> Nyarlathotep </i>

<br> Shub-Niggurath
```

👎

Never put spaces after an opening tag or before a closing tag for *any* element

.....

```
<i>Nyarlathotep</i>

<br>Shub-Niggurath
```

👍

Size

`<small>`

~~`<big>`~~ ← Removed from HTML5

`<small> … </small>`

HTML 4: Text in a *small* font (but deprecated)

HTML5: *Side comments such as fine print*, regardless of how it looks (but usually smaller)

Examples:

» Legalese, disclaimers, & caveats
» Copyright notice
» Footnotes
» Licensing info

HTML

```html
<p>
  Try new Cthulhu-Frosted Flakes! They're delicious!
</p>
<p>
  <small>Note: may cause nightmares, despair, passivity, & insanity.</small>
</p>
```

CSS

JS

Try new Cthulhu-Frosted Flakes! They're delicious!

Note: may cause nightmares, despair, passivity, & insanity.

HTML

```html
<p>Without CSS:</p>

<h3 class="unstyled">
  The Shadow over Innsmouth: <small>A Tale of Horror</small>
</h3>

<p>With CSS:</p>

<h3>
  The Shadow over Innsmouth: <small>A Tale of Horror</small>
</h3>
```

CSS

```css
h3 > small {
  display: block;
}
```

JS

Without CSS:

The Shadow over Innsmouth: A Tale of Horror

With CSS:

The Shadow over Innsmouth:
A Tale of Horror

Embedded Multimedia

`<img>`

`<svg>`

`<video>`, `<source>`, `<track>`

`<audio>` ← See *Bonus* section at end

`<figure>` & `<figcaption>`

Raster & Vector

All images can be classified as *raster* or *vector*

Raster

Raster (AKA *bitmap* & *continuous tone*) images use *dots representing a grid of pixels* that correspond bit-for-bit with an image displayed on a screen

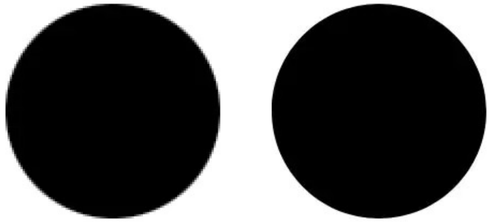
Better for…

» photographs
» photo-realistic images

Humans create a lot of raster images!

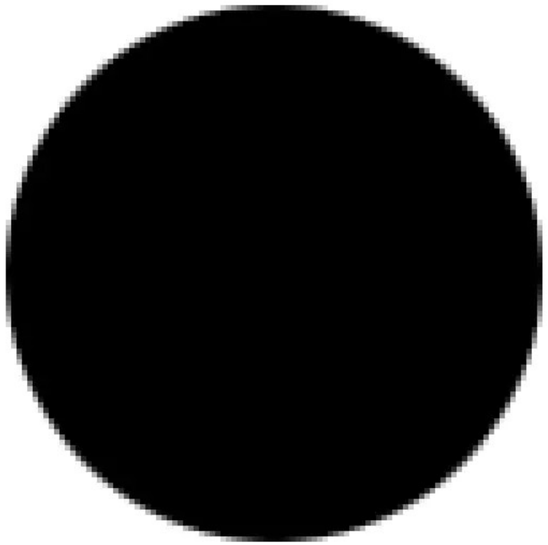
People around the world took *1.5 trillion* photos in 2022

1.5 trillion ÷ 365 = **4+ billion every day**

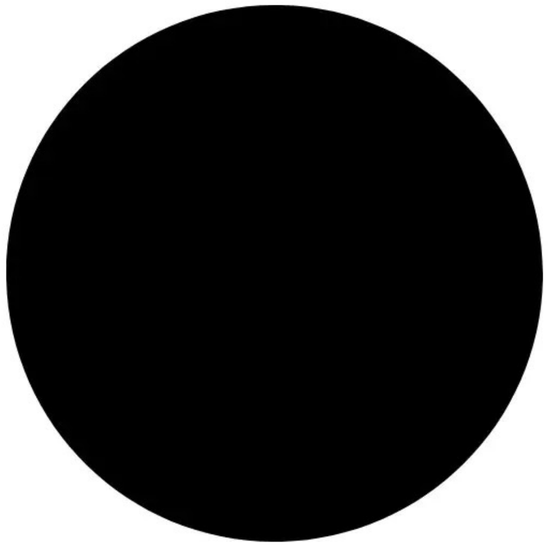


Raster Vector

100%

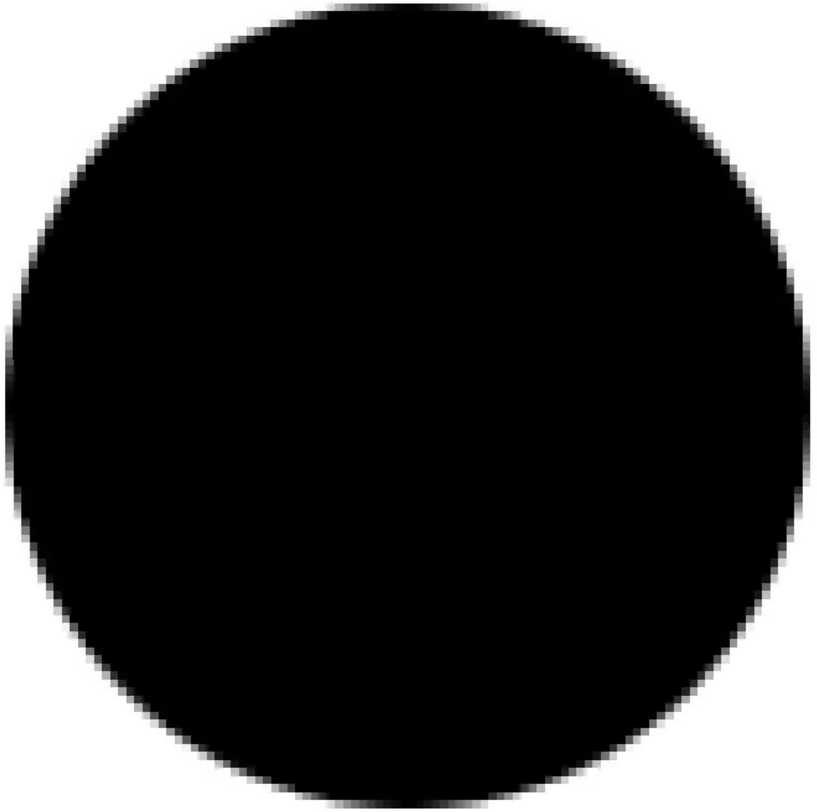


Raster

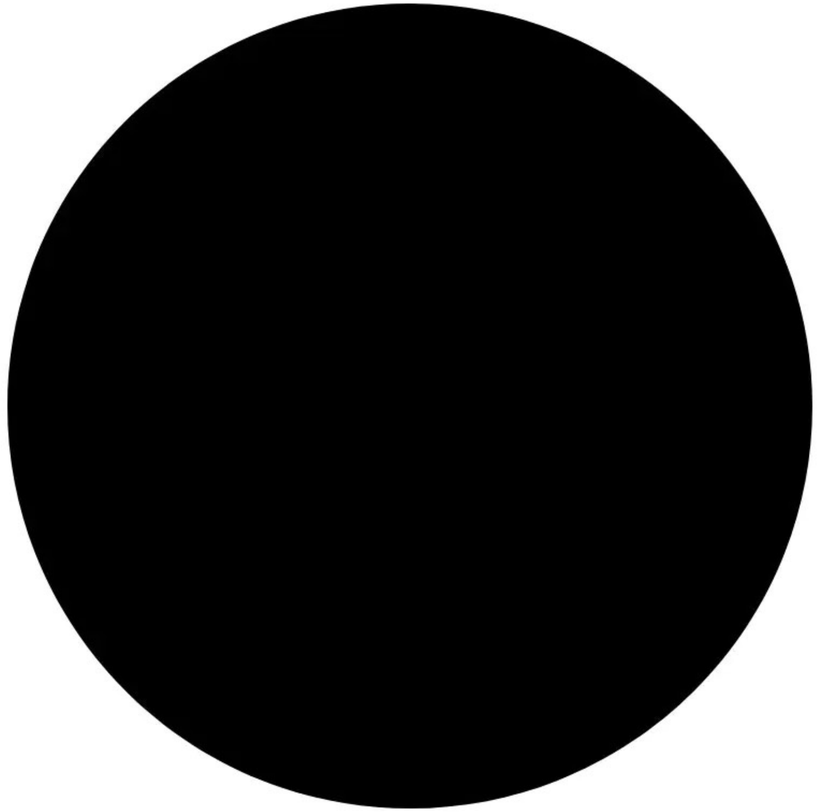


Vector

240%



Raster



Vector

400%

Raster Web formats: AVIF • GIF • JPEG • JPEG XL • PNG • WebP

Raster *non-Web* formats: BMP • HEIC/HEIF • PSD • TIFF

Image editors

- Photoshop ⊞
- Microsoft Paint ⊞
- Paint.NET ⊞
- Acorn
- Pixelmator Pro
- Affinity Photo ⊞

Vector

Vector images use *mathematical expressions* to draw points, lines, curves, shapes, &/or polygon(s) to create images

Better for…

» Graphic design
» Logos
» Typesetting
» Charts & data visualization
» Animation

Great on high-resolution displays

Tiny file sizes because its just code

In webpages, you use *SVG* (Scalable Vector Graphics)

HTML

Tidy

```
<svg xmlns="http://www.w3.org/2000/svg"
width="700" height="550">
  <rect x="10" y="10"
        width="400" height="400"
        fill="#606060"/>
  <line x1="80" y1="120"
        x2="700" y2="120"
        stroke="#ff0000"
        stroke-width="60"
        stroke-opacity="0.5"/>
  <rect x="200" y="200"
        width="400" height="400"
        fill="#ffaa00"
        fill-opacity="0.7"/>
</svg>
```

A very basic SVG

HTML

```html
<svg xmlns="http://www.w3.org/2000/svg" viewBox="-40 -40 80 80">
  <title>Yin Yang</title>
  <desc>In Ancient Chinese philosophy, yin and yang is a concept of dualism, describing how seemingly opposite forces may actually be interconnected.</desc>
  <defs>
    <style>
      .yin {
        fill: indigo;
      }
      .yang {
        fill: white;
      }
    </style>
  </defs>
  <circle class="yin" r="39"/>
  <path class="yang" d="M0,38a38,38 0 0 1 0,-76a19,19 0 0 1 0,38a19,19 0 0 0 0,38"/>
  <circle class="yang" cy="19" r="5"/>
  <circle class="yin" cy="-19" r="5"/>
</svg>
```

CSS (SCSS)

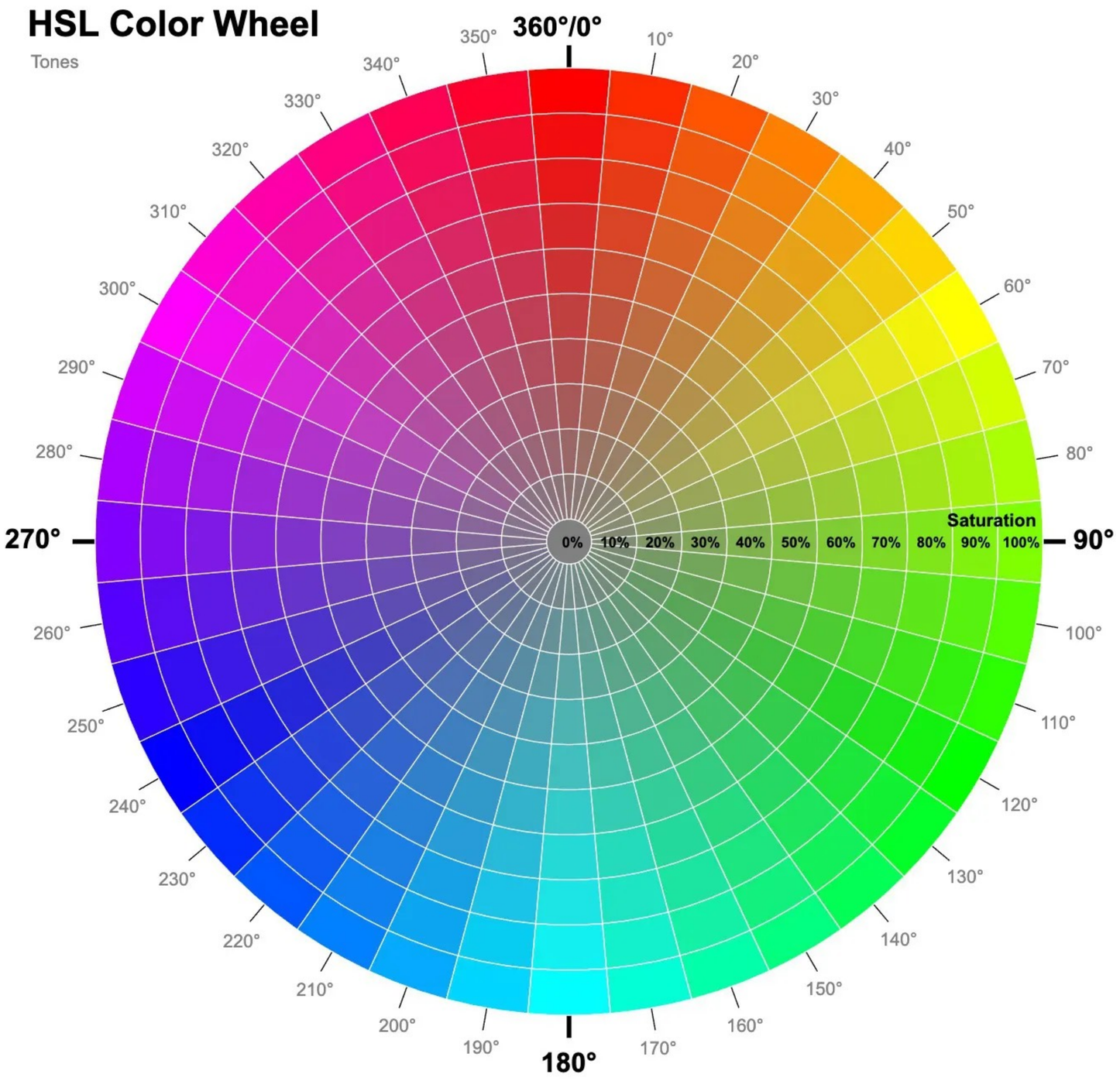
JS

HTML

```html
<svg xmlns="http://www.w3.org/2000/svg" xmlns:xlink="http://www.w3.org/1999/xlink" version="1.1" id="hsl-color-wheel" x="0px" y="0px" width="100%" height="100%" viewBox="0 0 1000 1000" xml:space="preserve">
  <style type="text/css">
    <![CDATA[
      path {
        stroke: white;
        stroke-miterlimit: 10;
      }
      text {
        font: medium Arial, sans-serif;
        fill: gray;
      }
      text.title {
        font-size: xx-large;
        font-weight: bold;
        fill: black;
```

CSS

JS



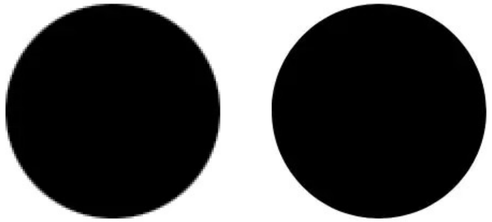
HTML

```
118     <path fill="hsl(0,20%,50%)" d="M505.22852,440.23633l3.48828-39.86914c-5.70605-0.49219-11.53125-0.50342-
17.43262,0.01318l3.48633,39.84766 C498.31152,439.91797,501.80469,439.94141,505.22852,440.23633z"/>
119     <path fill="hsl(0,30%,50%)" d="M508.7168,400.36719l3.48633-39.85303c-7.9873-0.68945-16.14355-0.70459-
24.40527,0.01855l3.48633,39.84766 C497.18555,399.86377,503.01074,399.875,508.7168,400.36719z"/>
120     <path fill="hsl(0,40%,50%)" d="M512.20312,360.51416l3.4873-39.85303c-10.27051-0.88623-20.75586-0.90527-
31.37793,0.02393l3.48535,39.84766 C496.05957,359.80957,504.21582,359.82471,512.20312,360.51416z"/>
121     <path fill="hsl(0,50%,50%)" d="M515.69043,320.66113l3.48535-39.85303c-12.55078-1.08301-25.36719-
1.10693-38.34961,0.02881l3.48633,39.84814 C494.93457,319.75586,505.41992,319.7749,515.69043,320.66113z"/>
122     <path f                                                                                    049-1.30957-
45.32324,0.
123     <path f                                                                                    9277-
1.51025-52.                                                                                        95605z"/>
124     <path f                                                                                    05-1.71191-
59.26953,0.
125     <path f                                                                                    -1.90479-
66.24316,0.05713l3.48633,39.84766 C490.43066,159.53809,510.23828,159.5752,529.63672,161.25z"/>
126     <path fill="hsl(0,100%,50%)" d="M533.12402,121.38867l3.4873-39.85352c-23.96289-2.06836-48.43164-
2.10547-73.2168,0.06299l3.48633,39.84766 C489.30469,119.48389,511.44336,119.51758,533.12402,121.38867z"/>
127     <path fill="hsl(10,10%,50%)" d="M505.17188,480.69922l10.36035-38.66846c-3.33691-0.89404-6.78418-
1.49072-10.30371-1.79443l-3.4873,39.85645 C502.91504,480.19434,504.05957,480.40088,505.17188,480.69922z"/>
128     <path fill="hsl(10,20%,50%)"
d="M505.22852,440.23633c3.51953,0.30371,6.9668,0.90039,10.30371,1.79443l10.35547-38.64795 c-5.5625-1.49072-
```

No one types this out by hand; instead, it is *generated* from an illustration or design program like Adobe Illustrator or Inkscape

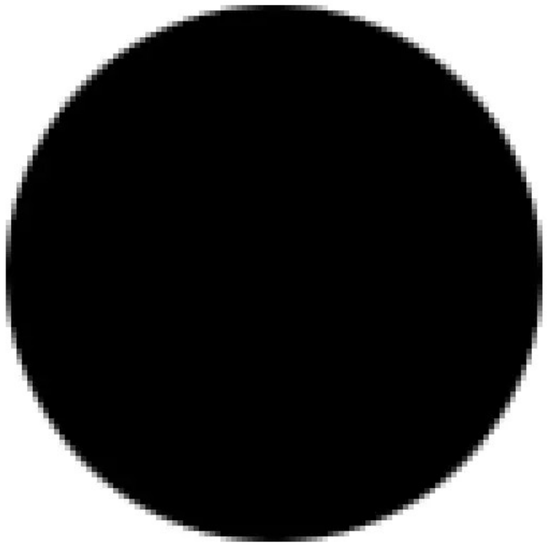
CSS

JS

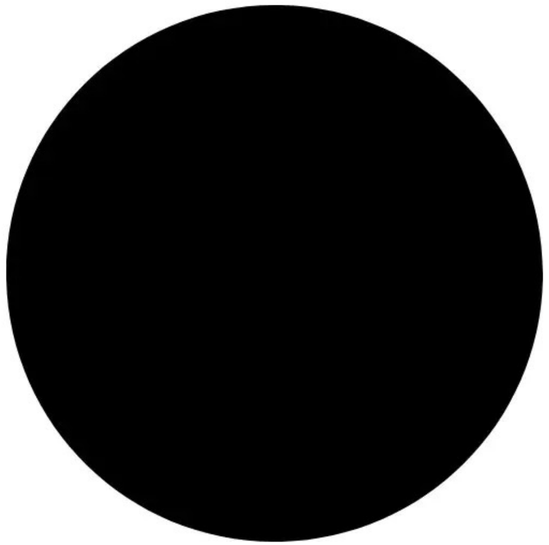


Raster Vector

100%

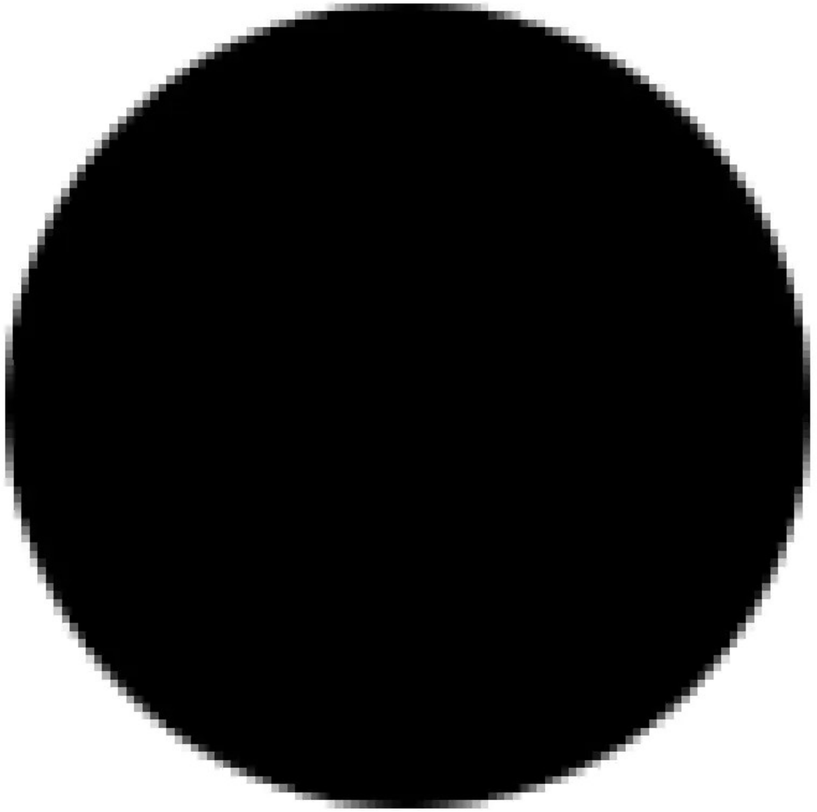


Raster

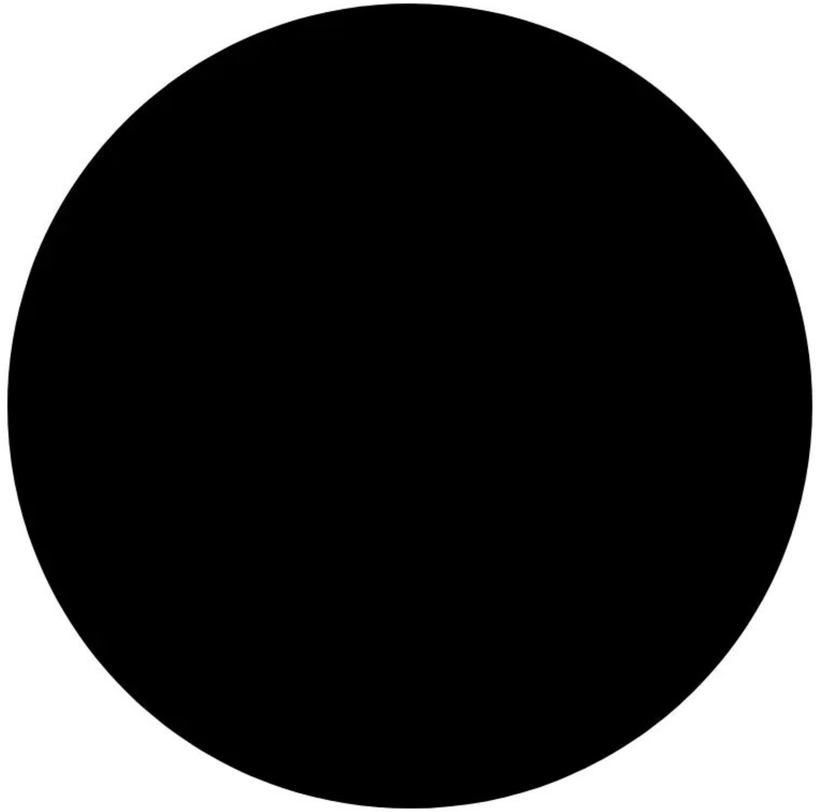


Vector

240%



Raster

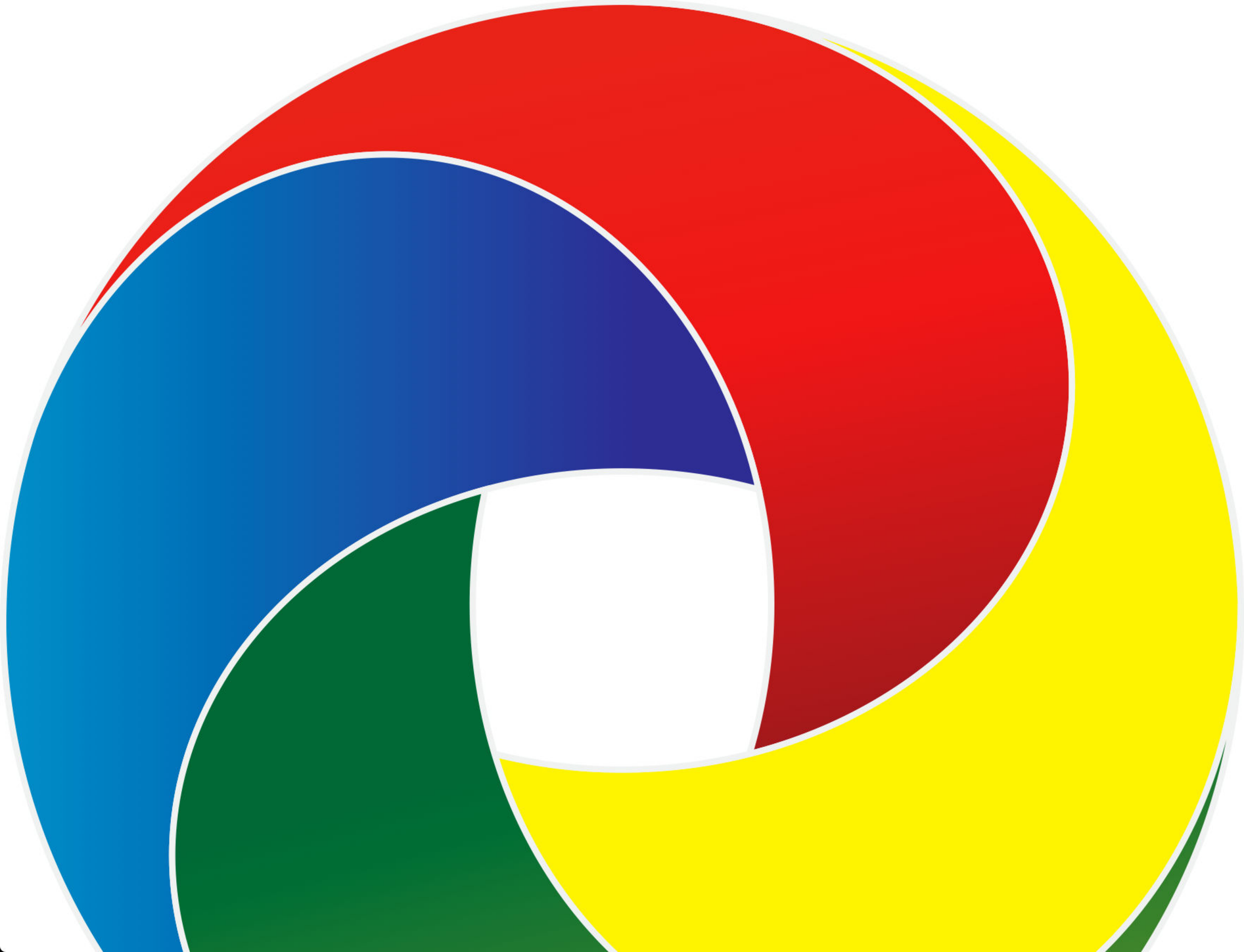


Vector

400%

Notice as I zoom in that the vector image is redrawn to fit inside the viewport

100%



150%

Zooming re-draws the image at full resolution, utilizing all pixels on the screen, creating more detail in the image

800%

Vector Web formats: SVG

Vector *non-Web* formats: AI (Adobe Illustrator) • Blender • EPS (Encapsulated PostScript) • PDF • PostScript

💡 PRO TIP

Note: you can embed raster objects inside vector images, so a vector format isn’t necessarily 100% vector content!

Drawing tools

- Adobe Illustrator
- Inkscape
- CorelDRAW
- Vectornator
- Affinity Designer
- Pixelmator Pro
- Boxy SVG

`<img>`

Embedded *image*

`src` attribute is required (just like `href` for `<a>`)

Other attributes: `alt` • `attributionsrc` • `crossorigin` • `decoding` • `elementtiming` • `fetchpriority` • `height` • `ismap` • `loading` • `referrerpolicy` • `sizes` • `srcset` • `width` • `usemap`

`width`

» Width of image in pixels
» Unimportant with responsive web design*

`height`

» Height of image in pixels
» Unimportant with responsive web design*

* In which case `width` & `height` are defined in CSS

`alt`

Alternate text information describing image for those with visual disabilities or images turned off

The trick with `alt` is finding a balance

Pretend a blind friend has asked you to describe this image

You wouldn't just say `White house` — that would be rude & unhelpful!

Likewise, Modern, sleek white house situated on a hillside. The design is characterized by curved architecture and terraced landscaping. The garden features various types of cacti and plants, which give it a desert-inspired aesthetic. Stepping stone pathways meander through the manicured grassy areas, leading to the entrance. is way too much detail!

How about this?

Modern white house on a hill with large white stepping stones lead-ing up to the door

ChatGPT 4 does a fantastic job generating `alt` text, but it's $20/month (free users as of February 2025 cannot upload images)

Anthropic’s Claude does a good job of generating `alt` text — & you can do it with the free version

ANTHROP\C

Claude ⌄ Research Company Careers News Try Claude

Meet Claude

Claude is AI for all of us. Whether you're brainstorming alone or building with a team of thousands, Claude is here to help.

Try Claude | Get API access

anthropic.com/claude

If you simply ask Claude to provide `alt` text for an image, you will get a very long, detailed description — much too long to use for `alt`

A lush garden landscape featuring curved flower beds with vibrant red, yellow, pink, and white flowers against a backdrop of manicured lawns. The beds are terraced and beautifully landscaped with evergreen shrubs and a large Japanese maple tree as a centerpiece. Blue cone-shaped garden lights are placed throughout the beds. The garden demonstrates professional landscaping with careful attention to color coordination and multi-level planting design.

Nice description, but way too long!

A lush garden landscape featuring curved flower beds with vibrant red, yellow, pink, and white flowers against a backdrop of manicure[illegible] The beds are te[illegible]beautifully [illegible]ed with evergreen [illegible]ubs and a large Japanese maple tree as a centerpiece. Blue cone-shaped garden lights are placed throughout the beds. The garden demonstrates professional landscaping with careful attention to color coordination and multi-level planting design.

For generating `alt` text, use this prompt:

```
Create alt text for this image in 1 sentence
of 15 words or less. Do not say that it is an
image or alt text, & do not use quotation
marks.
```

I need alt text for this image

Claude

Good evening, Scott

Create alt text for this image in 1 sentence of 15 words or less. Do not say that it is an image or alt text, & do not use quotation marks.

Claude 3.7 Sonnet

Choose style

Use shift + return for new line

fertilizers-full.webp

Drop files here to add to chat

Max 20 files per chat at 30 MB each

Your recent chats

View all →

SG

Claude

Good evening, Scott

Create alt text for this image in 1 sentence of 15 words or less. Do not say that it is an image or alt text, & do not use quotation marks.

Claude 3.7 Sonnet Choose style Use shift + return for new line

SG

Your recent chats

View all →

Claude Describing Farm Landscape in 15 Words

Share

SG Create alt text for this image in 1 sentence of 15 words or less. Do not say that it is an image or alt text, & do not use quotation marks.

Mounds of manure or compost with blurred cattle in the background on a farm.

Retry

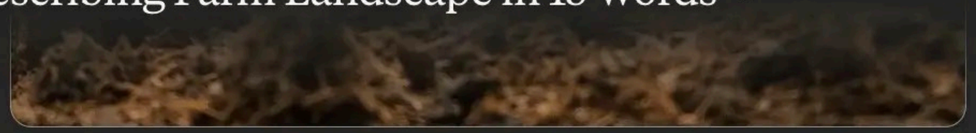
SG

Reply to Claude...

Claude 3.7 Sonnet Choose style

Claude Describing Farm Landscape in 15 Words

Share



SG Create alt text for this image in 1 sentence of 15 words or less. Do not say that it is an image or alt text, & do not use quotation marks.

Mounds of manure or compost with blurred cattle in the background on a farm.

Retry

Claude can make mistakes. Please double-check responses.

SG Now do this one

Claude 3.7 Sonnet Choose style

Use shift + return for new line

Claude Describing Farm Landscape in 15 Words

Share

SG Now do this one

Trees completely enveloped in massive spider webs near water after flooding.

Retry

Claude can make mistakes. Please double-check responses.

SG

Reply to Claude...

Claude 3.7 Sonnet Choose style

Terraced garden with vibrant flower beds flowing around manicured lawns and decorative trees.

DEMO!

`alt` was required by HTML 4, but HTML5 changes this

» Omitting `alt` tells rendering engine that the image is *vital, but no textual equivalent* is available
» Using `alt=""` tells rendering engine that the image is *not vital*, so non-visual browsers may omit it

HTML

```html
<p>
  The eight planets orbiting the sun <img src="https://assets.codepen.io/122116/sun-Freepik-Flaticon.webp" alt="">:</p>
<ul>
  <li>Mercury <img src="https://assets.codepen.io/122116/mercury-Freepik-Flaticon.webp" alt=""></li>
  <li>Venus <img src="https://assets.codepen.io/122116/venus-Freepik-Flaticon.webp" alt=""></li>
  <li>Earth <img src="https://assets.codepen.io/122116/planet-earth-Freepik-Flaticon.webp" alt=""></li>
  <li>Mars <img src="https://assets.codepen.io/122116/mars-Freepik-Flaticon.webp" alt=""></li>
  <li>Jupiter <img src="https://assets.codepen.io/122116/jupiter-Freepik-Flaticon.webp" alt=""></li>
  <li>Saturn <img src="https://assets.codepen.io/122116/saturn-Freepik-Flaticon.webp" alt=""></li>
  <li>Uranus <img src="https://assets.codepen.io/122116/uranus-Freepik-Flaticon.webp" alt=""></li>
  <li>Neptune <img src="https://assets.codepen.io/122116/neptune-Freepik-Flaticon.webp" alt=""></li>
</ul>
```

CSS (SCSS)

JS

The eight planets orbiting the sun :

- Mercury
- Venus
- Earth
- Mars
- Jupiter
- Saturn
- Uranus
- Neptune

Planet icons created by Freepik - Flaticon

📦 FORMATTING GUIDE

Capitalize the first letter of the `alt` value — it looks & reads nicer

```
<img src="hpl.webp" alt="picture of H.P. Lovecraft">
```

👎

```
<img src="hpl.webp" alt="Picture of H.P. Lovecraft">
```

👍

📦 FORMATTING GUIDE

You do not need to end the `alt` value with a period — it's unnecessary

```
<img src="hpl.webp" alt="Picture of H.P. Lovecraft.">
```

👎

```
<img src="hpl.webp" alt="Picture of H.P. Lovecraft">
```

👍

HTML

```html
<p>
  <img src="https://s3-us-west-2.amazonaws.com/s.cdpn.io/122116/Libby.nov98.jpg" width="500" height="363" alt="Libby as a puppy">
</p>
```

CSS

JS

That is a terrible `alt` value! Why?

In this case `<img>` is inside `<p>`, but you don't have to do that

`srcset`

List of possible image sources for the browser to use, with `src` containing the fallback

Some browsers don’t support WebP images (thanks, Safari prior to 14 🙄), but every browser supports JPEGs

So use JPEGs in `src`, & WebP in `srcset`

Older browsers will see the JPEG in `src` & ignore the WebP in `srcset`

Other, newer browsers will see the JPEG in `src` & then see the WebP in `srcset` & use that instead

HTML

```html
<img src="https://assets.codepen.io/122116/tsathaggua-color.jpg"
srcset="https://assets.codepen.io/122116/tsathaggua-bw.webp" width="500" height="500" alt="Tsathaggua">
```

`tsathaggua-color` in `src`;
`tsathaggua-bw` in `srcset`

Notice which one got used

CSS (SCSS)

JS

Of course, in a few years, all browsers worth supporting will use WebP (keep checking Can I Use!)

At that point, we will change this:

```
<img src="cthulhu.jpg" srcset="cthulhu.webp">
```

To this:

```
<img src="cthulhu.webp">
```

📦 FORMATTING GUIDE

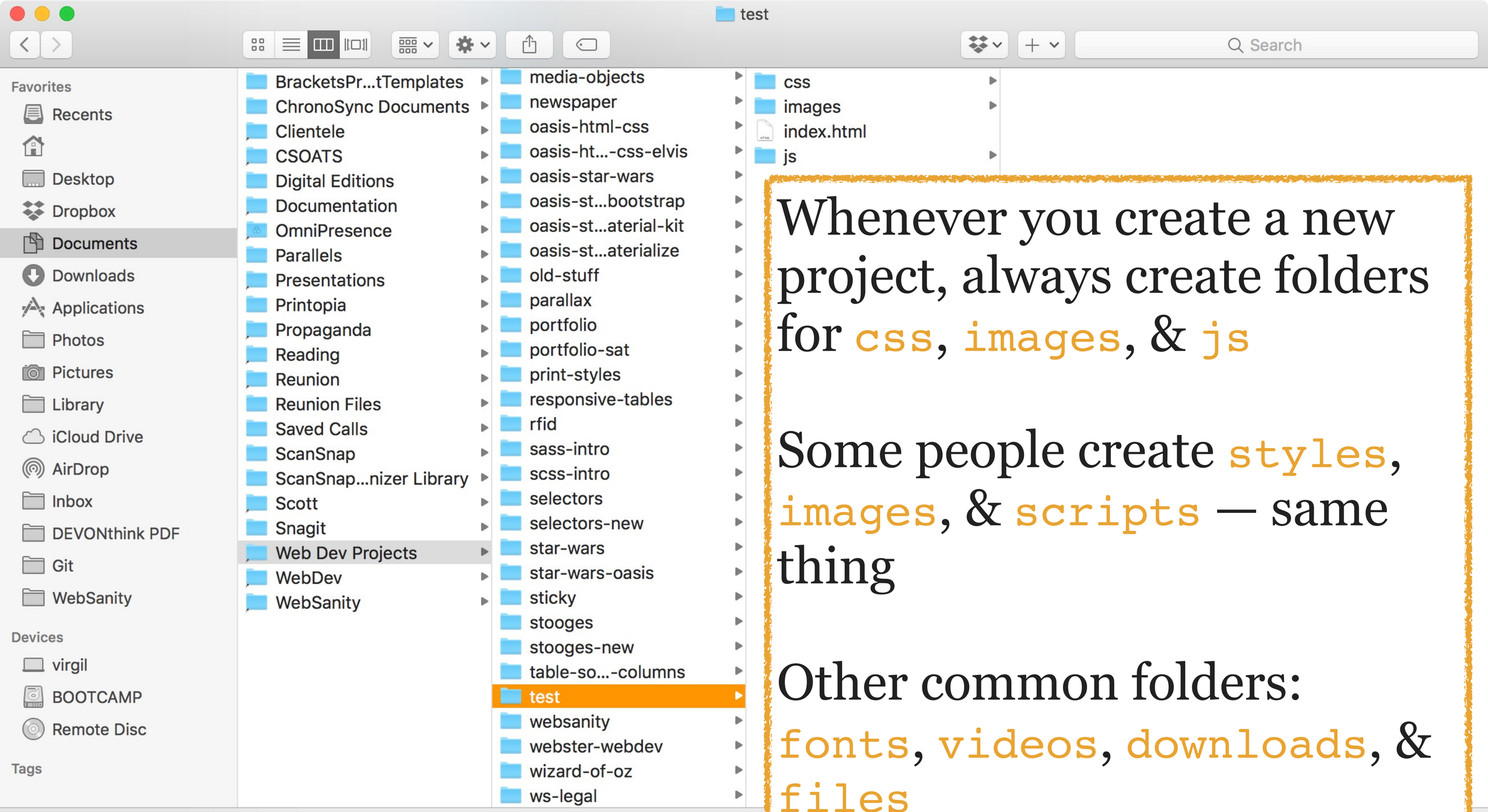
When using `<img>`, `src` is *required*

`srcset` is only used if it is needed

`<img srcset="hpl.webp">` is *not valid* because it's missing `src`! 👎

`<img src="hpl.jpg" srcset="hpl.webp">` is correct & valid 👍

					iOS		
srcset	–	16	38	9	9	34	34



Whenever you create a new project, always create folders for `css`, `images`, & `js`

Some people create `styles`, `images`, & `scripts` — same thing

Other common folders: `fonts`, `videos`, `downloads`, & `files`

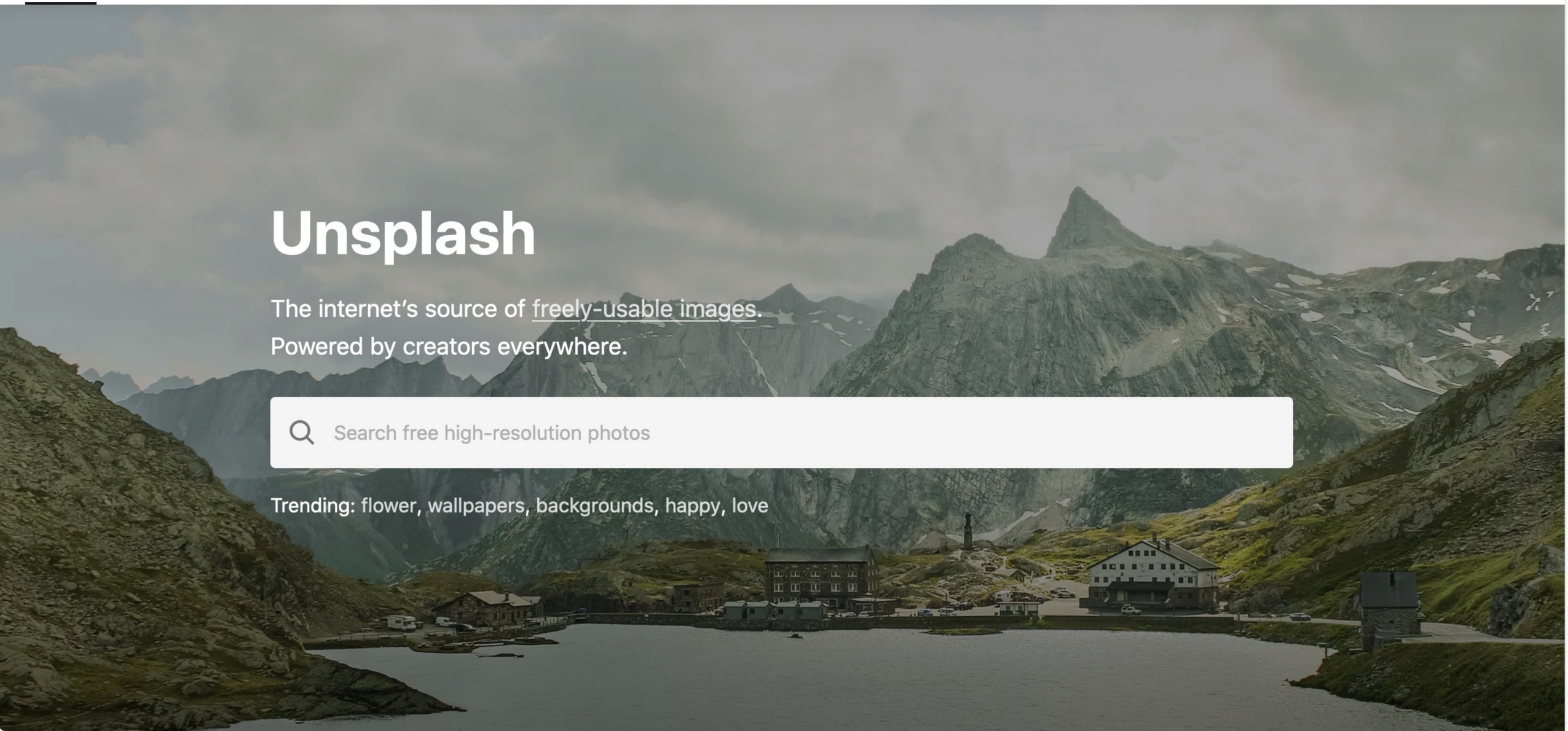
Broadly, images are used for 3 reasons on the Web:

» Navigation: buttons & banners
» Content
» Ornamentation

Images should always serve a purpose!

💡 PRO TIP

When you're developing your website, you will often need *temporary placeholder images*



Unsplash

The internet's source of freely-usable images.
Powered by creators everywhere.

Search free high-resolution photos

Trending: flower, wallpapers, backgrounds, happy, love

Embed a random Unsplash image by specifying its dimensions … & more

```
<img src="https://unsplash.it/500/300">
```

produces an image that is 500×300

```
<img src="https://unsplash.it/500">
```

produces an image that is 500×500

```
<img src="https://unsplash.it/g/400/200">
```
produces a gray shaded image that is 400×200

```
<img src="https://unsplash.it/500/300?blur">
```
produces a blurred image that is 500×300

```
<img src="https://unsplash.it/g/700/400?blur">
```
produces a blurry gray image that is 700×400

HTML

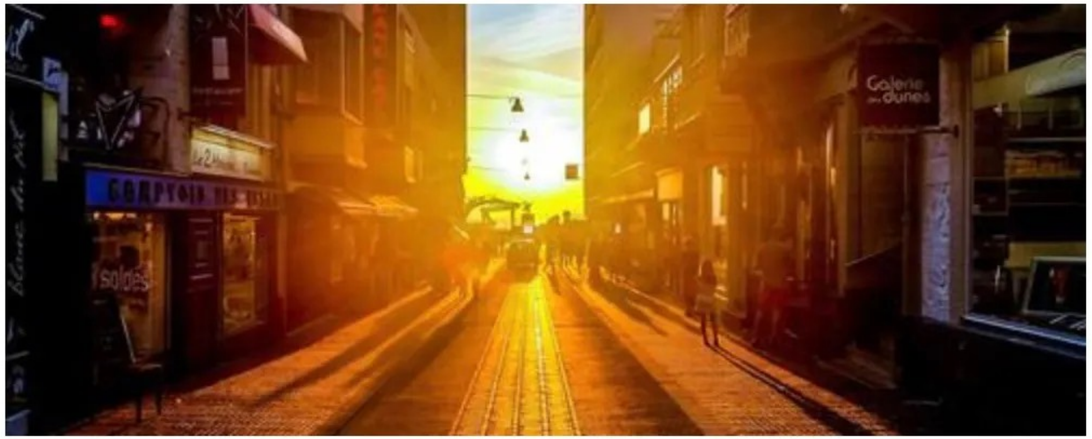
```html
<img src="https://unsplash.it/500/200">

<img src="https://unsplash.it/200">

<img src="https://unsplash.it/300/200?blur">
```

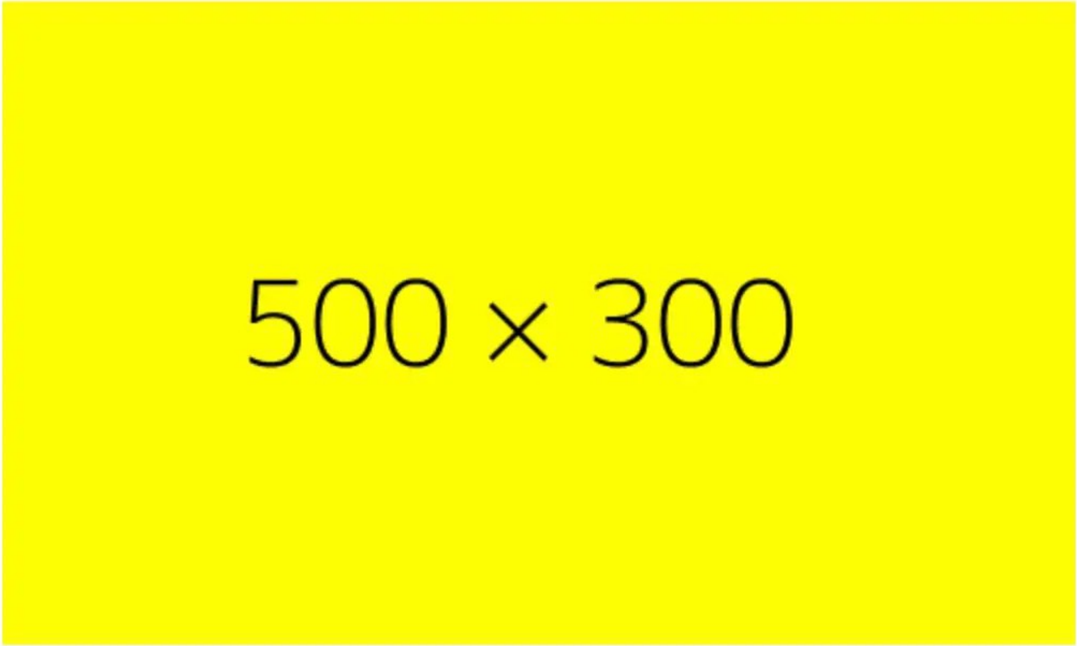
CSS (SCSS)

JS



Dynamic Dummy Image Generator

by Russell Heimlich (@kingkool68)



https://dummyimage.com/500x300/fffb00/000000.gif

Size: 500x300 / Background Color: fffb00 / Foreground Color: 000000 . Format: gif

& Text:

Dynamic Dummy Image Generator

by Russell Heimlich (@kingkool68)

https://dummyimage.com/500x300/fffb00/000000.gif&text=D

Size: 500x300 / Background Color: fffb00 / Foreground Color: 000000 . Format: gif

& Text: Dagon

What if you need sample headshots?

This Person Does Not Exist displays a new AI-generated face every time the webpage reloads

It’s not always perfect, though…

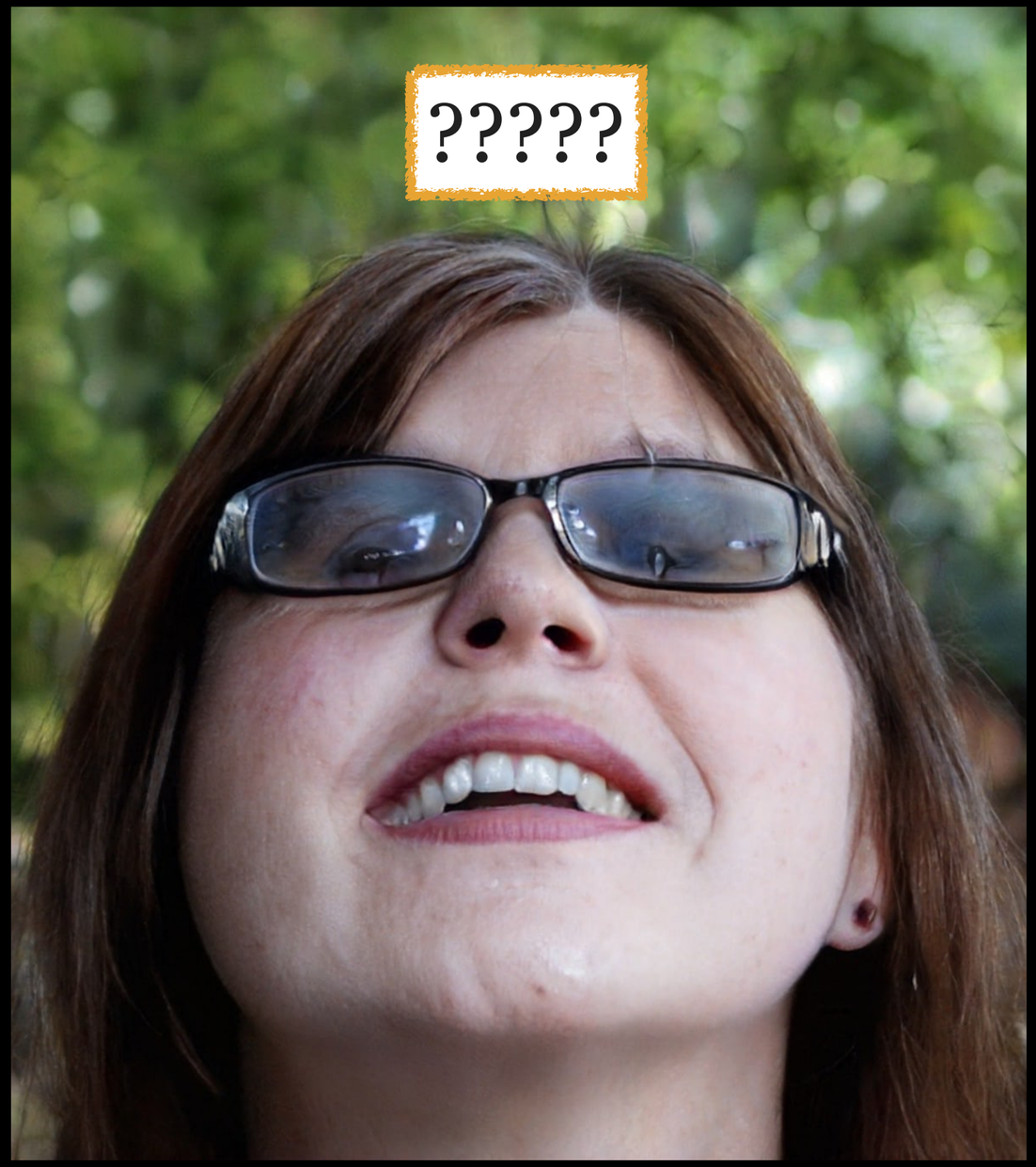


Image Formats

According to Google, images on average are responsible for > 60% of the bytes needed to load a webpage

Choose the right image formats to reduce your page load (& for other reasons too)

Web-native image formats

- GIF
- JPEG
- PNG

Raster: legacy

- SVG

Vector

- WebP
- AVIF
- JPEG XL

Raster: modern

Legacy Raster

GIF • JPEG • PNG

GIF

Graphics Interchange Format (pronounced *giff**)

Dates back to 1987

Limited to 256 colors total

Only real modern (mis-)use is animation

* Fight me.

GIF

Graphics Interchange Format (pronounced *giff**)

Dates back to 1987

Limited to 256 colors total

Only real modern (mis-)use is animation

* Fight me.

JPEG

Joint Photographic Experts Group (pronounced *jay-peg*)

Introduced in 1992

Most widely-used image format, but better formats exist & you should use them

Only use for backwards compatibility with older software

PNG

Portable Network Graphics (pronounced *ping*)

Intended to replace GIF … in 1996!

Again, better formats exist & you should use them

Only use for backwards compatibility with older software

SVG

Scalable Vector Graphics

Vector image format

SVG is vital to the Web & will be with us for a long time

More ahead in `<svg>`

					iOS		
GIF	Y	Y	Y	Y	Y	Y	Y
JPEG	Y	Y	Y	Y	Y	Y	Y
PNG	Y	Y	Y	Y	Y	Y	Y
SVG	Y	Y	Y	Y	Y	Y	Y

Modern Raster

WebP • AVIF • JPEG XL

New, modern formats have many advantages over older one

- Better compression so much smaller
- Look great
- New, useful features

WebP

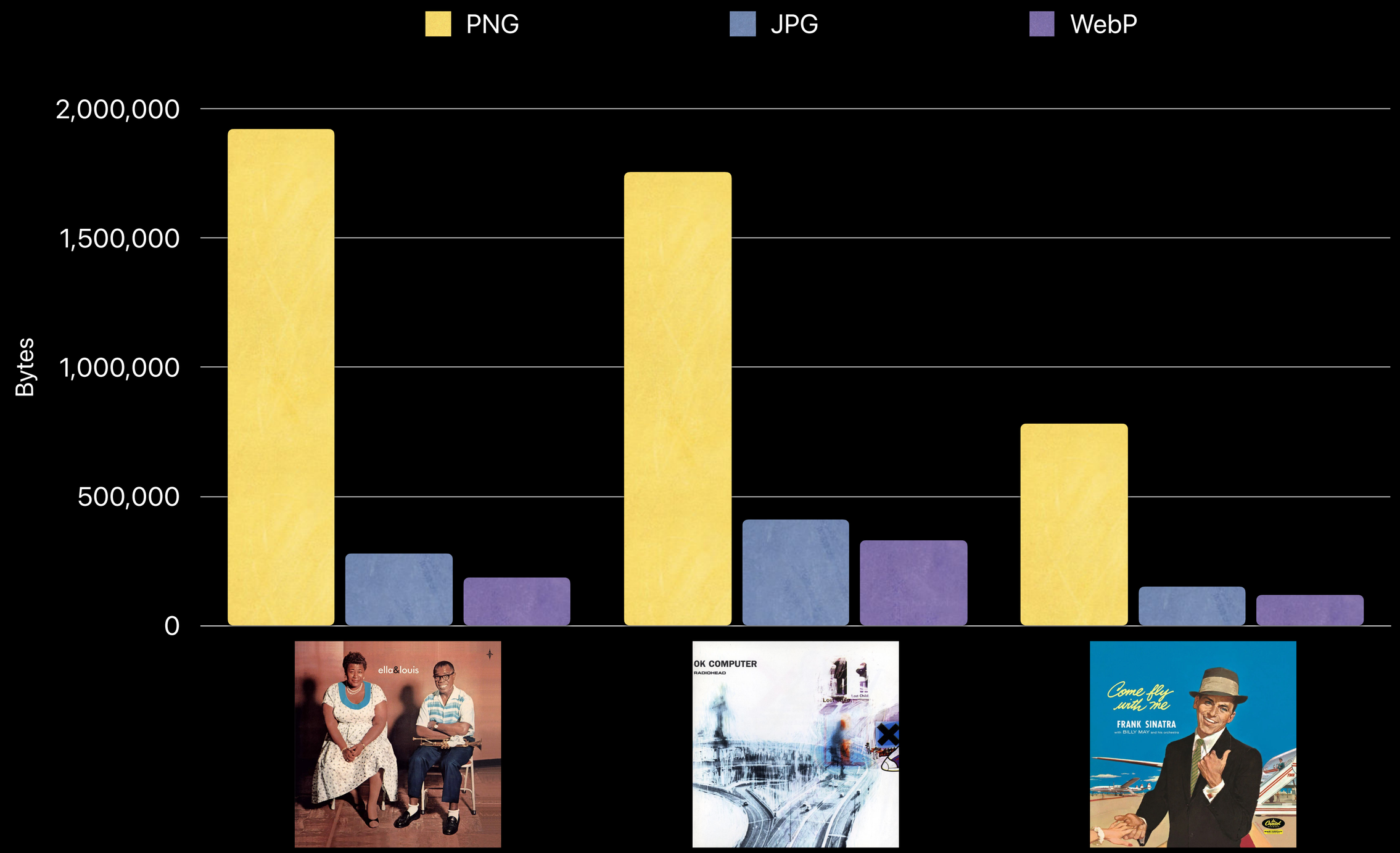
Designed to replace JPEG, PNG, & GIF

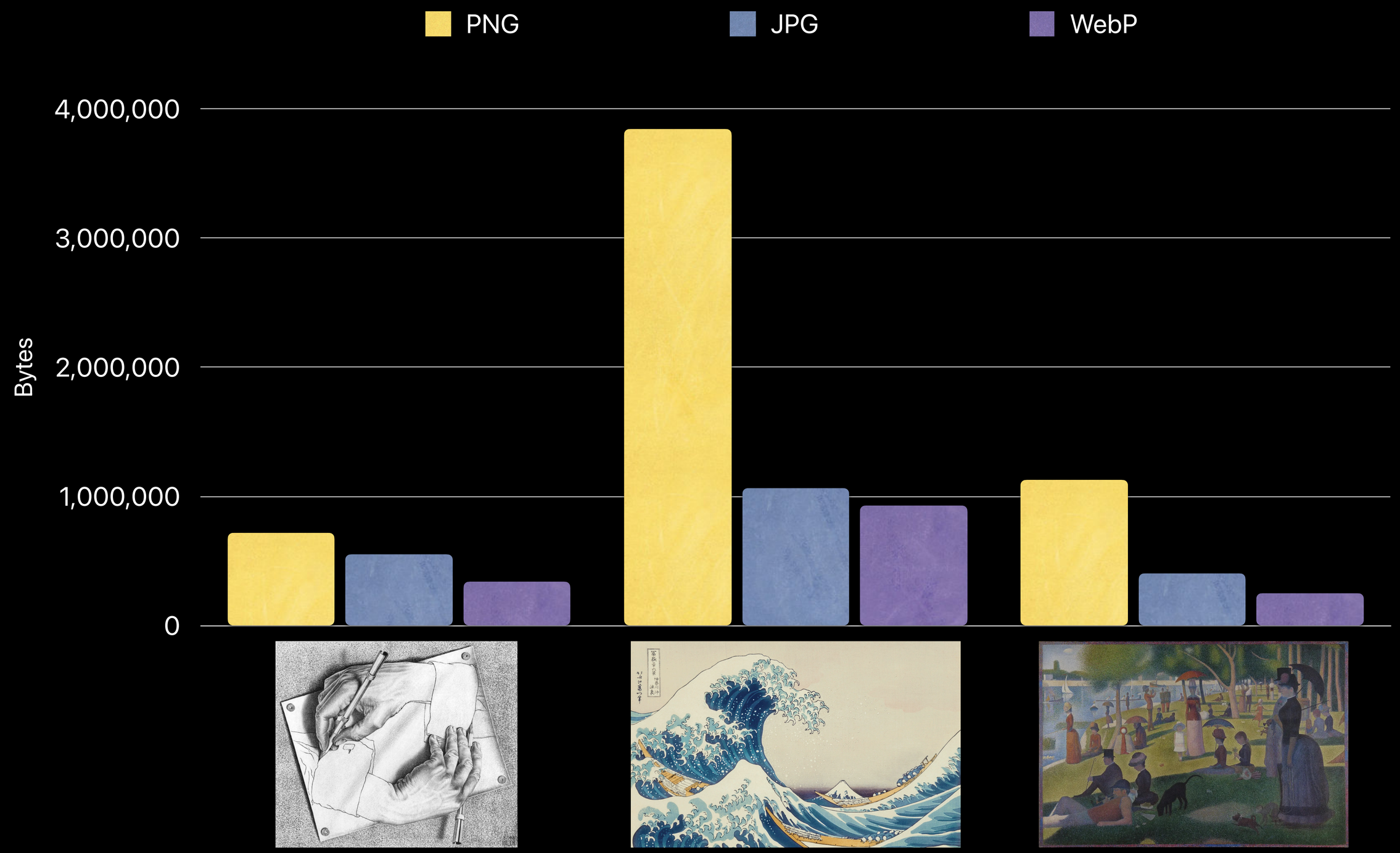
Announced by Google in 2010 as an open, royalty-free format

As of March 2023, supported by 97% of browsers worldwide!

Supports:

- lossy & lossless compression in the same image
- animation
- alpha transparency
- photos & flat colors (e.g., logos)


PNG
JPG
WebP
Bytes
2,000,000
1,500,000
1,000,000
500,000
0
ella&louis
OK COMPUTER
RADIOHEAD
Lost Child
Come fly with me
FRANK SINATRA
with BILLY MAY and his orchestra

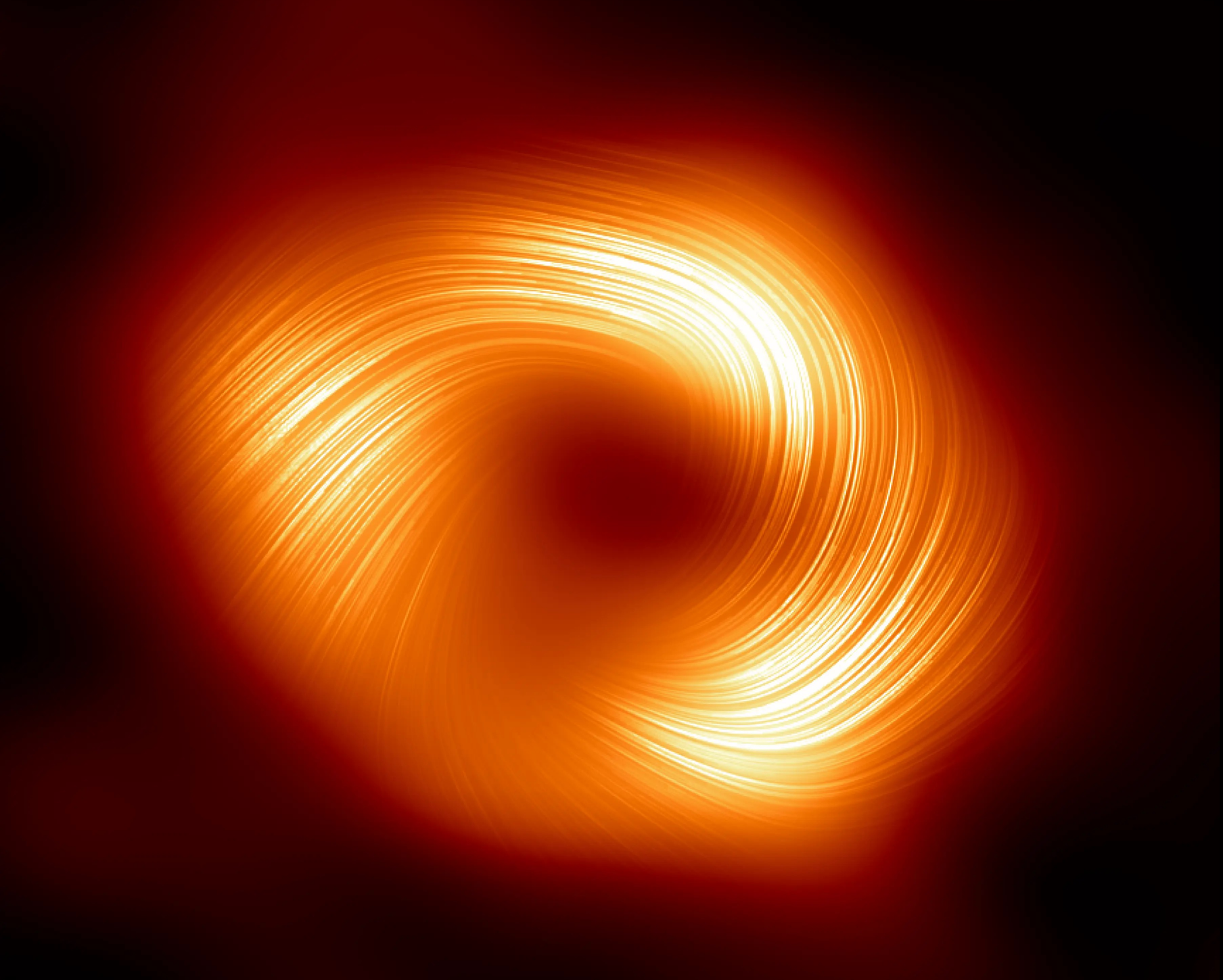

PNG
JPG
WebP
Bytes
4,000,000
3,000,000
2,000,000
1,000,000
0

On 6 September 2022, NASA released the latest image taken by the Webb Space Telescope

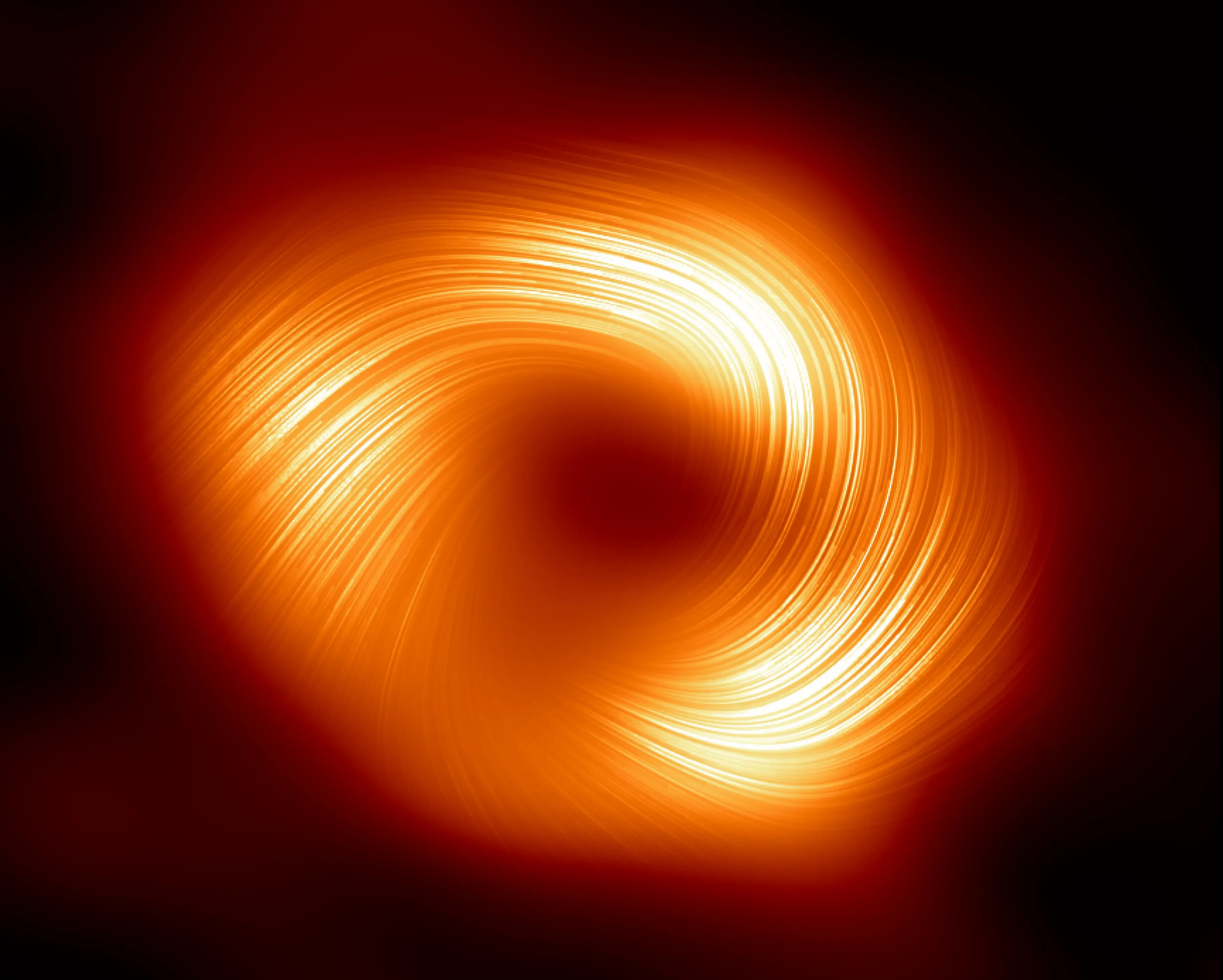
The Tarantula Nebula, 170,000 light-years away from Earth & stretching 340 light-years across

14557×8418 pixels
141 MB PNG

Converted to a 5 MB WebP!



On 27 March 2024, the European Southern Observatory released this image of magnetic fields spiraling from the edge of the supermassive black hole Sagittarius A at the center of Milky Way galaxy



TIFF	41 MB
PNG	16 MB
JPG	1.4 MB
WebP	253 KB

Jans & I have moved over to WebP for all images on our sites

However, you should check your analytics data to make sure your website’s audience can view them

AVIF

Designed to replace WebP

Really good animation options (not a surprise since it’s based on the AV1 video codec)

As of Feb. 2025, supported by 95% of all browsers worldwide!

Already being used on lots of sites

Supports:

- lossy & lossless compression in the same image
- alpha transparency
- royalty-free
- supports 10-bit & 12-bit color depth, allowing for HDR (High Dynamic Range)
- photos & flat colors (e.g., logos)
- animated images

JPEG XL

Designed to replace all existing raster formats

Jans ~~is~~ was very excited about JPEG XL! 🥰

There’s one huge problem with JPEG XL

As of March 2025, only 14% of browsers support it

Why? Who’s to blame for that?

There’s one huge problem with JPEG XL

As of March 2025, only 14% of browsers support it

Why? Who’s to blame for that?

Many organizations have stated that their preferred choice for online images is JPEG XL:

Adobe • Cloudinary • Facebook • Flickr • The Guardian • Intel • Serif • Shopify • SmugMug • Video Electronics Standards Association

On 25 May 2021, Google rolled out Chrome 91, which supported JPEG XL if the user turned on a hidden preference

On 30 Oct. 2022, Google announced that it would remove support for JPEG XL from Chrome 110

Comment 84 by dah...@chromium.org on Sun, Oct 30, 2022 at 6:34 PM CDT

Thank you everyone for your comments and feedback regarding JPEG XL. We will be removing the JPEG XL code and flag from Chromium for the following reasons:

- Experimental flags and code should not remain indefinitely
- There is not enough interest from the entire ecosystem to continue experimenting with JPEG XL
- The new image format does not bring sufficient incremental benefits over existing formats to warrant enabling it by default
- By removing the flag and the code in M110, it reduces the maintenance burden and allows us to focus on improving existing formats in Chrome

Google's ridiculous (& easily debunked) explanation for removing JPEG XL

Supports:

- lossy & lossless compression in the same image
- alpha transparency
- royalty-free with open source implementation
- supports 10-bit & 12-bit color depth, allowing for HDR (High Dynamic Range)
- photos & flat colors (e.g., logos)
- animation

WebP & AVIF all support those! How's JPEG XL different?

- image dimension of 1 billion+ pixels per side
- 4100 grayscale or RGB channels + 4096 “extra” channels
- transcode existing JPEGs to JPEG XL for an average 20% smaller file — & it’s reversible!
- progressive image delivery for faster loading
- 360 degree images
- image bursts
- large panoramas/mosaics
- CMYK & printing support

jpegxl.info

JPEG XL

Industry-leading image compression & fidelity

Smaller Files, Higher Quality, Faster Downloads.

Unmatched in quality-per-byte, JPEG XL delivers best-of-breed image compression from web

Apps with official support for JPEG XL

: Pixelmator Pro • GraphicConverter • Acorn

⊞: Paint.NET • IrfanView

⊞: Photoshop • Lightroom • Affinity Photo

: Gimp

⊞: ImageMagick (command line only) • ExifTool • FFmpeg

Apple officially supports JPEG XL (e.g., in Safari, Photos, Preview, Finder…)

- macOS 14 Sonoma (2023)
- iOS/iPadOS 17 (2023)

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yllan / JXLook Public

Notifications Fork 7 Star 69

Code Issues 11 Pull requests 1 Actions Projects Security Insights

main 3 Branches 4 Tags Go to file Code

yllan Merge pull request #17 from JLHwung/improve-jxl-swift 28228c0 · 4 years ago 70 Commits

macOS 11–13 (Big Sur, Monterey, & Ventura) users can install JXLook (but that doesn't support browsers)

		4 years ago
		4 years ago
		4 years ago
		4 years ago
JXQuickLook	refactor: draw image on CGContext	4 years ago
JXQuickLookThumbnail	feat: implement thumbnail provider	4 years ago
Sparkle.framework	Add sparkle framework	4 years ago
jpeg-xl	update libjxl to 0.6.1+	4 years ago
.gitignore	Support grey-scale image and update libjxl to 0....	4 years ago

About

JPEG-XL viewer on macOS

Readme
MIT license
Activity
69 stars
4 watching
7 forks
Report repository

Releases 4

JXLook 0.1.4 Latest
on Jul 12, 2021

+ 3 releases

Windows 11 version 26100.0 or higher users can install Microsoft’s free JPEG XL Image Extension from the Microsoft Store

PLEASE NOTE – the extension is NOT an app – you cannot interact directly with it. It installs a plug-in used by Windows apps, such as File Explorer, to decode JPEG XL images. Please use File Explorer to view thumbnails after installing the extension.

You can set JPEG XL images as a desktop background and open JPEG XL images in Windows Media Player Legacy. Support for JPEG XL is coming to additional apps.

JPEG XL Image Extension

Microsoft Corporation

Utilities & tools

EVERYONE

Share

Description

The JPEG XL Image Extension enables Windows to view and save files that use the .jxl file extension.

This package is made possible thanks to the libjxl open source project (https://github.com/libjxl/libjxl).

PLEASE NOTE – the extension is NOT an app – you cannot interact directly with it. It installs a plug-in used by Windows apps, such as File Explorer, to decode JPEG XL images. Please use File Explorer to view

People also view ›

Windows File Manager
4.5 ★ Utilities & tools
Free

NanaZip Preview
5.0 ★ Utilities & tools
Free

A browser extension named JPEG XL Viewer adds simple support for JPEG XL to Chromium-based browsers & Firefox

Does not support transparency or animation, however

chrome web store

Search extensions and themes

Sign in

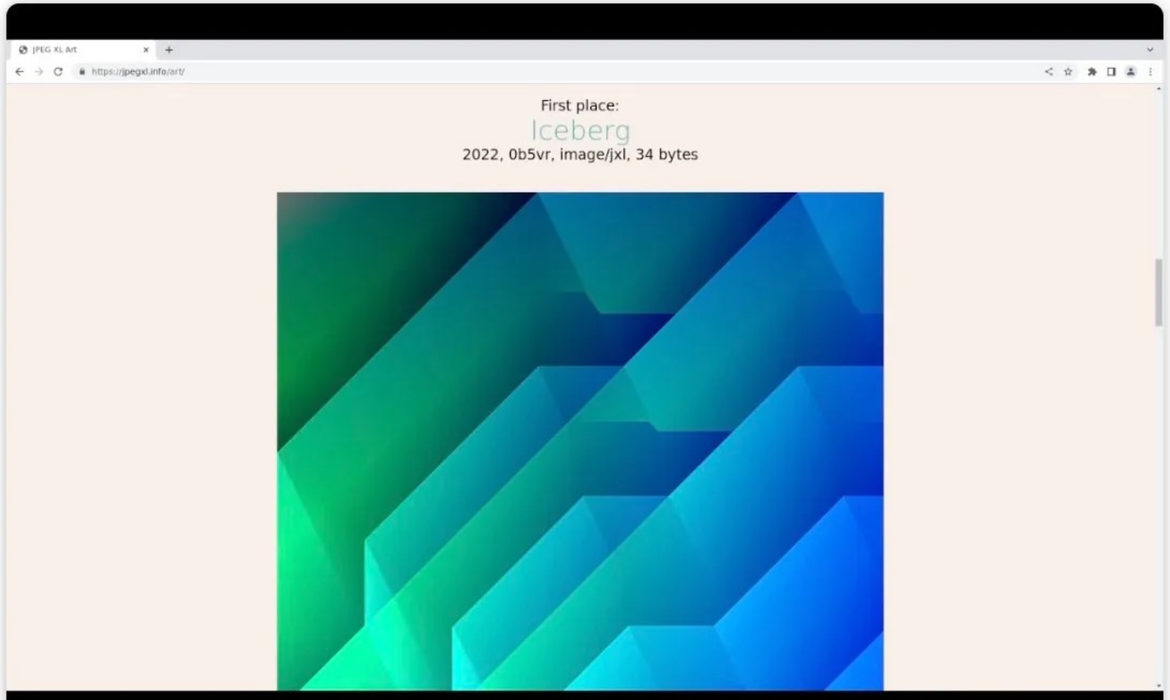
Discover Extensions Themes

JPEG XL Viewer

Add to Brave

Featured 4.5 ★ (25 ratings) Share

Extension Art & Design 3,000 users



Version
0.3.0

Offered by
zamfofex

Developer
Email

Non-trader
This developer has not identified itself as a trader. For consumers in the European Union, please note that consumer rights do not apply to contracts between you and this developer.

Updated
January 3, 2024

Size
384KiB

Flag concern

Languages
English (United States)

Privacy

The developer has disclosed that it will not collect or use your data.

This developer declares that your data is

- Not being sold to third parties, outside of the approved use cases
- Not being used or transferred for purposes that are unrelated to the item's core functionality
- Not being used or transferred to determine creditworthiness or for lending purposes

chrome web store

Search extensions and themes

Sign in

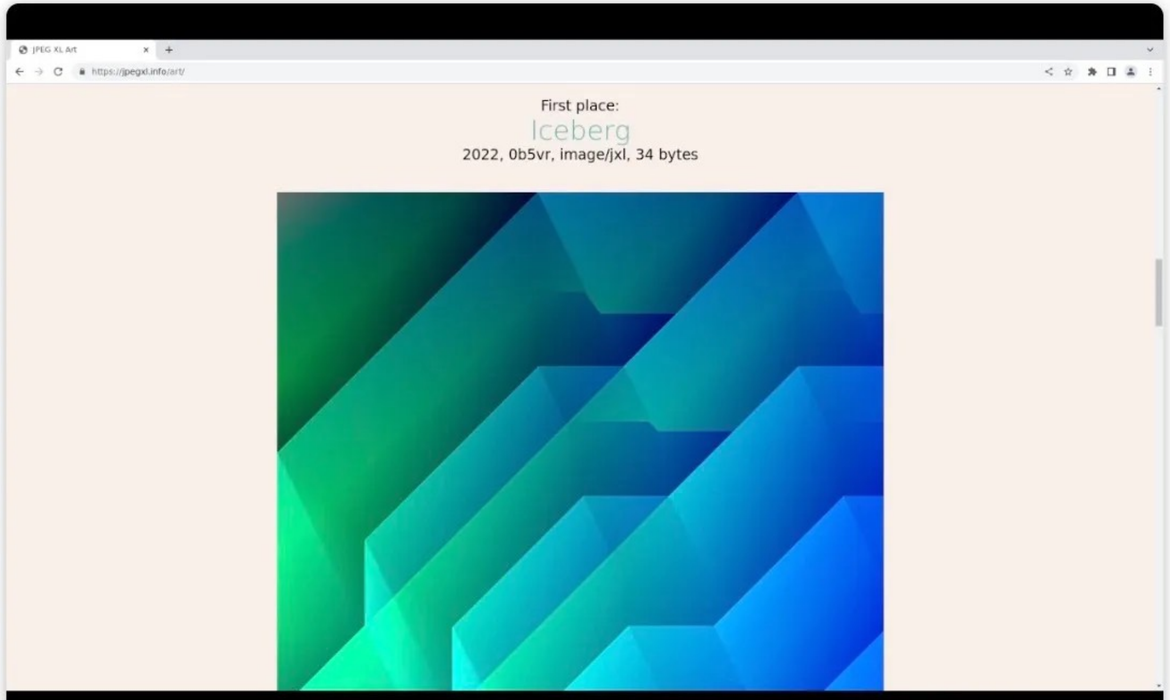
Discover Extensions Themes

JPEG XL Viewer

Add to Brave

Featured 4.5 ★ (25 ratings) Share

Extension Art & Design 3,000 users



After installation, test it

Does your browser support the new image format JPEG XL?

May 10, 2021 · 3 min

▶ Table of Contents

Note: If your browser supports JPEG XL, you will see the image with the text saying it

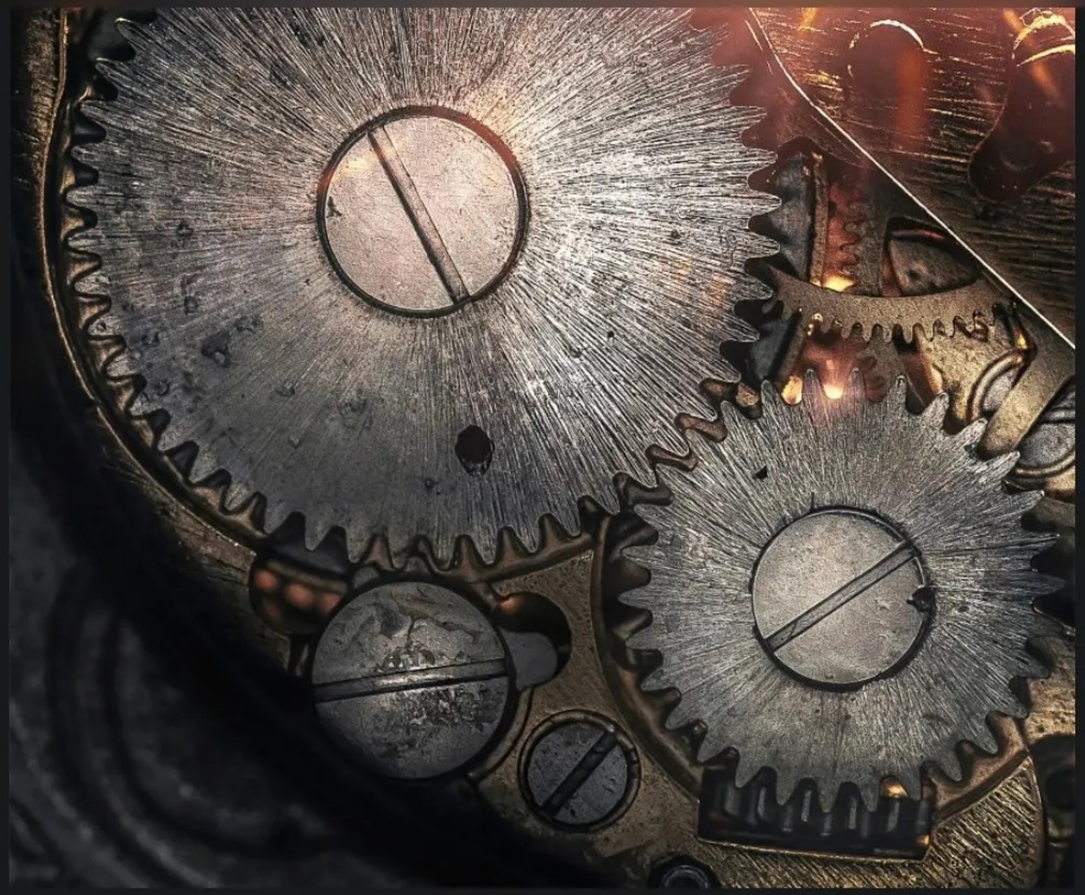
JPEG XL

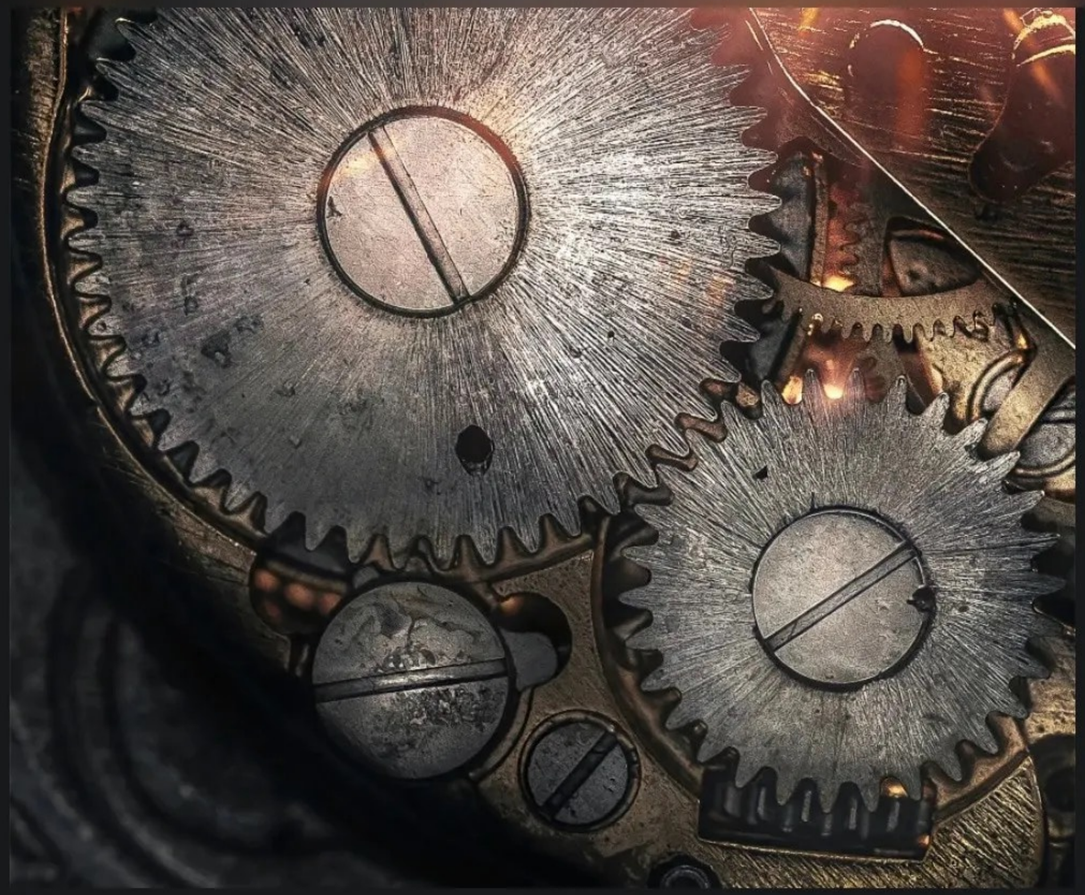
JPEG XL Test Page

Test your browser against common JPEG XL image types.

Size Comparison

JPEG XL

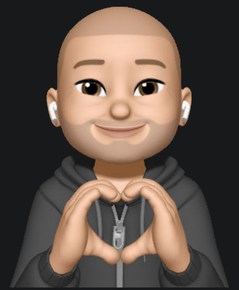




JPEG XL

Size: 359.1 KB

SSIMU2: 80.6



WEBP

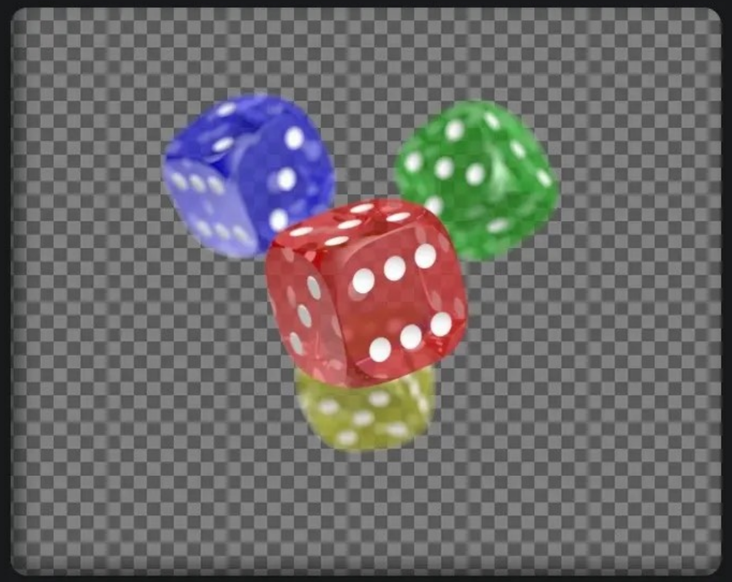
Size: 435.2 KB

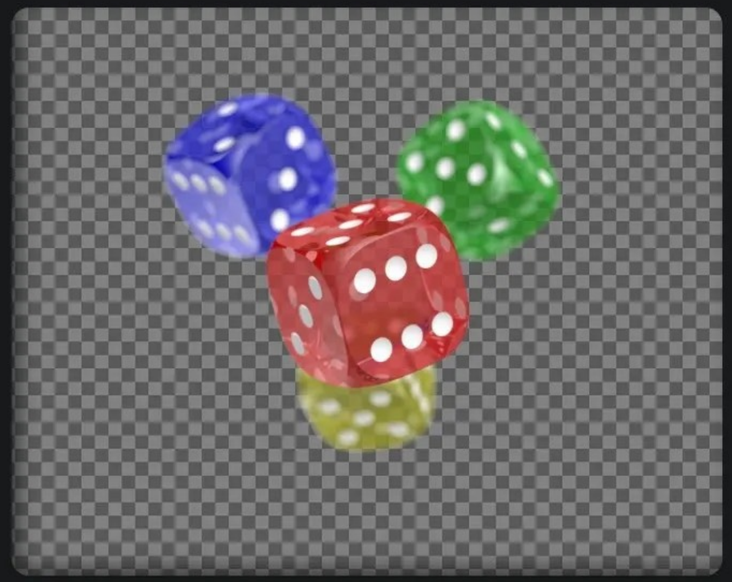
SSIMU2: 80.9

JPEG XL

Alpha Transparency

Your browser does not currently support JPEG XL





JPEG XL

Size: 46 KB
SSIMU2: 89.35

WEBP

Size: 65 KB
SSIMU2: 80.23

PNG

Size: 227 KB
SSIMU2: 100

JPEG XL

Wide Gamut

A faint Webkit logo can be seen when viewed on a P3 display

Your browser does not currently support JPEG XL

JPEG XL

Size: 10 KB
Bit Depth: 16-bit
SSIMU2: 100

WEBP

Size: 11 KB
Bit Depth: 8-bit
SSIMU2: 100

JPEG

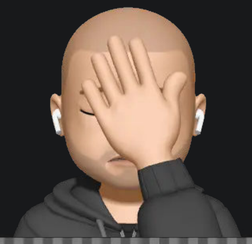
Size: 20 KB
Bit Depth: 8-bit
SSIMU2: 84.66

PNG

Size: 48 KB
Bit Depth: 16-bit
SSIMU2: 100

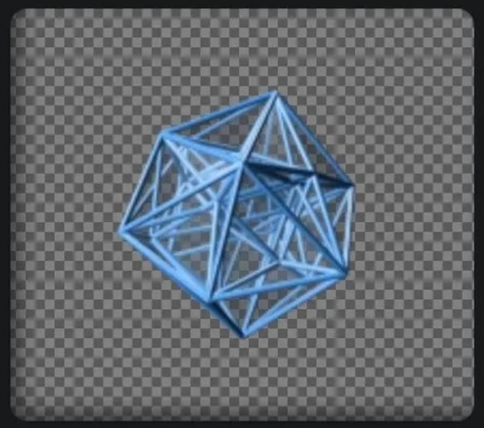
JPEG XL

Animations



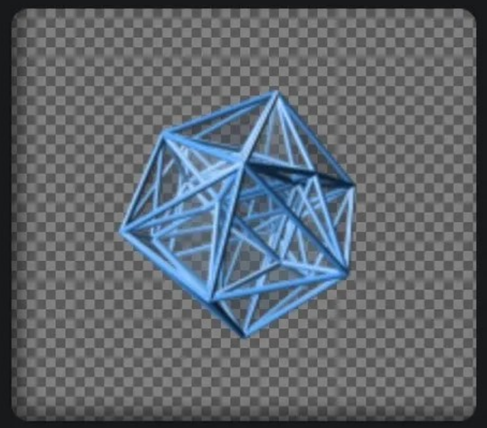
JPEG XL

Size: 341 KB



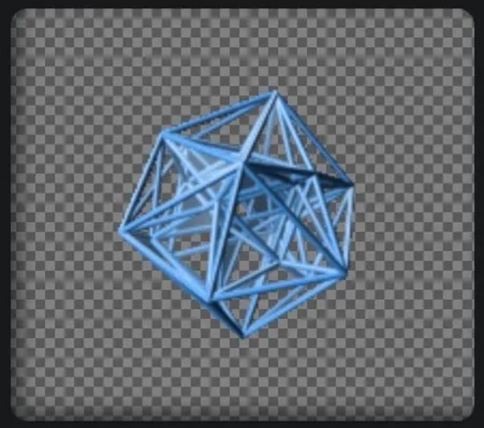
WEBP

Size: 391 KB



APNG

Size: 991 KB



GIF

Size: 384 KB

					iOS			
WebP	–	18	65	14††	14	32	4.2	97%
AVIF	–	121	93* 113	16.1* 16.4	16* 16.4	85	85	95%
JPEG XL	–	91† 110☠	90†	17*	17*	91† 110☠	–	14%

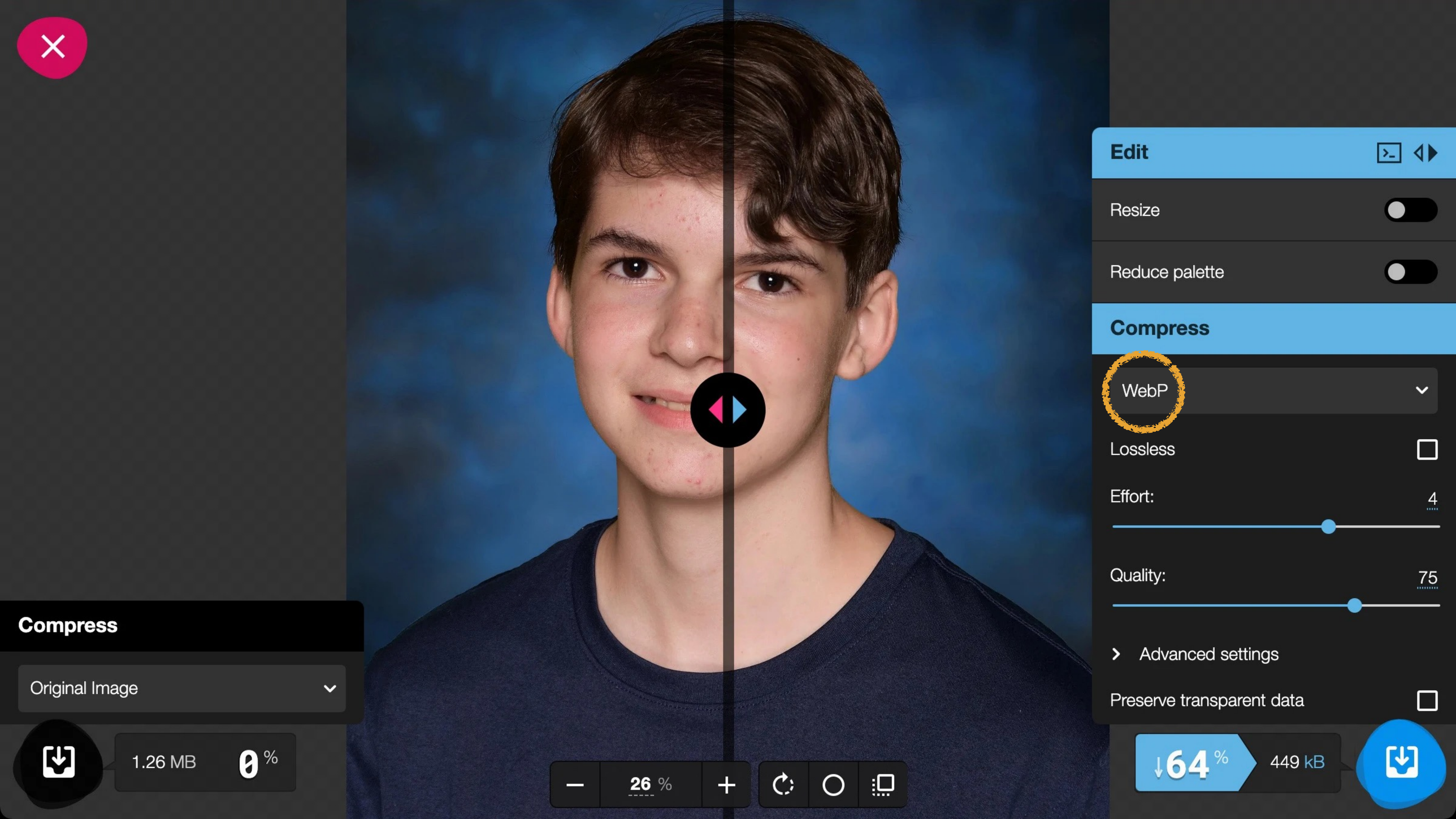
* No animation † Enabled via a flag †† Requires macOS 11 Big Sur or later

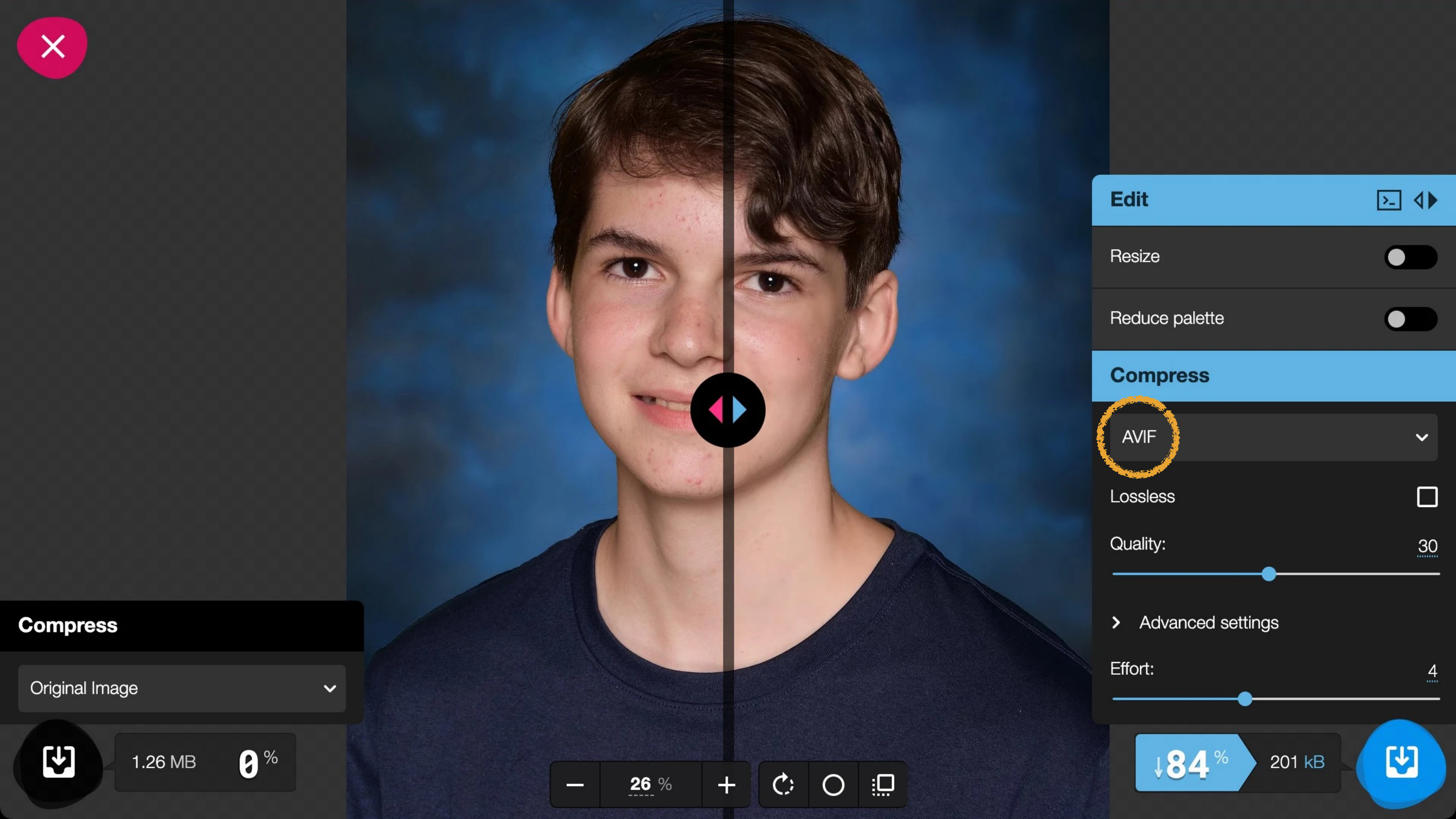
Want to play with new formats?

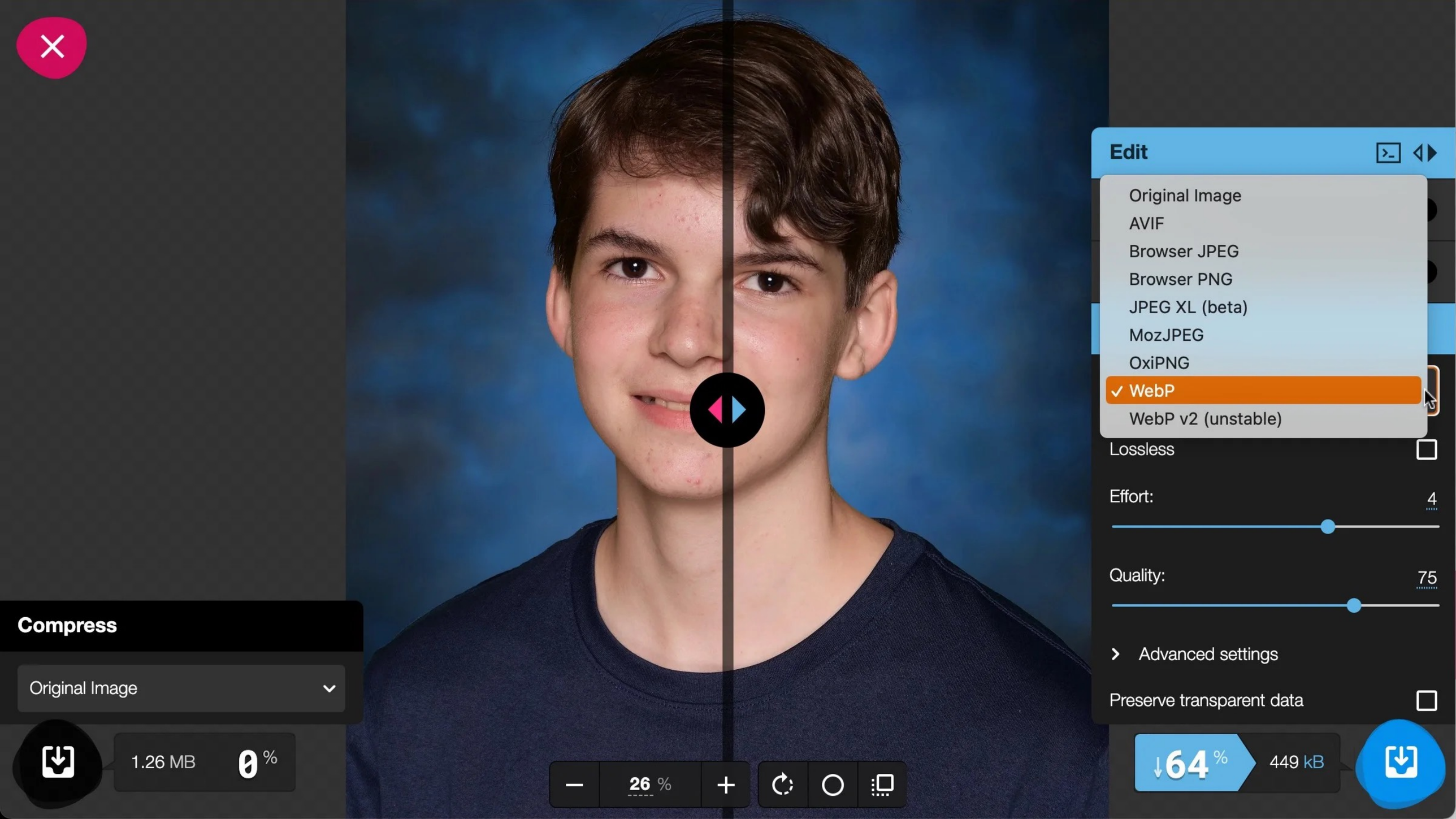
Go to `squoosh.app`

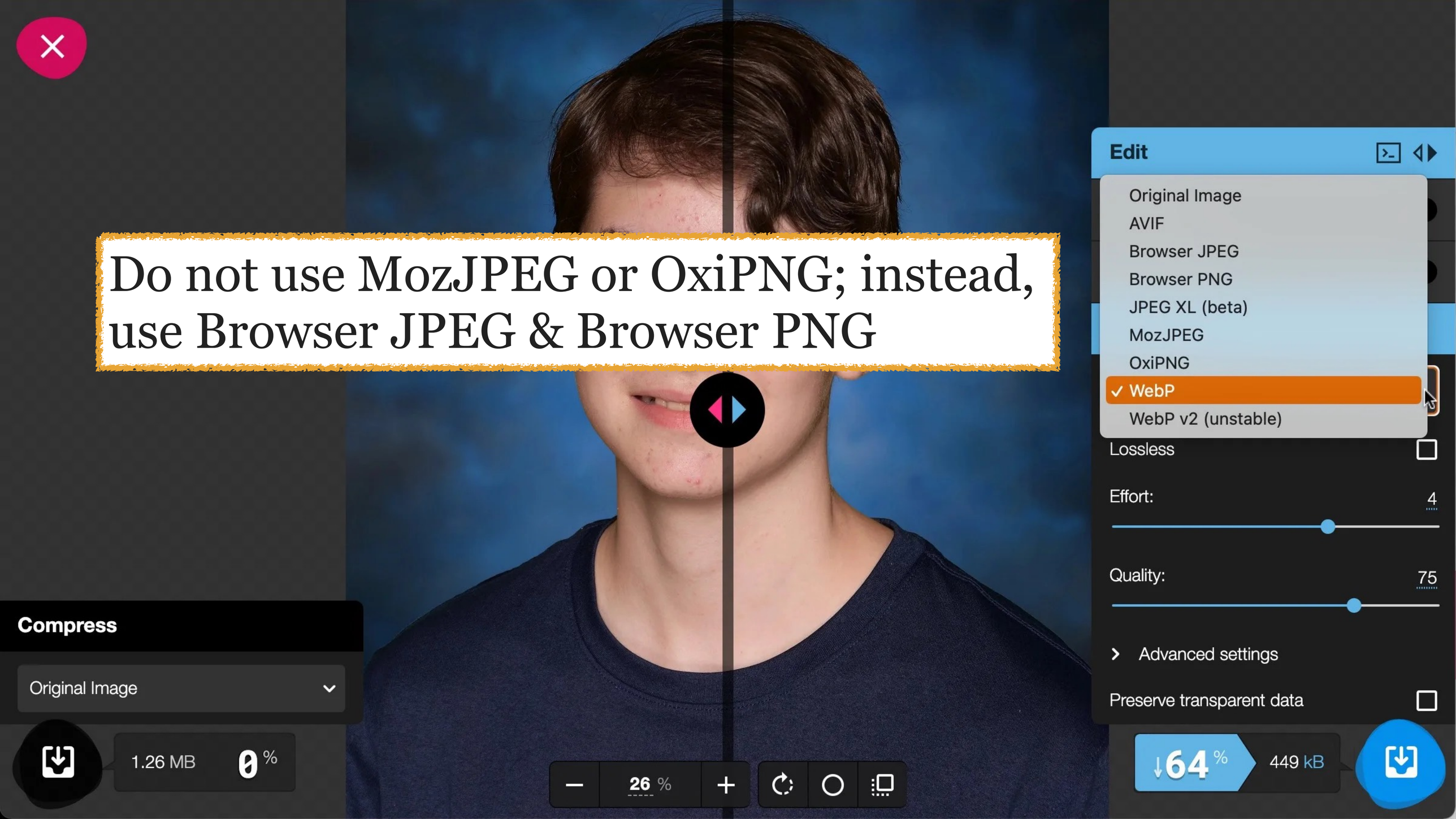
Squoosh

Drop OR Paste


Edit
Resize
Reduce palette
Compress
WebP
Lossless
Effort:
4
Quality:
75
Advanced settings
Preserve transparent data
Compress
Original Image
1.26 MB
0 %
26 %
64 %
449 kB


Compress
Original Image
1.26 MB
0 %
26 %
Edit
Resize
Reduce palette
Compress
AVIF
Lossless
Quality:
30
Advanced settings
Effort:
4
84 %
201 kB


Compress
Original Image
1.26 MB
0 %
26 %
Edit
Original Image
AVIF
Browser JPEG
Browser PNG
JPEG XL (beta)
MozJPEG
OxiPNG
WebP
WebP v2 (unstable)
Lossless
Effort:
4
Quality:
75
Advanced settings
Preserve transparent data
64 %
449 kB


Do not use MozJPEG or OxiPNG; instead, use Browser JPEG & Browser PNG
Edit
Original Image
AVIF
Browser JPEG
Browser PNG
JPEG XL (beta)
MozJPEG
OxiPNG
WebP
WebP v2 (unstable)
Lossless
Effort:
4
Quality:
75
Advanced settings
Preserve transparent data
Compress
Original Image
1.26 MB
0 %
26 %
↓64 %
449 kB

Need to convert several images at one time (i.e., *batch* or *bulk conversion*)?

XL Converter • $0 • ⊞ 🐧

codepoems.eu/xl-converter/

Permute • $15 •

software.charliemonroe.net/permute/

Squash • $20/yr •

realmacsoftware.com/squash/

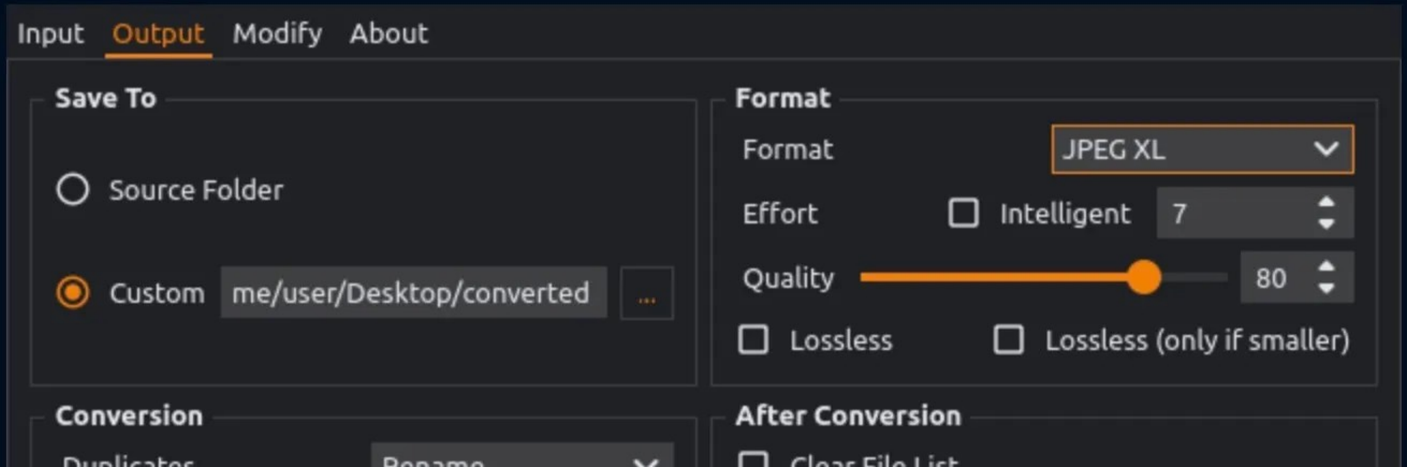
To WebP • $0 •

towebp.io

XL Converter

XL Converter

XL Converter is a powerful image converter.



XL Converter is *excellent!*

Batch conversion *to* WebP, JPEG XL, AVIF, JPG, & PNG

Many sophisticated JPEG XL options

Can convert *from* many formats, including HEIF

Uses newest, most efficient JPG encoder: JPEGLI

Convert to multiple formats to see which is smallest

Open source

No ads, no tracking

Local conversion only — no online connection needed

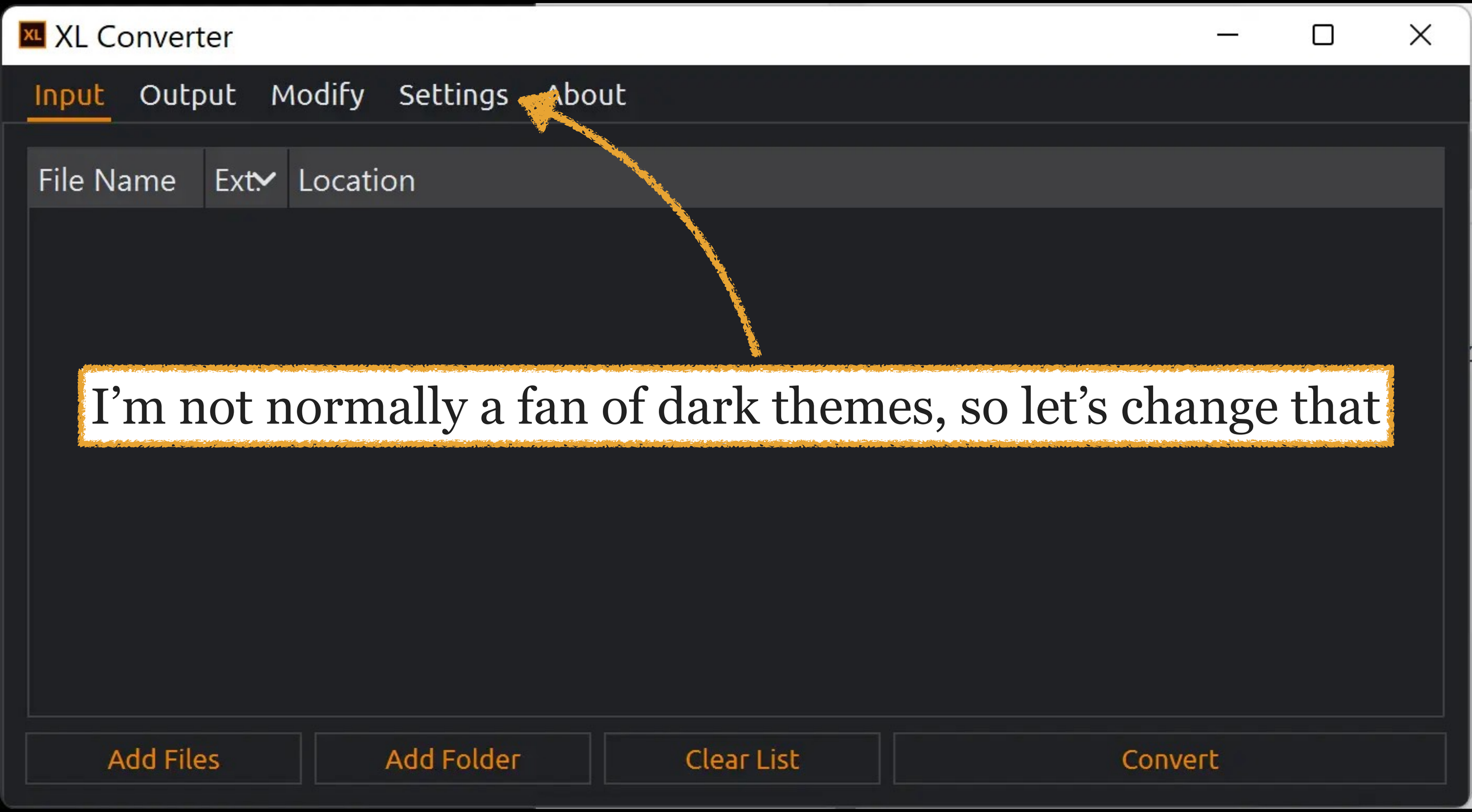
Let’s look at XL Converter

XL Converter

Input Output Modify Settings About

File Name	Ext.	Location

Add Files | Add Folder | Clear List | Convert


XL Converter
Input
Output
Modify
Settings
About
File Name
Ext.
Location
I'm not normally a fan of dark themes, so let's change that
Add Files
Add Folder
Clear List
Convert

XL Converter

Input Output Modify Settings About

General

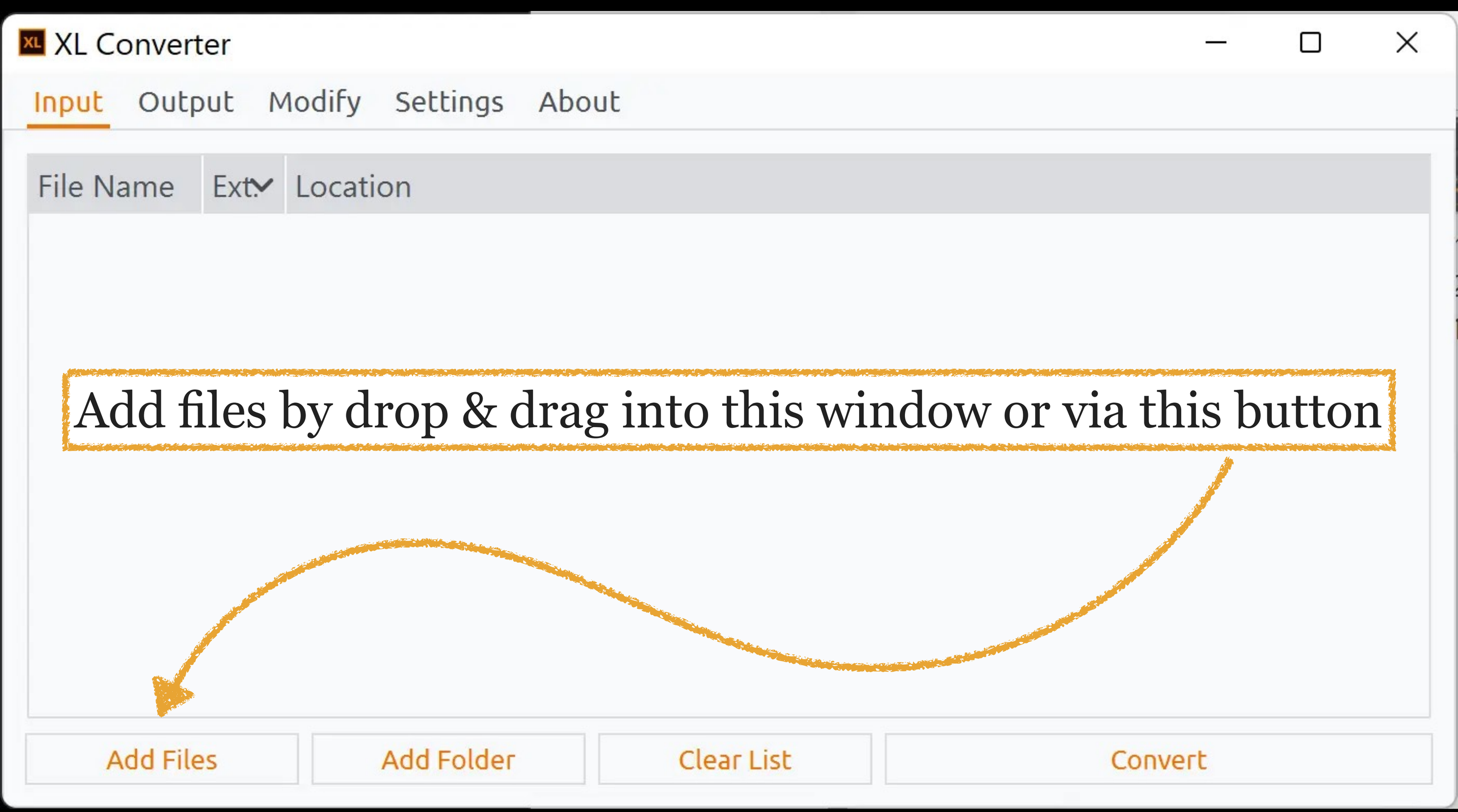
- [x] Dark Theme
- [x] Disable Downscaling on Startup
- [x] Disable Delete Original on Startup
- [ ] Disable Exception Popups
- [ ] Input - Disable Sorting

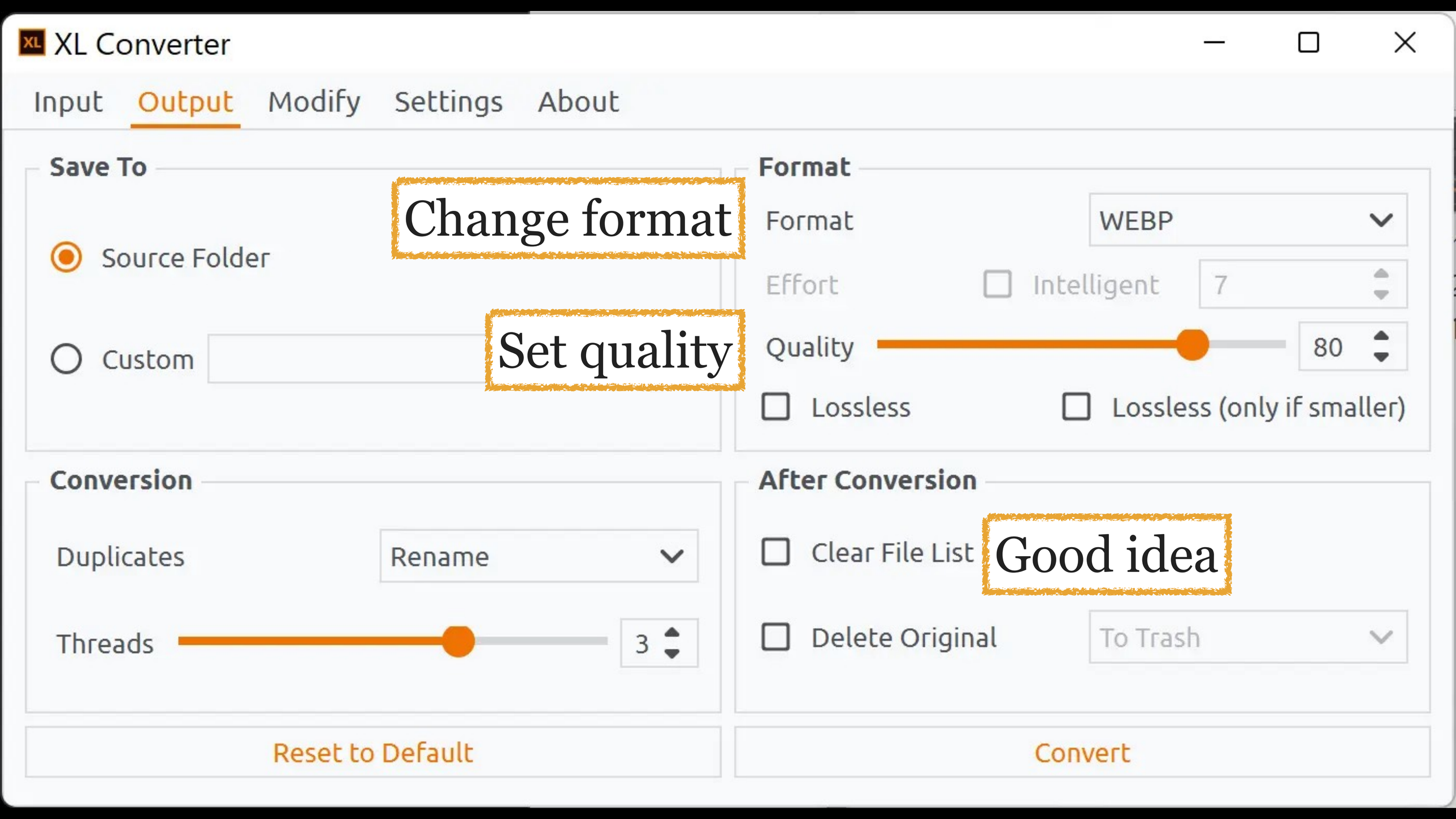
Advanced

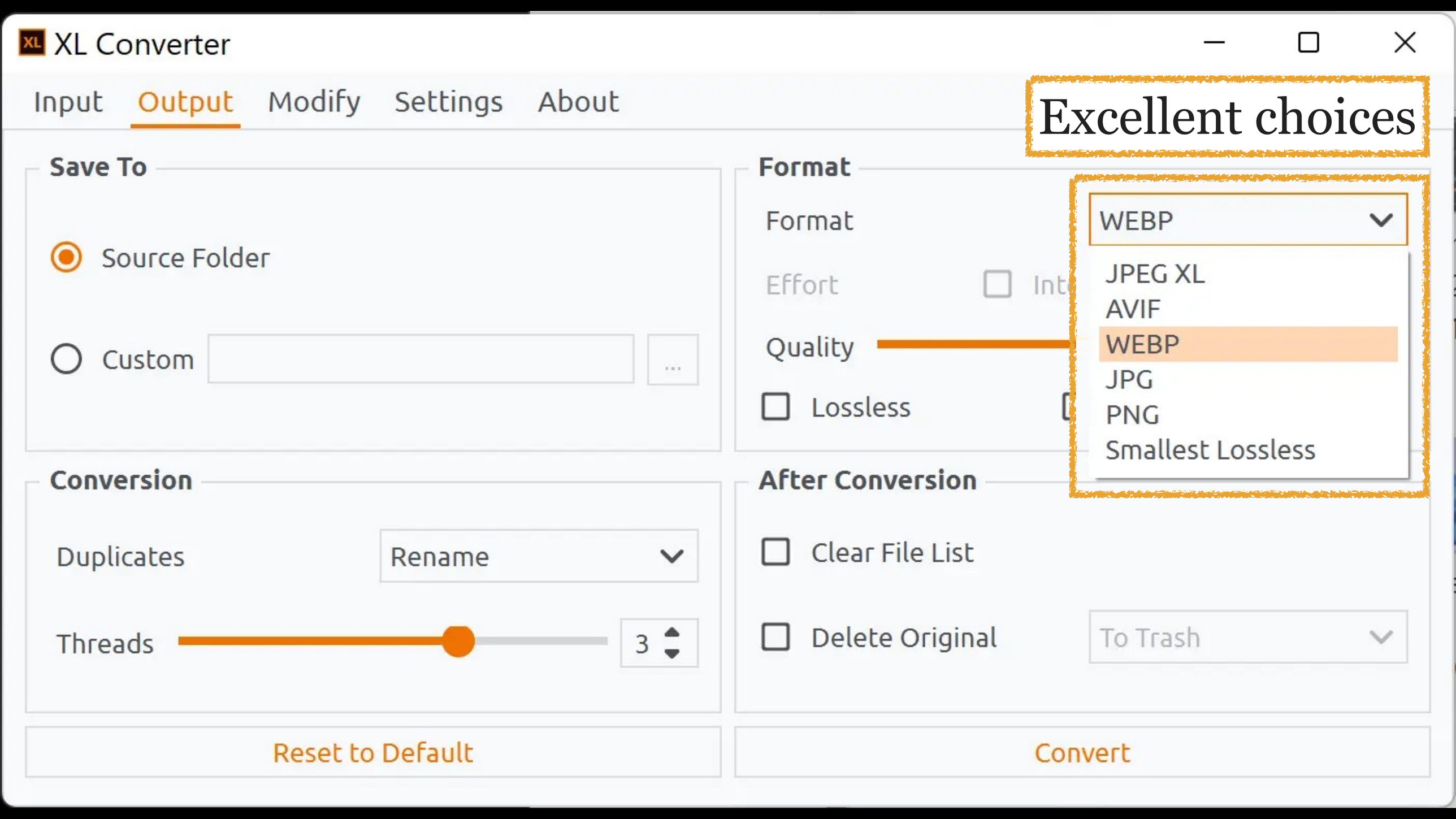
- [ ] JPEG XL - Enable Effort 10 (slow)
- [ ] JPEG XL - Disable UTF-8 Check
- [ ] Downscaling - Custom Resampling

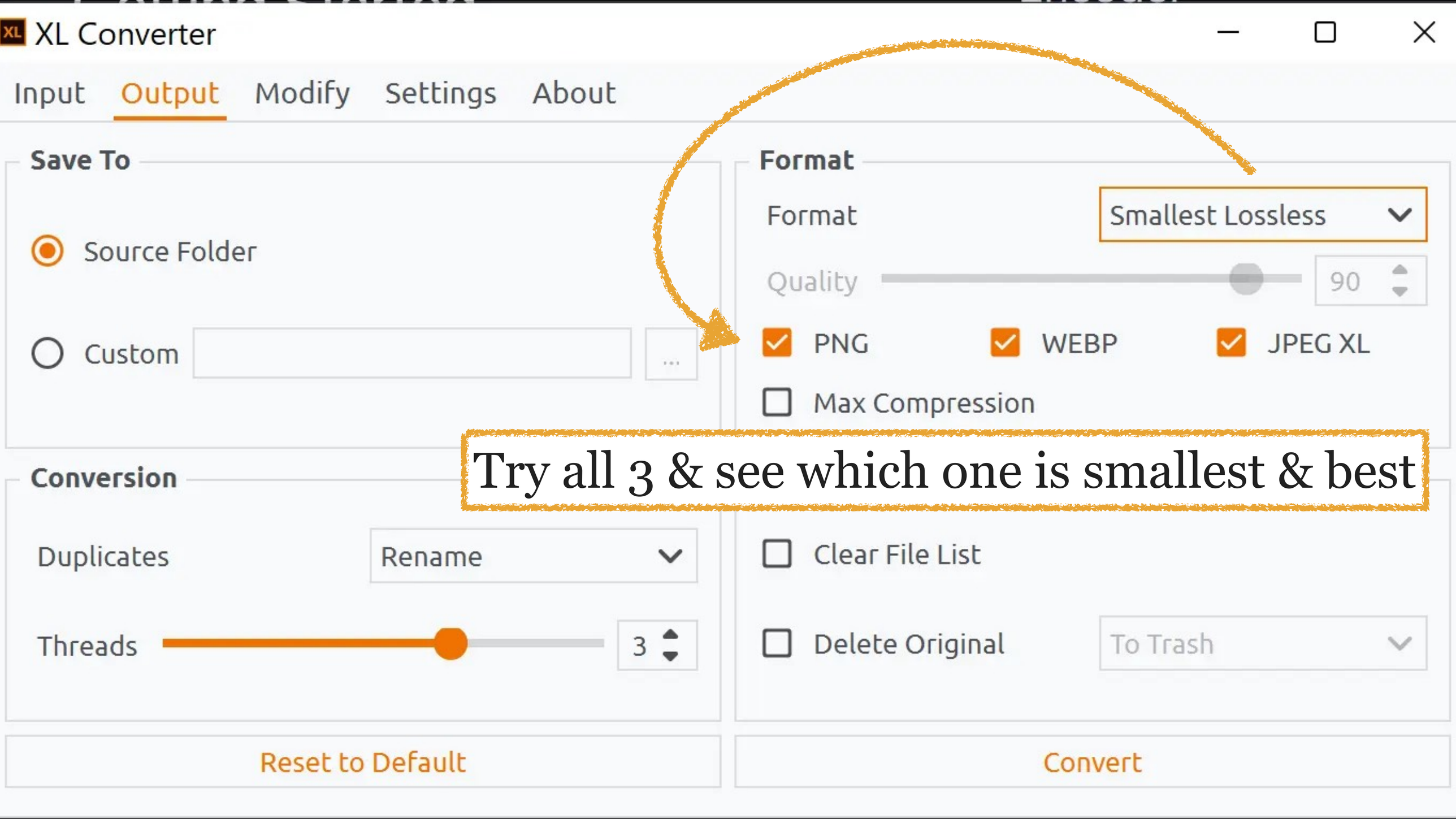
File List Save Load

Reset to Default

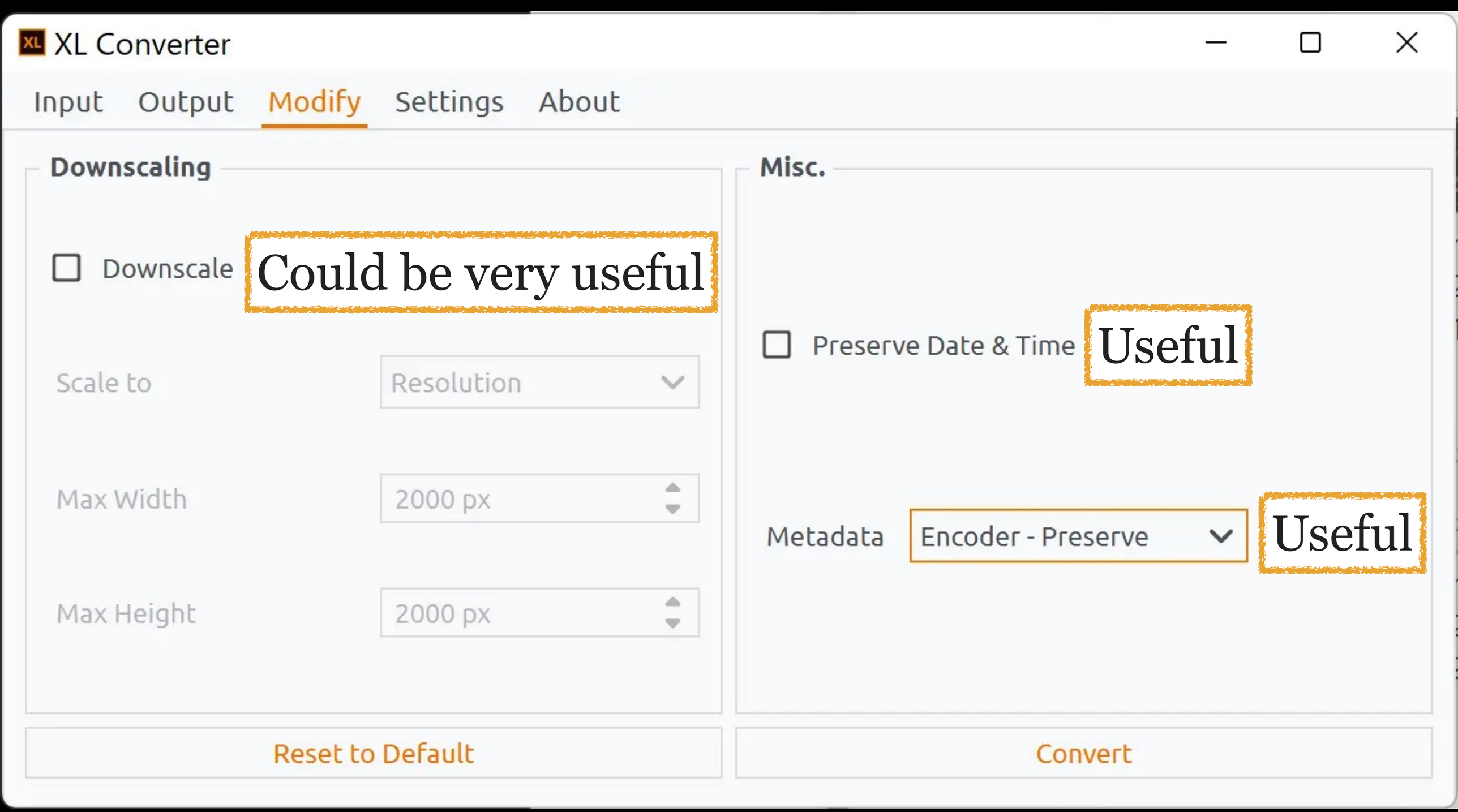

XL Converter
Input
Output
Modify
Settings
About
File Name
Ext.
Location
Add files by drop & drag into this window or via this button
Add Files
Add Folder
Clear List
Convert


XL Converter
Input
Output
Modify
Settings
About
Save To
Source Folder
Custom
Change format
Set quality
Format
Format
WEBP
Effort
Intelligent
7
Quality
80
Lossless
Lossless (only if smaller)
Conversion
Duplicates
Rename
Threads
3
After Conversion
Clear File List
Good idea
Delete Original
To Trash
Reset to Default
Convert

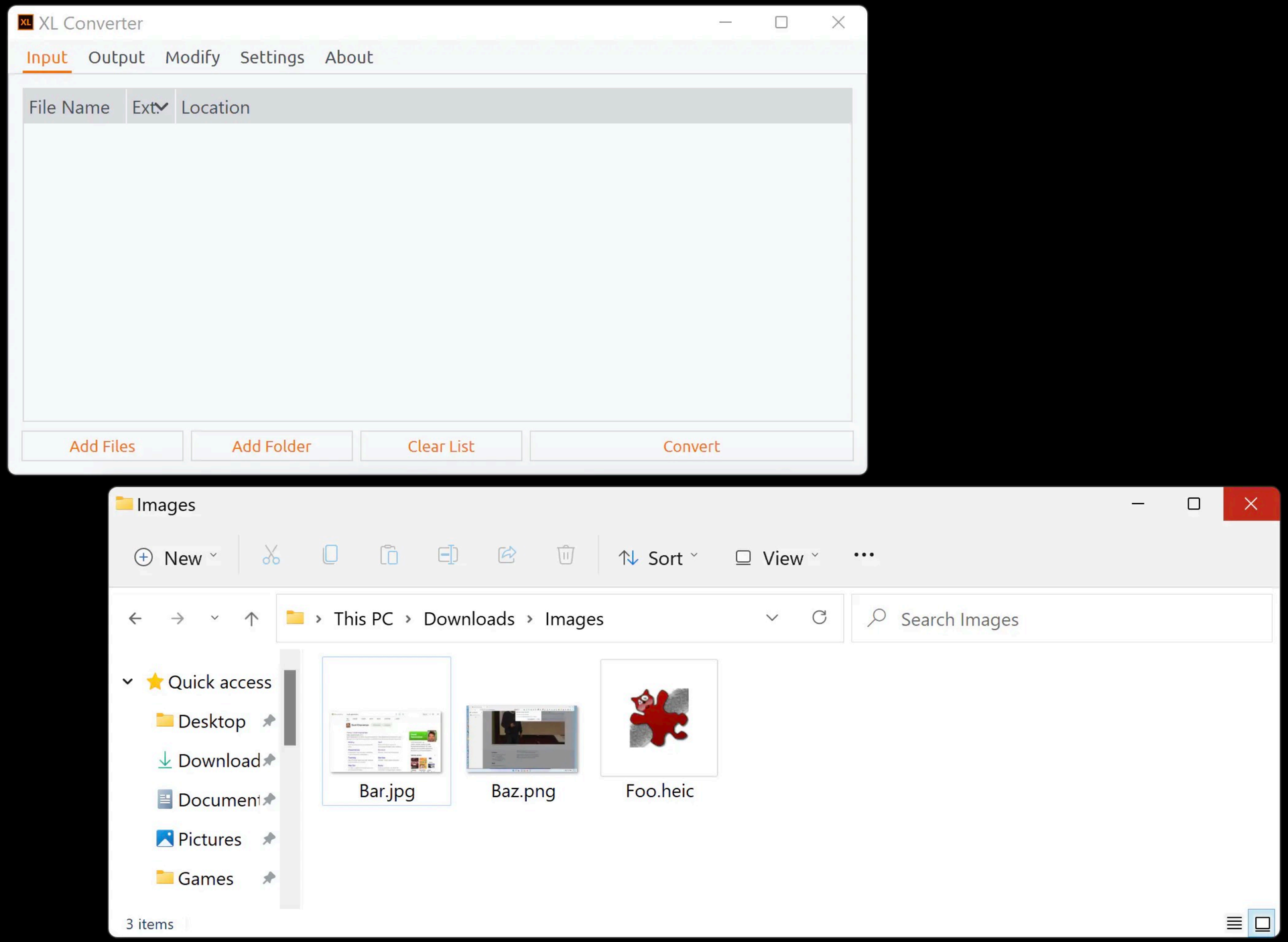

XL Converter
Input
Output
Modify
Settings
About
Excellent choices
Save To
Source Folder
Custom
...
Format
Format
WEBP
Effort
Int
Quality
Lossless
JPEG XL
AVIF
WEBP
JPG
PNG
Smallest Lossless
Conversion
Duplicates
Rename
Threads
3
After Conversion
Clear File List
Delete Original
To Trash
Reset to Default
Convert

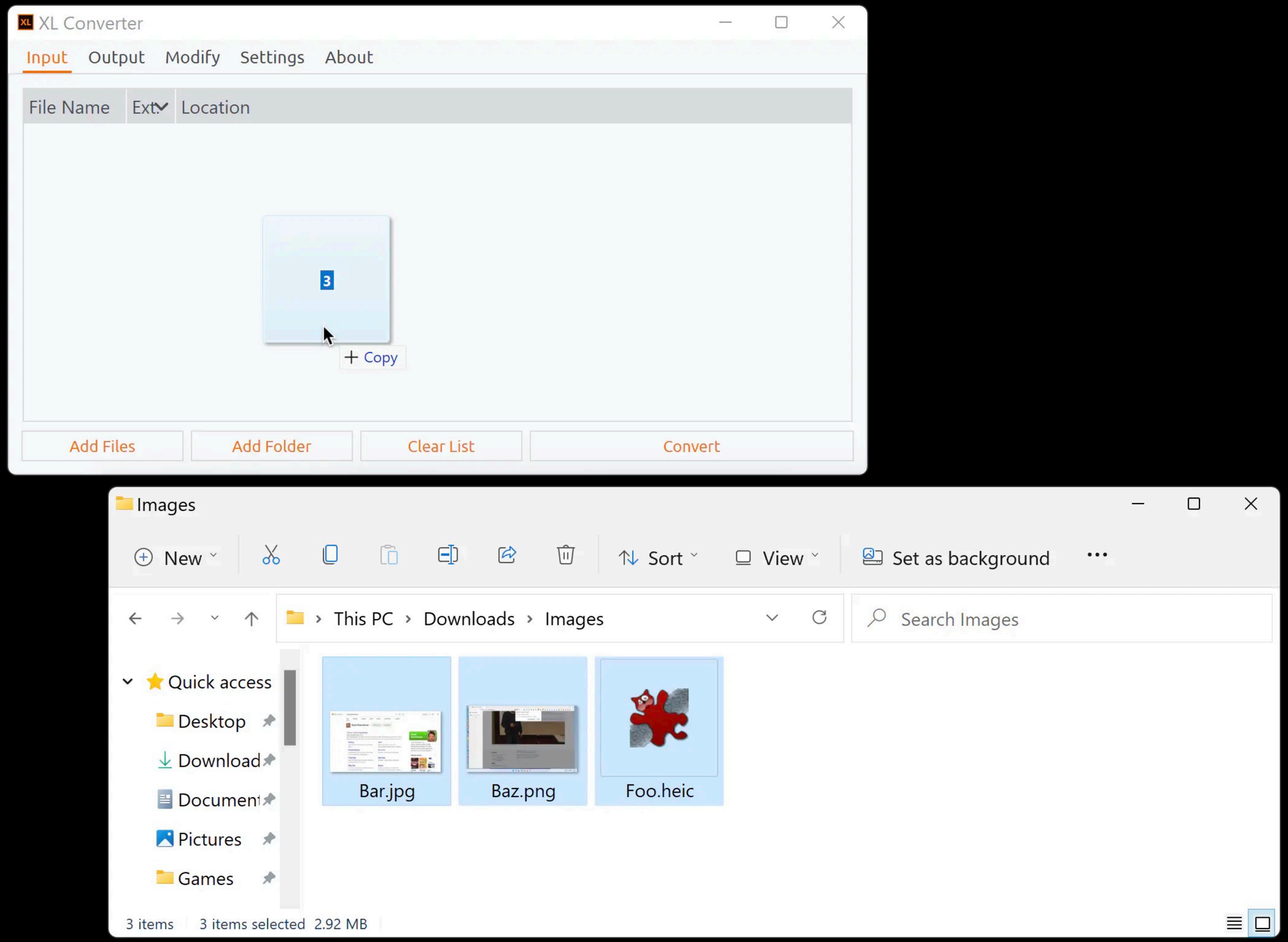


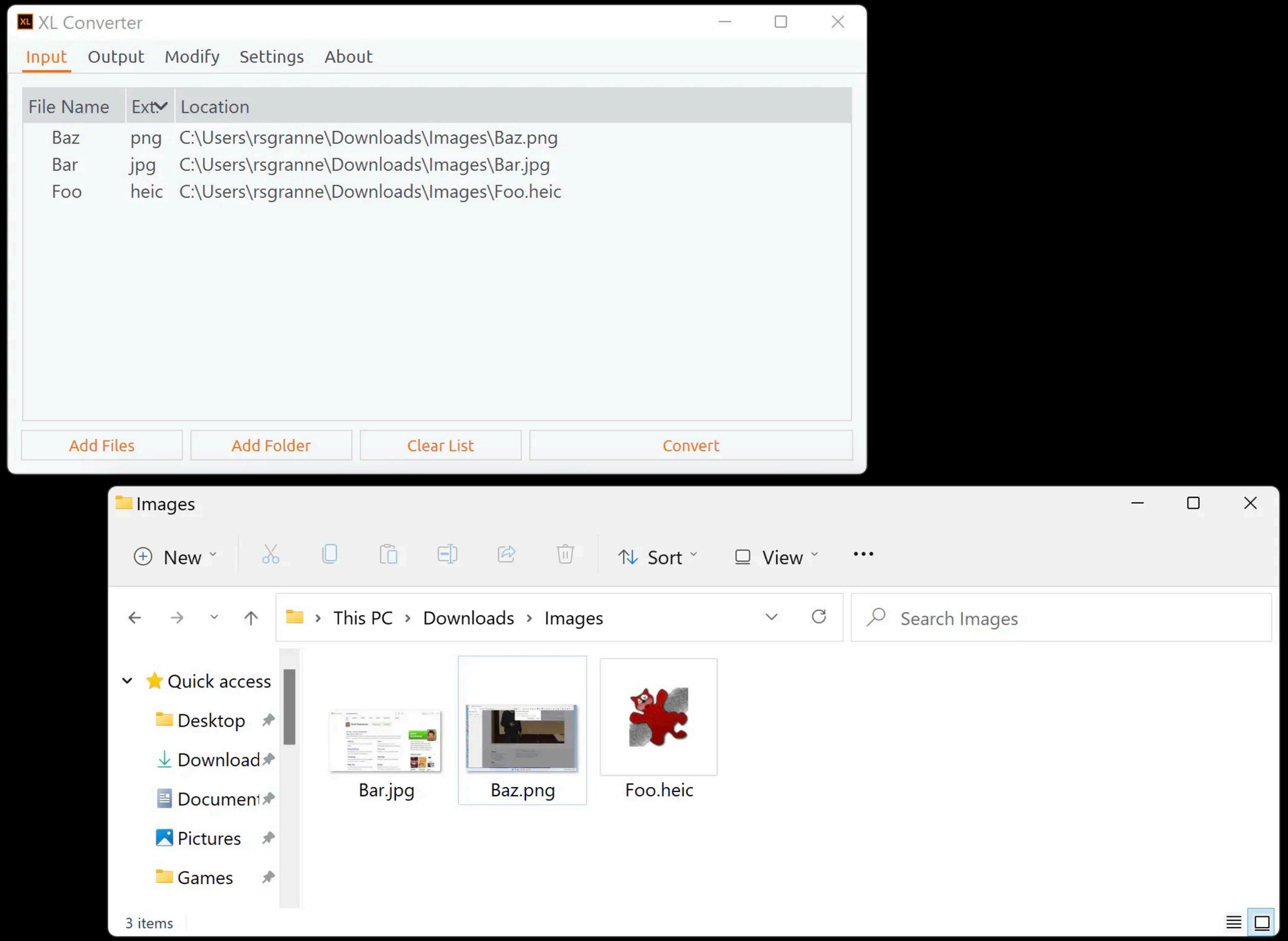
Try all 3 & see which one is smallest & best

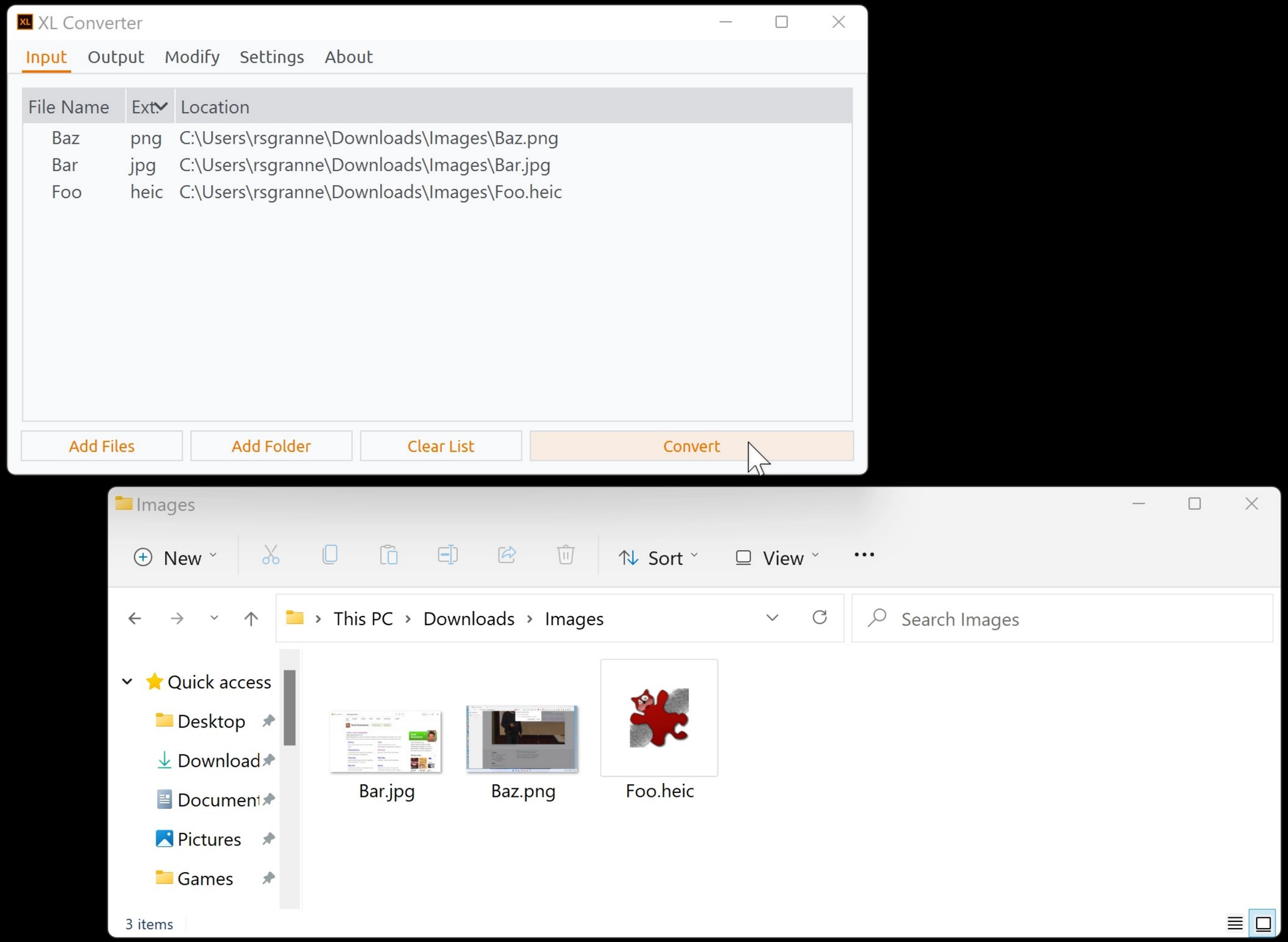

XL Converter
Input
Output
Modify
Settings
About
Downscaling
Downscale
Could be very useful
Scale to
Resolution
Max Width
2000 px
Max Height
2000 px
Misc.
Preserve Date & Time
Useful
Metadata
Encoder - Preserve
Useful
Reset to Default
Convert

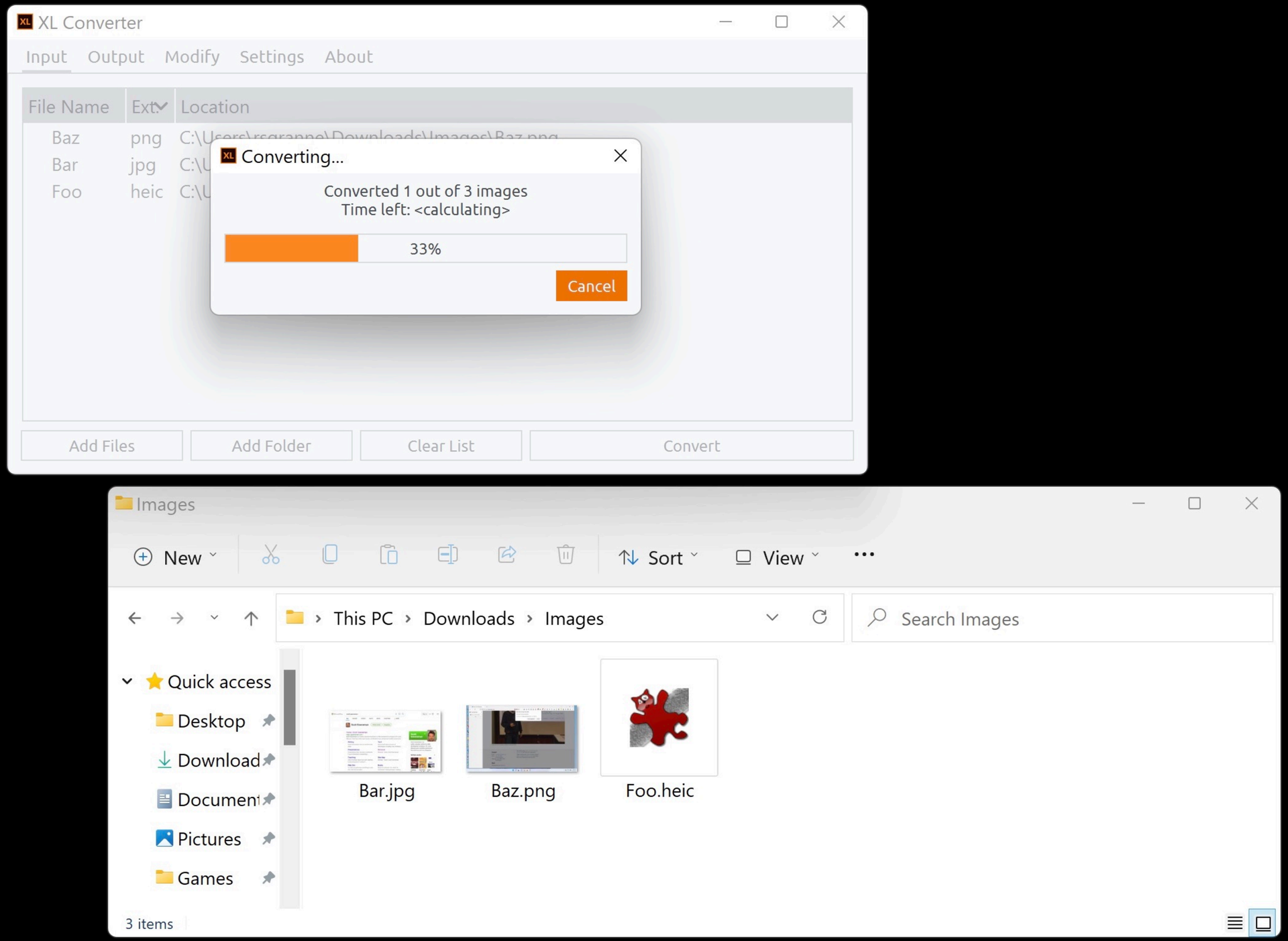
How to use XL Converter to convert a JPEG, PNG, & HEIC to WebP


XL Converter
Input
Output
Modify
Settings
About
File Name
Ext.
Location
Add Files
Add Folder
Clear List
Convert
Images
New
Sort
View
This PC › Downloads › Images
Search Images
Quick access
Desktop
Download
Document
Pictures
Games
Bar.jpg
Baz.png
Foo.heic
3 items

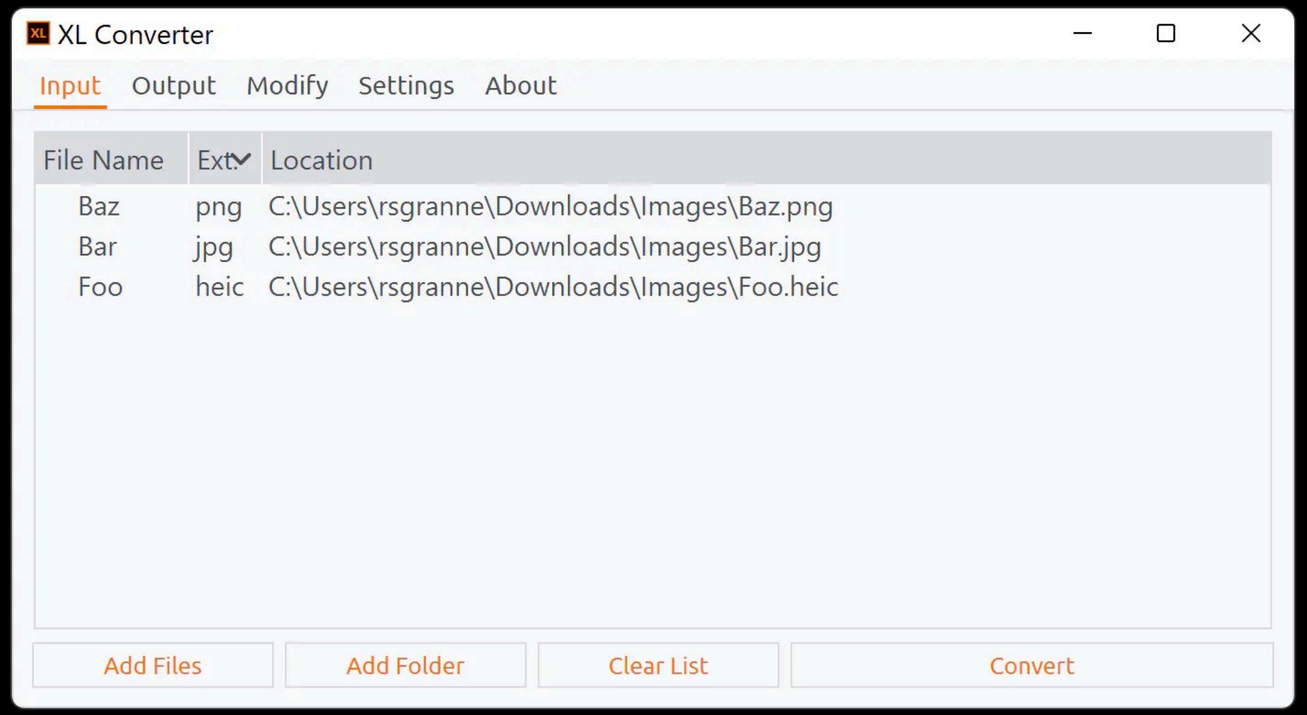

XL Converter
Input
Output
Modify
Settings
About
File Name
Ext.
Location
3
Copy
Add Files
Add Folder
Clear List
Convert
Images
New
Sort
View
Set as background
This PC
Downloads
Images
Search Images
Quick access
Desktop
Download
Document
Pictures
Games
Bar.jpg
Baz.png
Foo.heic
3 items
3 items selected 2.92 MB

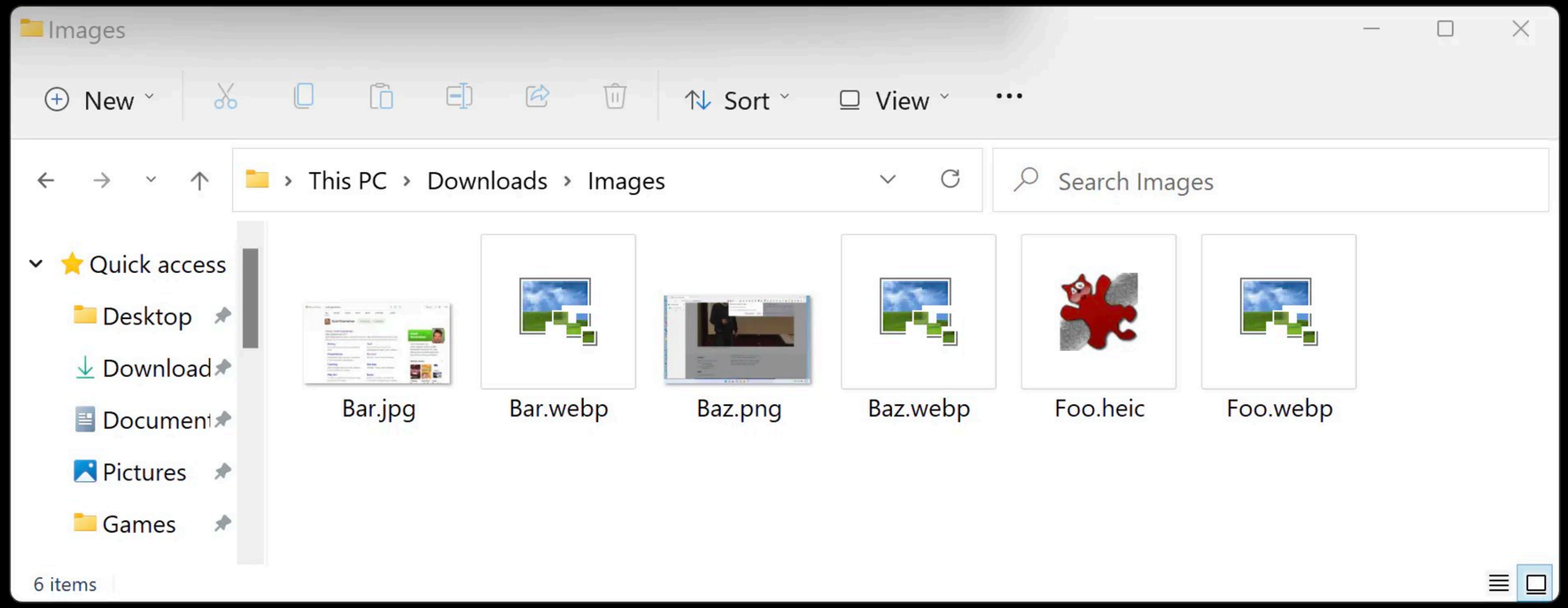

XL Converter
Input
Output
Modify
Settings
About
File Name
Ext.
Location
Baz png C:\Users\rsgranne\Downloads\Images\Baz.png
Bar jpg C:\Users\rsgranne\Downloads\Images\Bar.jpg
Foo heic C:\Users\rsgranne\Downloads\Images\Foo.heic
Add Files
Add Folder
Clear List
Convert
Images
New
Sort
View
This PC › Downloads › Images
Search Images
Quick access
Desktop
Download
Document
Pictures
Games
Bar.jpg
Baz.png
Foo.heic
3 items


XL Converter
Input
Output
Modify
Settings
About
File Name
Ext.
Location
Baz png C:\Users\rsgranne\Downloads\Images\Baz.png
Bar jpg C:\Users\rsgranne\Downloads\Images\Bar.jpg
Foo heic C:\Users\rsgranne\Downloads\Images\Foo.heic
Add Files
Add Folder
Clear List
Convert
Images
New
Sort
View
This PC › Downloads › Images
Search Images
Quick access
Desktop
Download
Document
Pictures
Games
Bar.jpg
Baz.png
Foo.heic
3 items


XL Converter
Input
Output
Modify
Settings
About
File Name
Ext.
Location
Baz
png
Bar
jpg
Foo
heic
Converting...
Converted 1 out of 3 images
Time left: <calculating>
33%
Cancel
Add Files
Add Folder
Clear List
Convert
Images
New
Sort
View
This PC
Downloads
Images
Search Images
Quick access
Desktop
Download
Documen
Pictures
Games
Bar.jpg
Baz.png
Foo.heic
3 items

codepoems.eu/xl-converter/





✏️ SIDE NOTE

Converseen is a free Windows batch image conversion app that supports a ridiculously large number of formats

However, it's user interface is very clunky & poorly designed

See the *Bonus* section at the end for more info

Converseen • $0 • ⊞

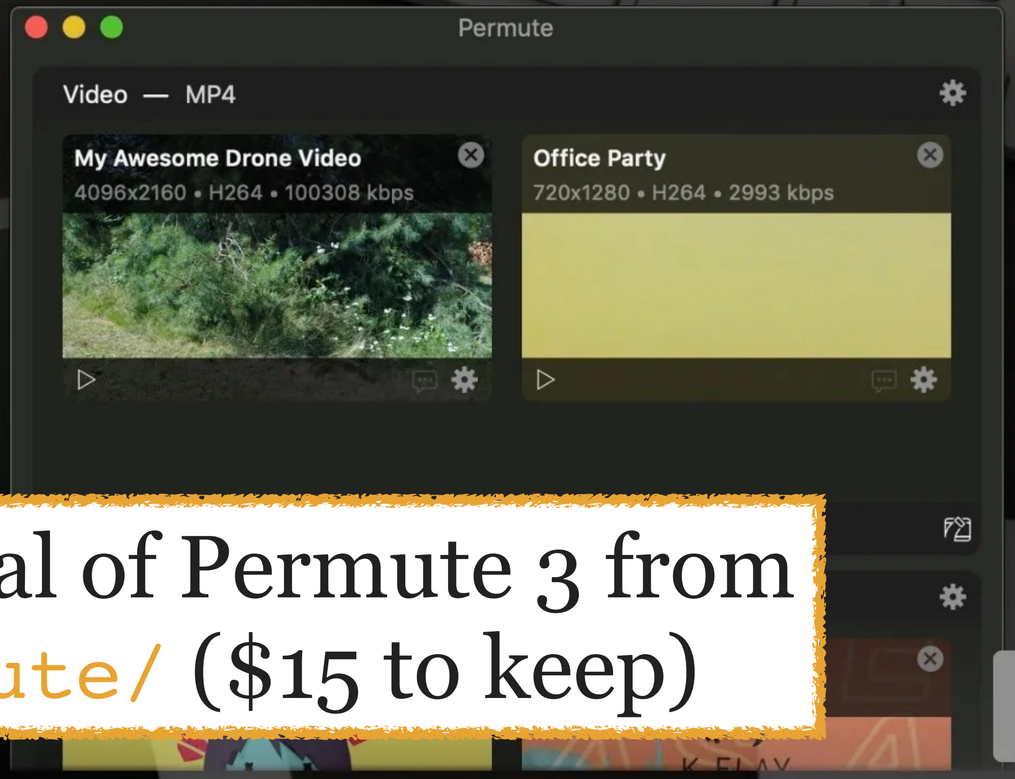
`converseen.fasterland.net`

Permute

Downie Permute Eon Timer UctoX Rottenwood Other apps Blog Contact

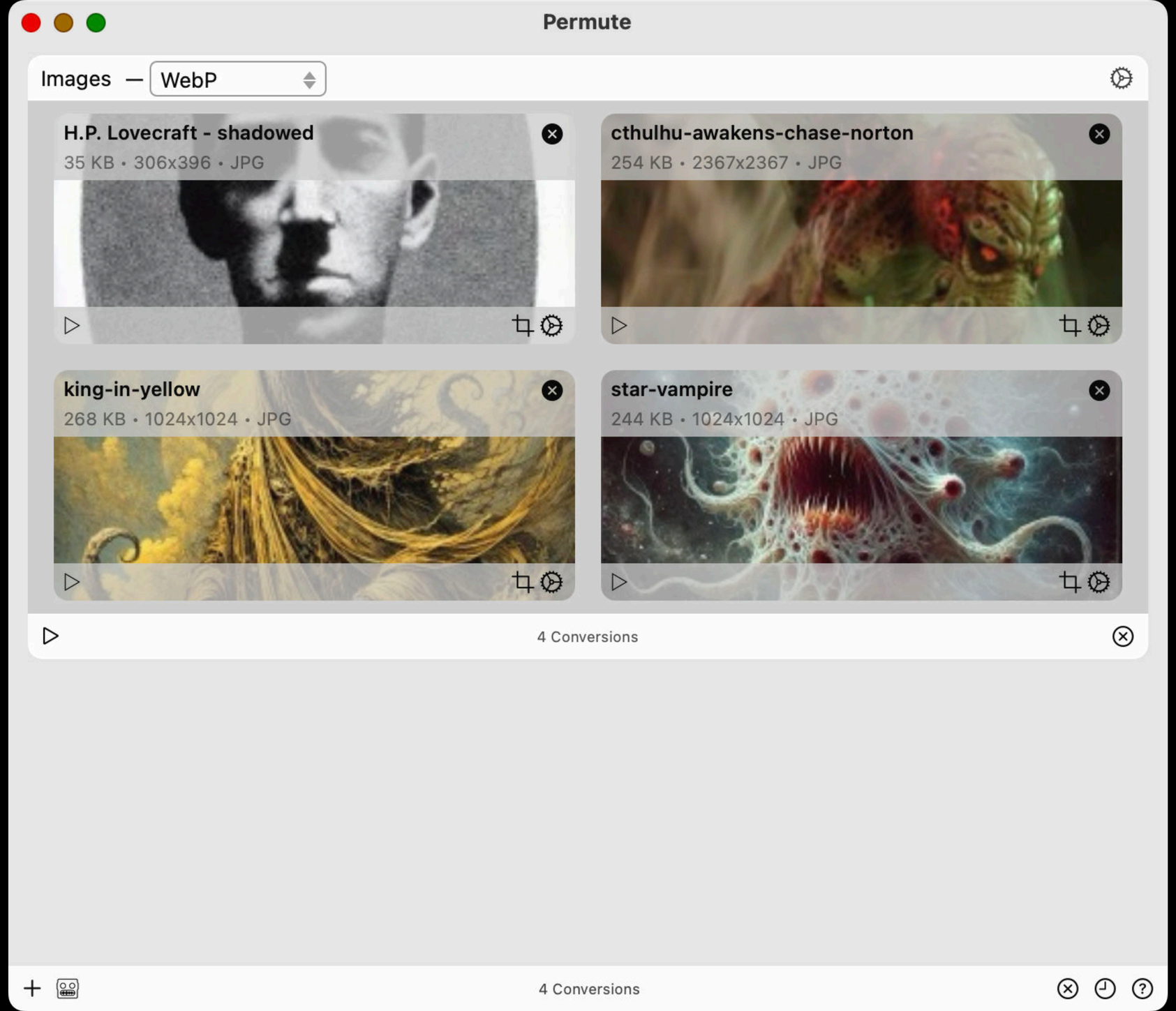
Permute

Video, audio and image files come in many different kinds and shapes, but sometimes you need a specific format since your iPad or DVD player won't play that video. That is what Permute is for - easily convert your media files to various different formats.

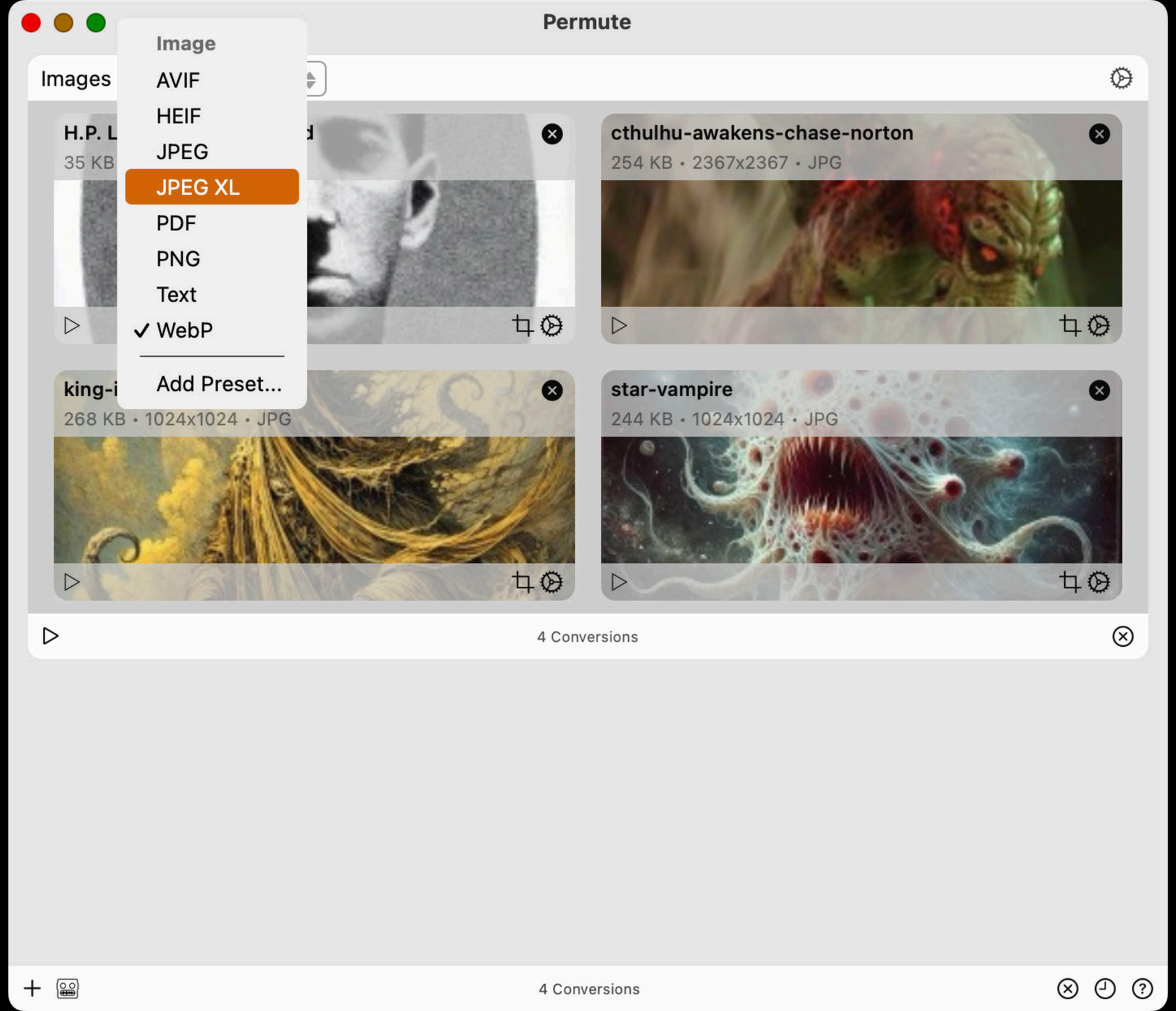


Download & install free trial of Permute 3 from charliemonroe.net/permute/ ($15 to keep)

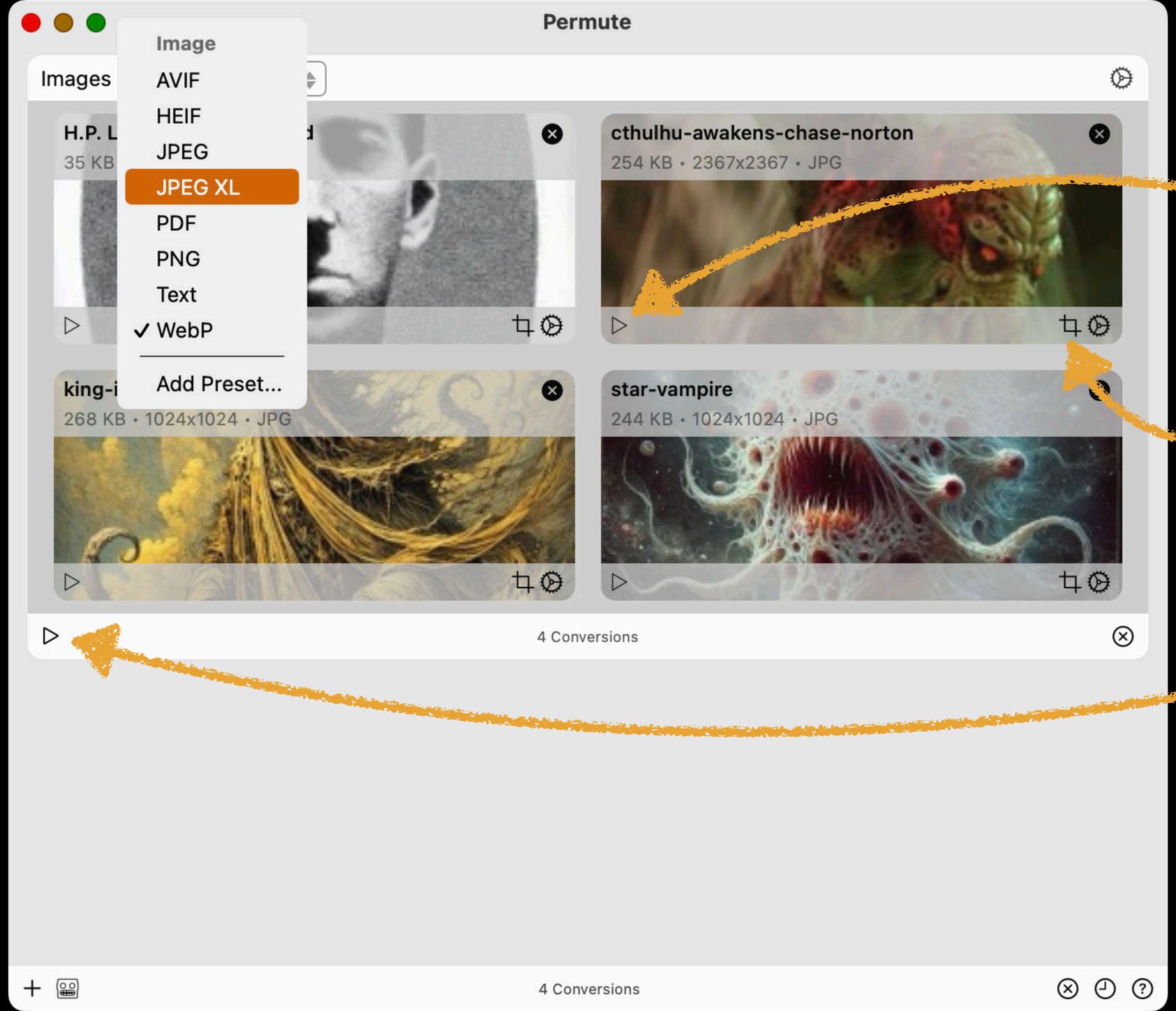
FAQ



Drag 4 JPGs into Permute



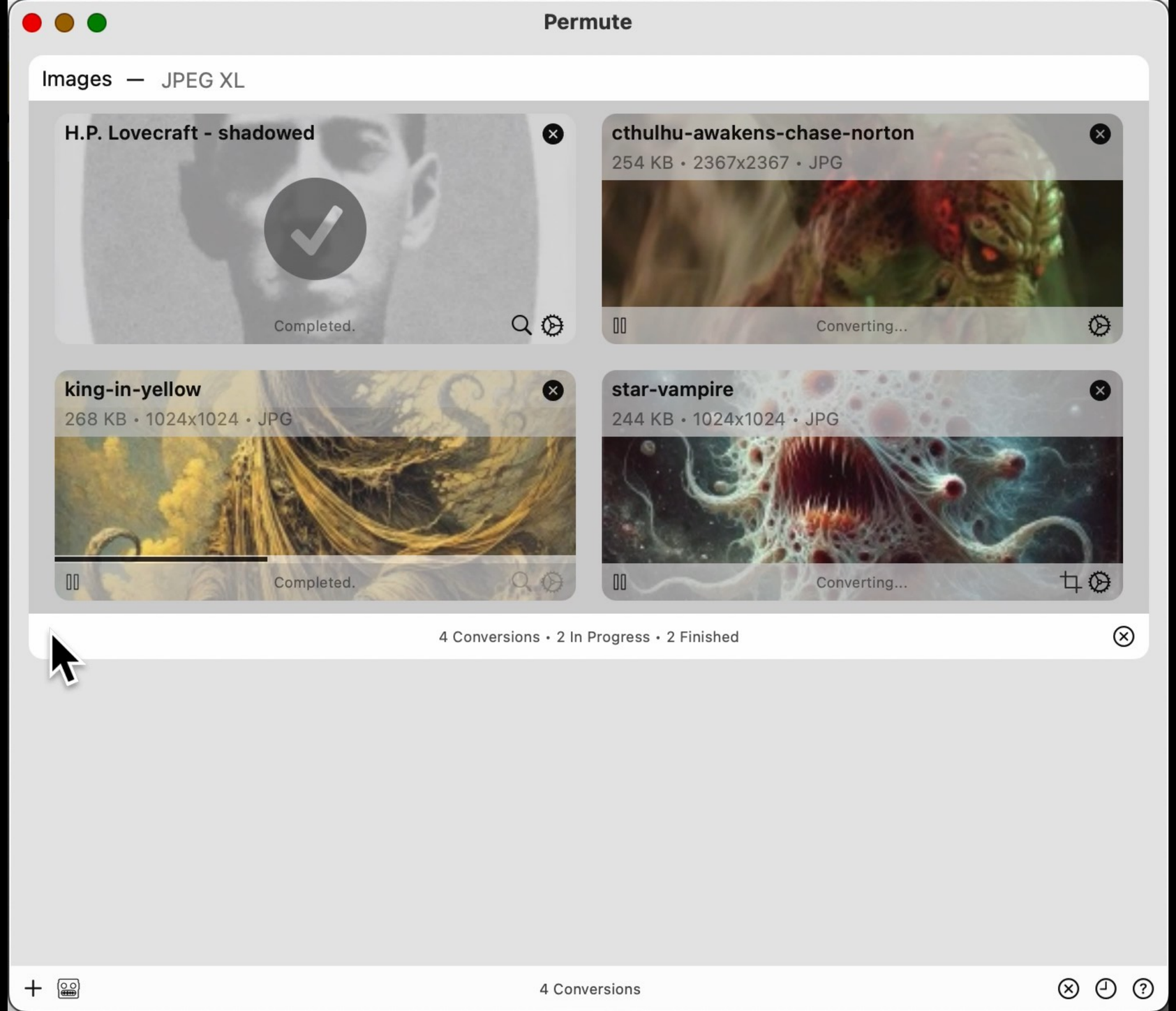
Select image conversion format



Click 1 ▷ to convert just that image

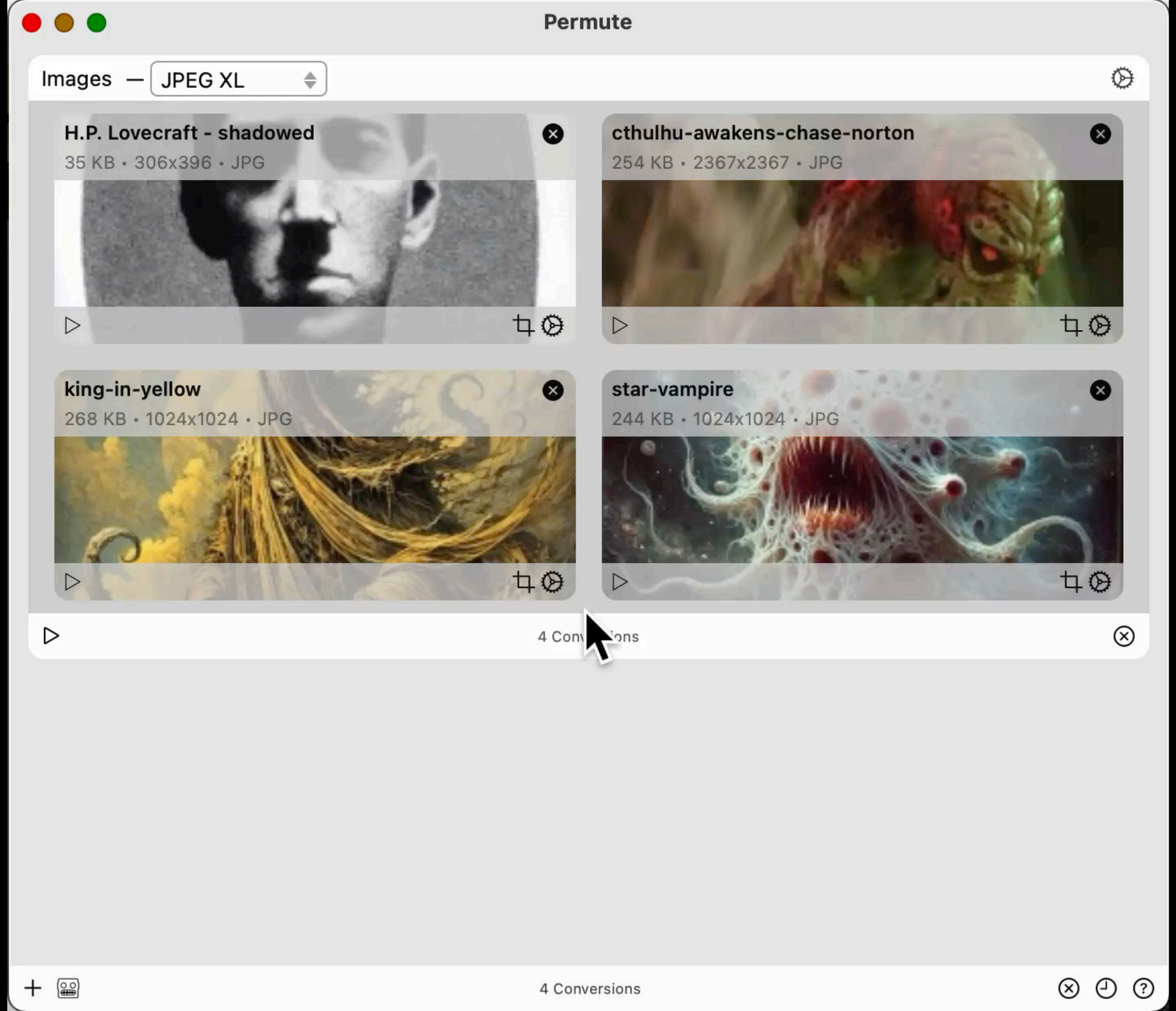
Click ⌗ to crop the image

Click this ▷ to convert all images

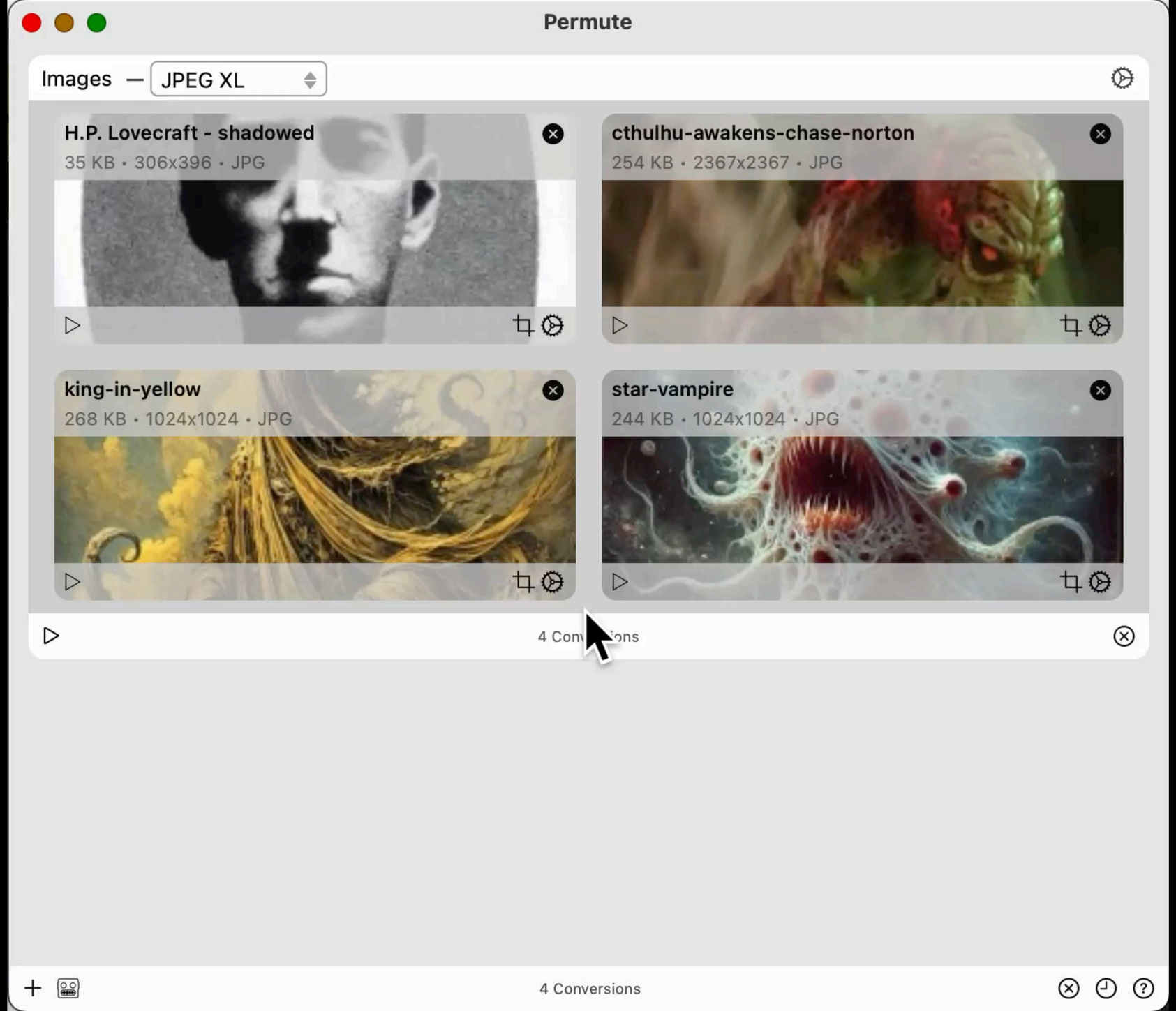


In the middle of conversion...

In action…


Permute
Images — JPEG XL
H.P. Lovecraft - shadowed
35 KB • 306x396 • JPG
cthulhu-awakens-chase-norton
254 KB • 2367x2367 • JPG
king-in-yellow
268 KB • 1024x1024 • JPG
star-vampire
244 KB • 1024x1024 • JPG
4 Conversions
4 Conversions

In action…


Permute
Images — JPEG XL
H.P. Lovecraft - shadowed
35 KB • 306x396 • JPG
cthulhu-awakens-chase-norton
254 KB • 2367x2367 • JPG
king-in-yellow
268 KB • 1024x1024 • JPG
star-vampire
244 KB • 1024x1024 • JPG
4 Conversions
4 Conversions

Preferences
General

Search

- General
- Apple Media Apps
- History
- Presets
- Workshop
- Custom Groups
- Privacy
- Advanced
- Updates
- Debug

Appearance

Display Mode

- [ ] Reduce Transparency

- [x] 🇺🇦 Show Solidarity with Ukraine — More Information...

Default DVD Format — NTSC ?

When done processing files

- [x] Play a sound
- [ ] Quit Permute
- [ ] Bounce icon in the Dock
- [ ] Automatically clear the conversion list

CPU Usage — Medium ?

Destination

Always save converted items to — Same Folder as Original

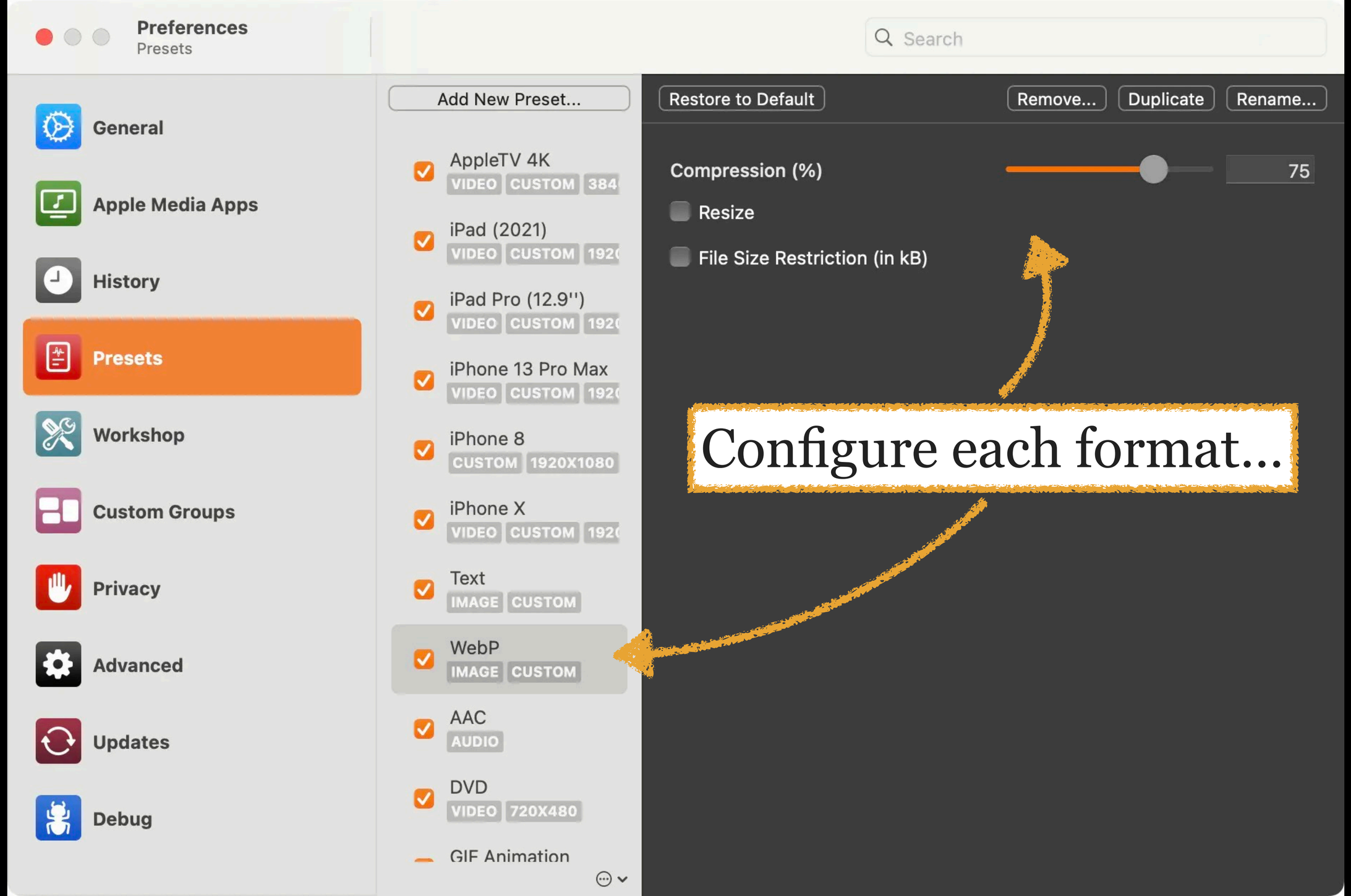
- [ ] Include preset name in file name

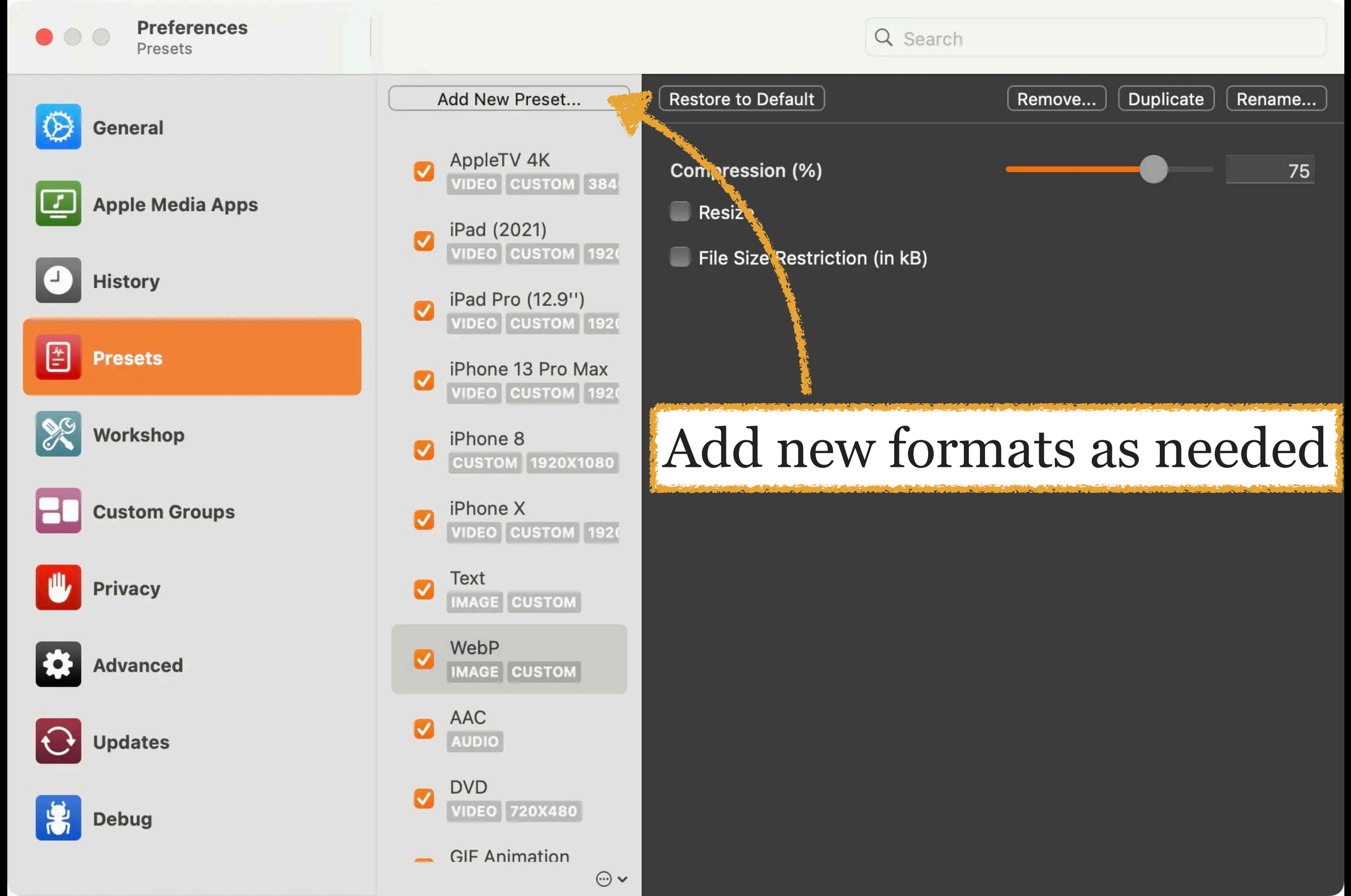
Subtitles

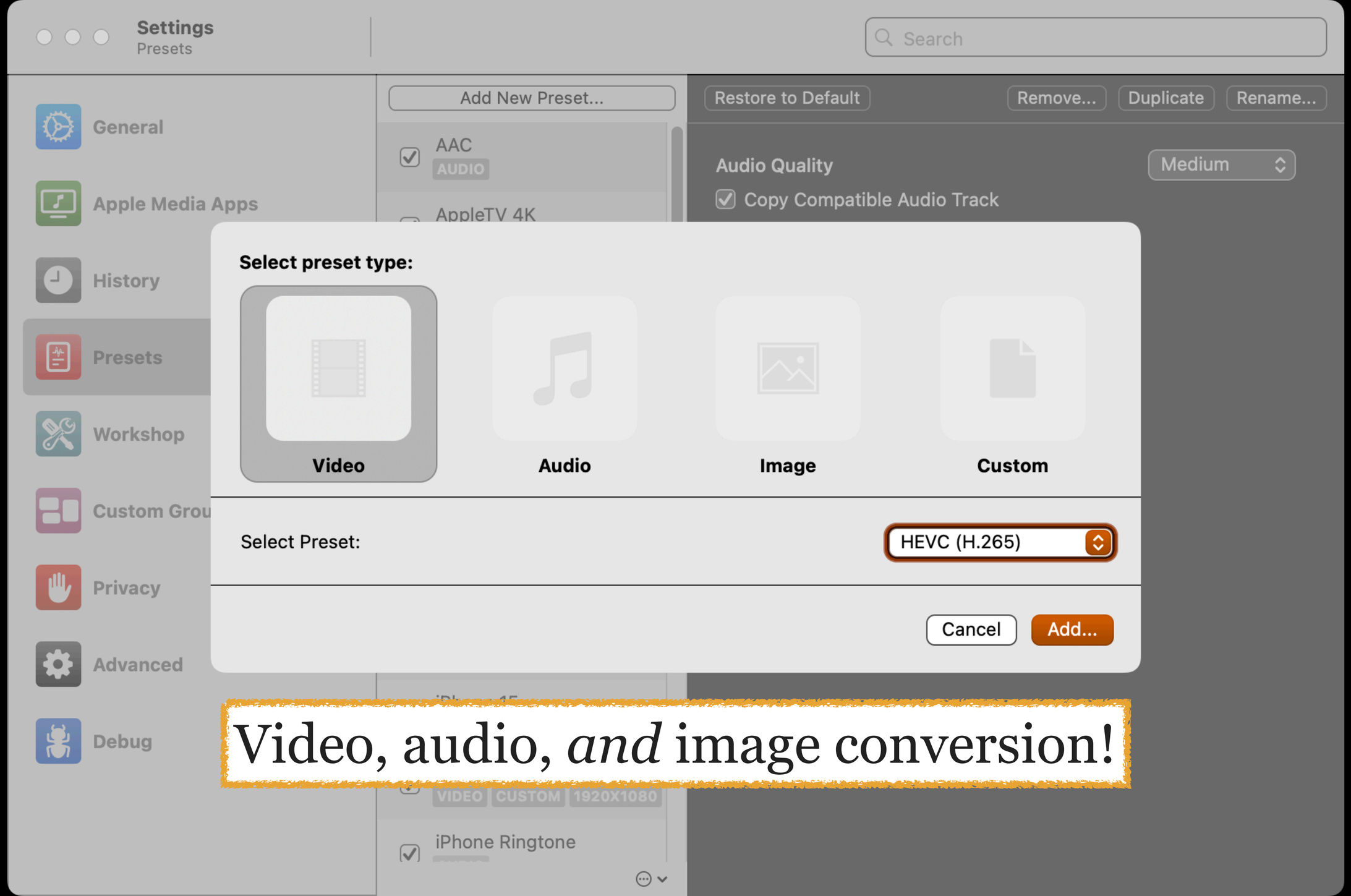
- [x] Automatically detect external subtitles ?
- [x] Automatically detect external subtitles language

Default Encoding — Unicode (UTF-8)

Default Language — Unspecified


Preferences
Presets
Search
General
Apple Media Apps
History
Presets
Workshop
Custom Groups
Privacy
Advanced
Updates
Debug
Add New Preset...
Restore to Default
Remove...
Duplicate
Rename...
AppleTV 4K
VIDEO CUSTOM 384
iPad (2021)
VIDEO CUSTOM 192
iPad Pro (12.9'')
VIDEO CUSTOM 192
iPhone 13 Pro Max
VIDEO CUSTOM 192
iPhone 8
CUSTOM 1920X1080
iPhone X
VIDEO CUSTOM 192
Text
IMAGE CUSTOM
WebP
IMAGE CUSTOM
AAC
AUDIO
DVD
VIDEO 720X480
GIF Animation
Compression (%)
75
Resize
File Size Restriction (in kB)
Configure each format...


Preferences
Presets
Search
General
Apple Media Apps
History
Presets
Workshop
Custom Groups
Privacy
Advanced
Updates
Debug
Add New Preset...
Restore to Default
Remove...
Duplicate
Rename...
AppleTV 4K
VIDEO CUSTOM 384
iPad (2021)
VIDEO CUSTOM 1920
iPad Pro (12.9'')
VIDEO CUSTOM 1920
iPhone 13 Pro Max
VIDEO CUSTOM 1920
iPhone 8
CUSTOM 1920X1080
iPhone X
VIDEO CUSTOM 1920
Text
IMAGE CUSTOM
WebP
IMAGE CUSTOM
AAC
AUDIO
DVD
VIDEO 720X480
GIF Animation
Compression (%)
75
Resize
File Size Restriction (in kB)
Add new formats as needed



Video, audio, *and* image conversion!

Image formats supported by Permute

Most useful: AVIF, JPEG XL, Text, TIFF, WebP

Others: BMP, GIF, HEIF, JPEG, JPEG 2000, PDF, PNG, TIFF

Audio formats supported by Permute

Most useful: AAC, FLAC, MP3

Others: AIFF, Apple Lossless, Audio Book, CAF, iPhone Ringtone, M4A, MP2, Ogg (Audio), WAV, WAV (PCM-ALAW), WAV (PCM-ULAW), & WMA

Video formats supported by Permute

Most useful: AV1, AVIF Animation, HEVC (H.265), MKV, MP4, WebM, WebP Animation

Others: Android Phone, Android TV, APNG, AppleTV, AVI (Uncompressed), DivX (AVI), DNXHD, DVD, FLV, GIF Animation, HAP, iPad, iPhone, MP4 (MPEG-4), MPEG-1, MPEG-2, Ogg (Video), Plex, ProRes, ProRes (PCM Audio), PS3, PSP, Roku TV, WMV, Xbox, Xvid (AVI)

Preferences
Workshop

Search

- General
- Apple Media Apps
- History
- Presets
- Workshop
- Custom Groups
- Privacy
- Advanced
- Updates
- Debug

IP Camera H.264 Fix-Up
Fixes up .264 files that come from some types of IP cameras so that the file can be used as an MP4 file.

MP4 Web Optimization
Moves the moov atom to the front of the MP4 file which enables playback of the file while only partially downloaded.

Metadata Editor
Allows you to edit metadata of MP4, M4A and MP3 files.

Multi-Preset
Converts the same file with multiple presets.

PDF Merge
Merges several PDF files into one single PDF.

PDF to Images
Splits PDF into images - one for each page.

Text Encoding Conversion
Converts files from one encoding to another.

Text to Speech
Converts text files into a speech file.

Track Export
Allows exporting individual tracks of video files.

Other cool stuff!

Squash

Realmac

RapidWeaver Squash Forum Support Store

Powerful Batch Photo Editor

Squash 3 for Mac

Want more features for images, without support for video or audio? Download & install free trial of Squash ($20/yr to keep, + additional $ for filters)

JPEG 364 KB
imageoptim
JPEG 82 KB
JPEG 58 KB
Snagit
Error
de: (1904)
le C:\Program Files\TechSmith\Snagit 2023
itET.dll failed to register. HRESULT -214702
ct your support personnel.
JPEG 123 KB
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of sorrow of those who have p
the world in all our despera
ity and, whether we realise it
is forever saying "Whatever
is how we honour humanity it
of those no longer with us.
Resize
Reduce image dimensions
Unlock
Mode
Width
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1024
Adjustments
Enhance images details
Unlock
Brightness
0%
Contrast
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Sepia
0%
Monochrome
0%
Blur
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Sharpen
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Vibrance
0%
Effects
Apply styles to the image
Basic Set
Search
Export Images

JPEG 364 KB
JPEG 82 KB
JPEG 58 KB
Error
JPEG 123 KB
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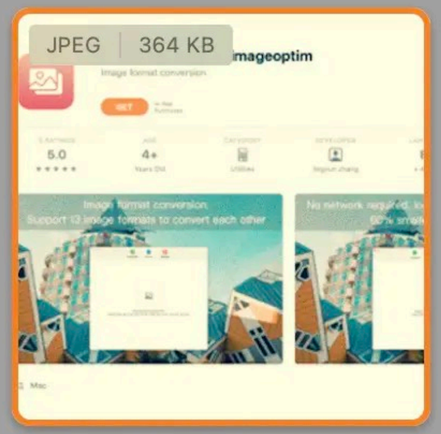
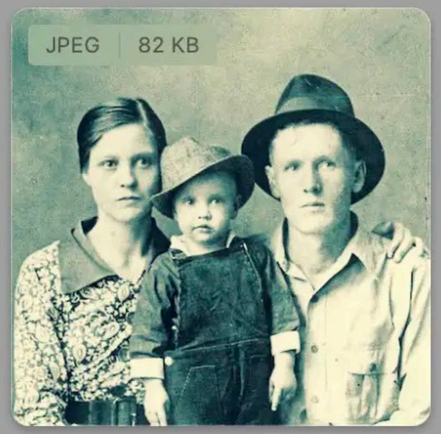
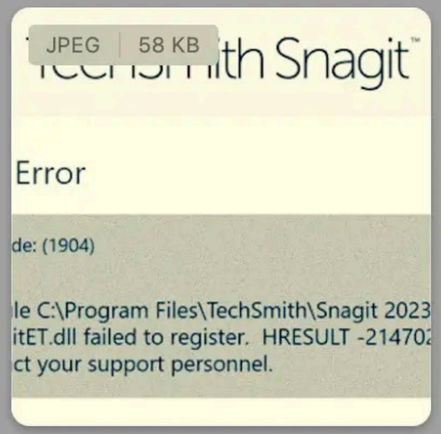
Basic Set
Search
Boston Noise
Denim Wash
Flamingo Beak
Grey Sky
Humble Pie
Plain Sailing
Intensity
100%
Watermark
Add a watermark to the image
Unlock
Format
Export to the specified format
Export Images

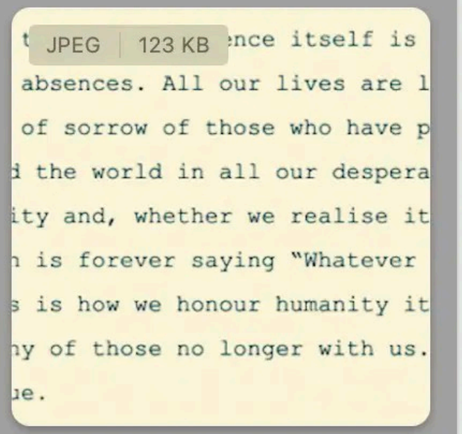
Convert *from* HEIC, PSD, AI, SVG, JPG, PNG, TIFF, RAW, DNG, & GIF

Convert *to* JPG, PNG, TIFF, WebP, & AVIF









Preserve image metadata

Unlock

Squash doesn't support copying of metadata to the chosen image format

Rename

Rename exported images

Unlock

Suffix | -squashed

Automatically number images by inserting '###'

Lowercase

Whitespace | Leave

Retain Dates

Retain dates from the original image

Date Created

Date Modified

Export

Save images to the specified directory

Location | Choose

Overwrite files

Export Images

To WebP

To WebP

JPG to WebP PNG to WebP GIF to WebP WebP to JPG WebP to PNG WebP to GIF

towebp.io

Bulk Convert Images to WebP

Batch convert from JPG, PNG, GIF, SVG, ICO, BMP, and AVIF to WebP free and online instantly **without uploading** to keep your files private.

1

Add Files

Clear Queue

2 **Quality:** 80%

Size: x1 3

Drop Your Files Here

1

0

Bulk Convert Images to WebP

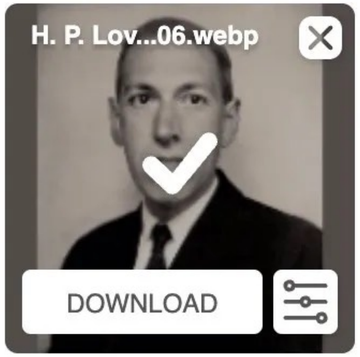
Batch convert from JPG, PNG, GIF, SVG, ICO, BMP, and AVIF to WebP free and online instantly **without uploading** to keep your files private.

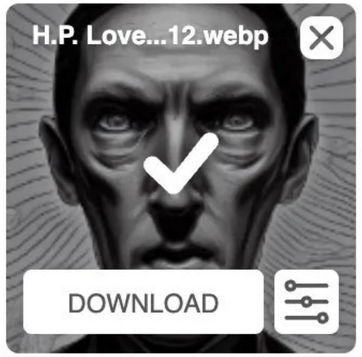
Add Files

Clear Queue

Quality: 80%

Size: x1





Bulk Convert Images to WebP

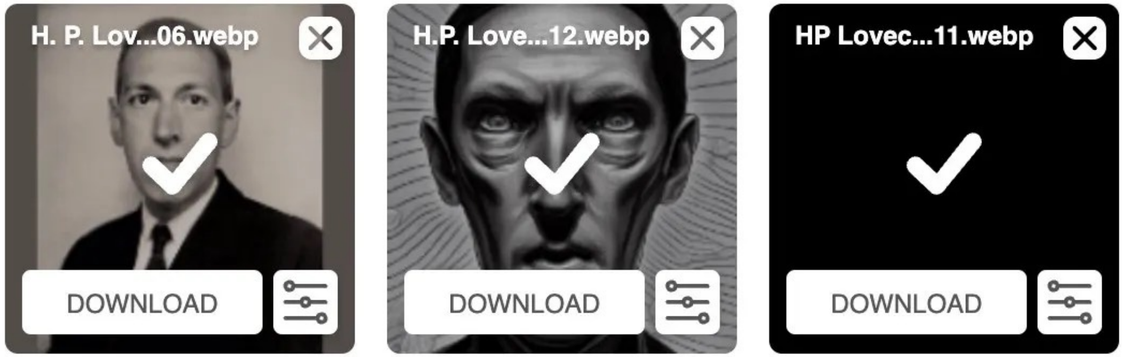
Batch convert from JPG, PNG, GIF, SVG, ICO, BMP, and AVIF to WebP free and online instantly **without uploading** to keep your files private.

Add Files

Clear Queue

Quality: 80%

Size: x1



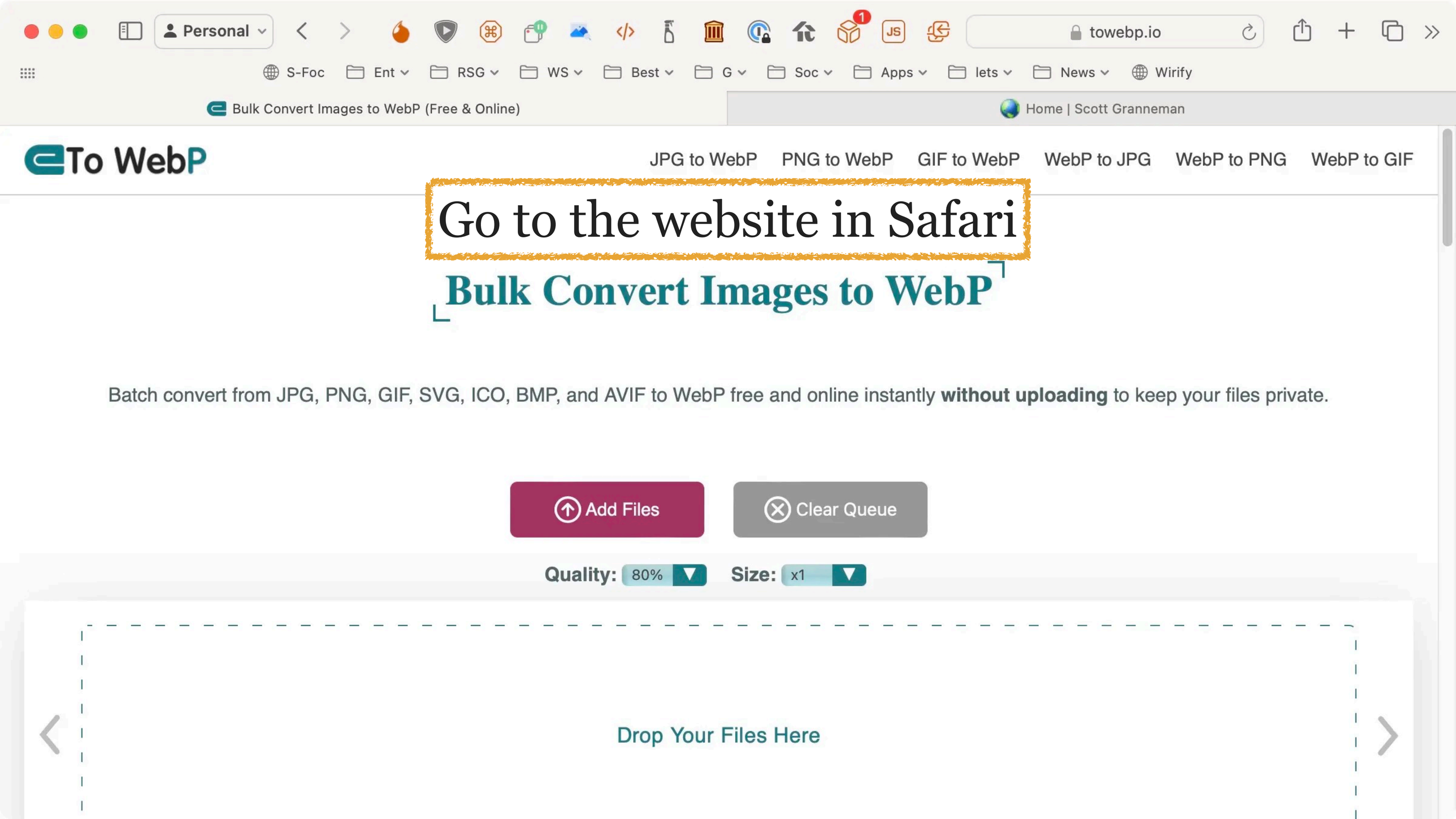
3

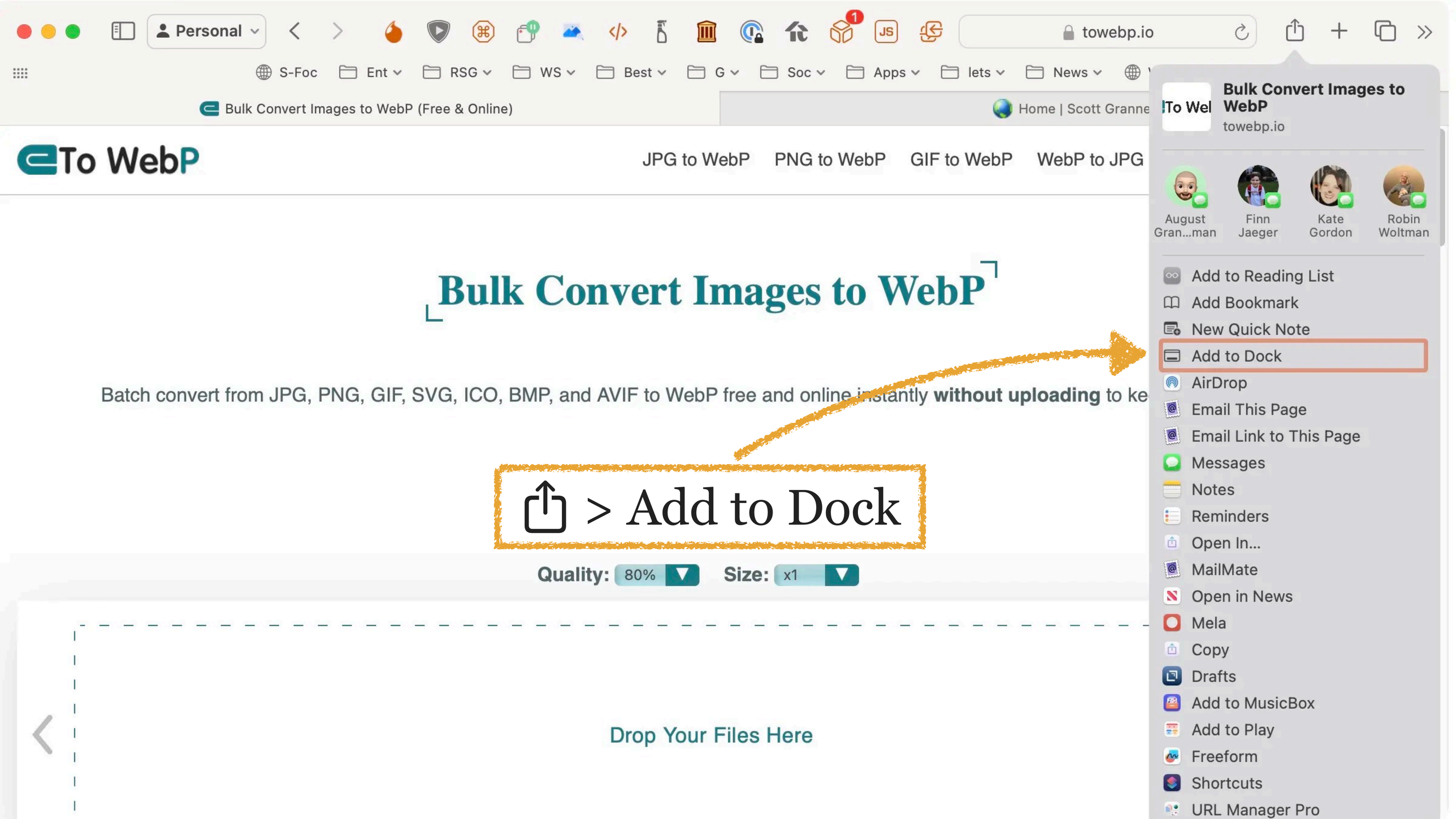
Download All

Favorites
rsgranne
Dropbox
Collections
Documents
Library
Inbox
Macintosh...
ShellFish
Source
Save As:
toWEBP.zip
Tags:
Downloads
Search
Name
Date Modified
Size
Kind
New Folder
Cancel
Save

toWEBP	85 KB	Folder	2024-03-23
H. P. Lovecraft - Lucius B. Truesdell - Wikimedia Commons - Public domain - 1934-06.webp	24 KB	WebP Image	2024-03-24
H.P. Lovecraft - DiffusionBee - Stable Diffusion - 2022-10-12.webp	60 KB	WebP Image	2024-03-24
HP Lovecraft stencil - OpenClipart - FreeSVG - Public domain - 2019-07-11.webp	1 KB	WebP Image	2024-03-24
toWEBP.zip	86 KB	ZIP archive	2024-03-23

If you use Safari, you can turn the website into a *Safari web app*


Personal
towebp.io
S-Foc
Ent
RSG
WS
Best
G
Soc
Apps
lets
News
Wirify
Bulk Convert Images to WebP (Free & Online)
Home | Scott Granneman
To WebP
JPG to WebP
PNG to WebP
GIF to WebP
WebP to JPG
WebP to PNG
WebP to GIF
Go to the website in Safari
Bulk Convert Images to WebP
Batch convert from JPG, PNG, GIF, SVG, ICO, BMP, and AVIF to WebP free and online instantly without uploading to keep your files private.
Add Files
Clear Queue
Quality: 80%
Size: x1
Drop Your Files Here


Personal
towebp.io
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Apps
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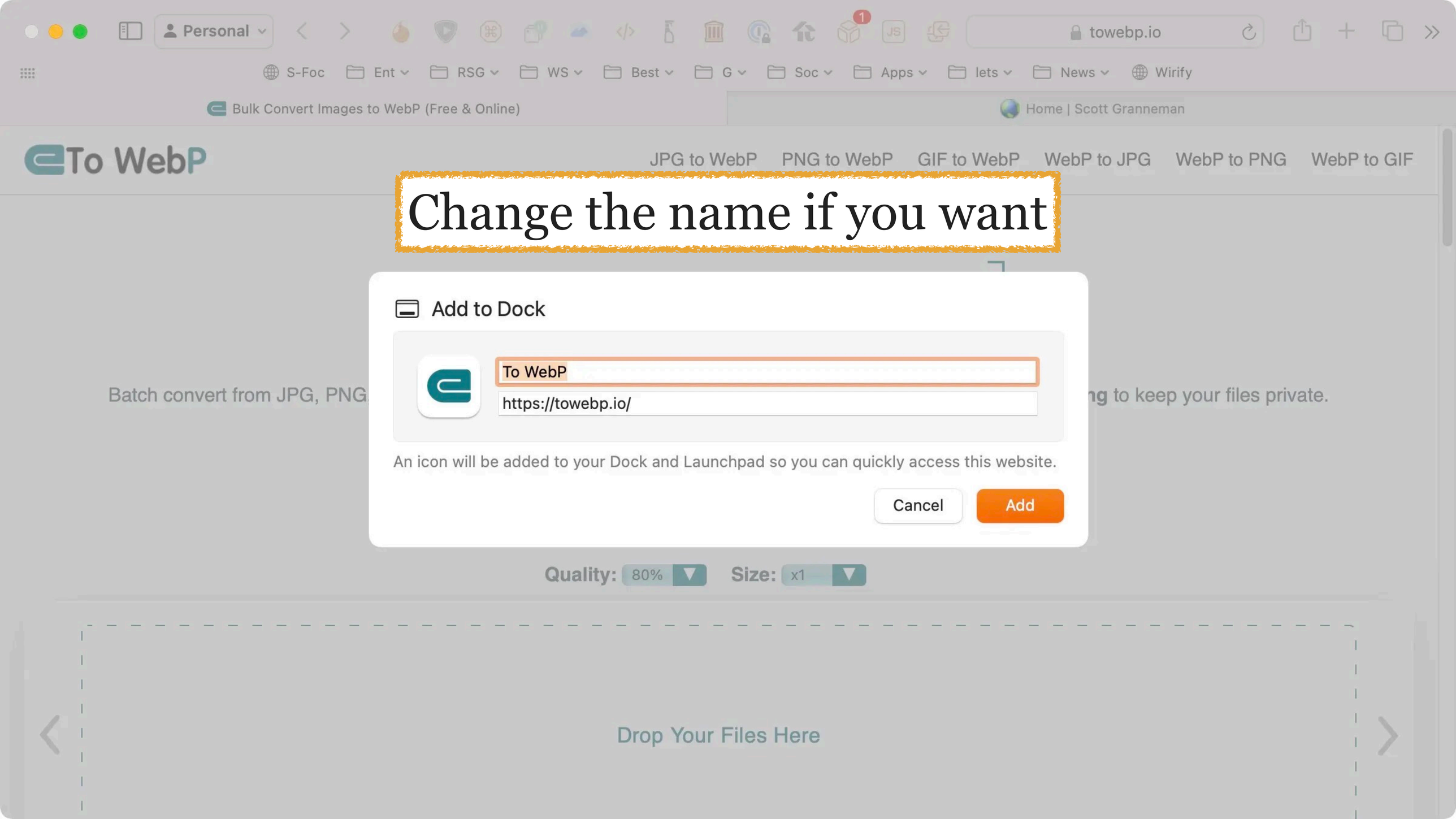
News
Bulk Convert Images to WebP (Free & Online)
Home | Scott Granne
To WebP
JPG to WebP
PNG to WebP
GIF to WebP
WebP to JPG
Bulk Convert Images to WebP
towebp.io
August Gran...man
Finn Jaeger
Kate Gordon
Robin Woltman
Add to Reading List
Add Bookmark
New Quick Note
Add to Dock
AirDrop
Email This Page
Email Link to This Page
Messages
Notes
Reminders
Open In...
MailMate
Open in News
Mela
Copy
Drafts
Add to MusicBox
Add to Play
Freeform
Shortcuts
URL Manager Pro
Bulk Convert Images to WebP
Batch convert from JPG, PNG, GIF, SVG, ICO, BMP, and AVIF to WebP free and online instantly without uploading to ke
> Add to Dock
Quality: 80%
Size: x1
Drop Your Files Here


Personal
towebp.io
S-Foc
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RSG
WS
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Apps
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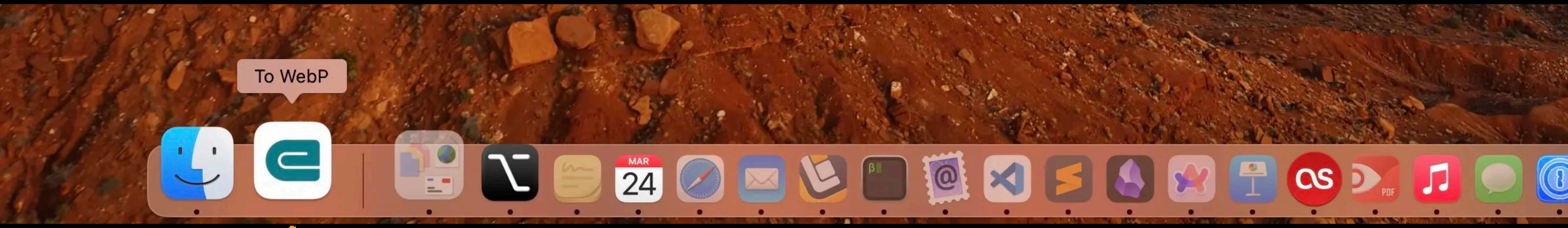
News
Wirify
Bulk Convert Images to WebP (Free & Online)
Home | Scott Granneman
To WebP
JPG to WebP
PNG to WebP
GIF to WebP
WebP to JPG
WebP to PNG
WebP to GIF
Change the name if you want
Add to Dock
To WebP
https://towebp.io/
An icon will be added to your Dock and Launchpad so you can quickly access this website.
Cancel
Add
Batch convert from JPG, PNG
ng to keep your files private.
Quality: 80%
Size: x1
Drop Your Files Here



The Safari web app is now in the Dock

Bulk Convert Images to WebP (Free & Online)

To WebP

JPG to WebP PNG to WebP GIF to WebP WebP to JPG WebP to PNG WebP to GIF

Bulk Convert Images to WebP

Batch convert from JPG, PNG, GIF, SVG, ICO, BMP, and AVIF to WebP free and online instantly **without uploading** to keep your files private.

When you click on the Safari web app, it opens in a pared-down Safari browser that has its own cookies, history, website data, & settings

Drop Your Files Here

`<svg>`

Begins & ends *Scalable Vector Graphics* documents (`<svg>…</svg>`, like `<html>…</html>`)

Only Web-native vector format

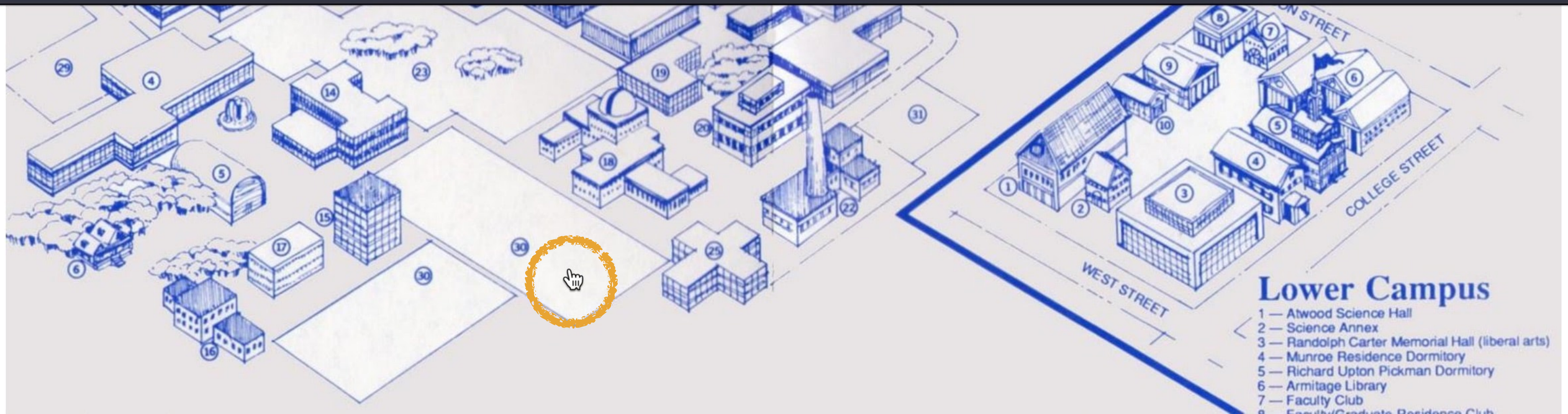
XML-based code, so extremely small file sizes

Supports...

» animation (& programmatically too!)
» hyperlinks & interactivity

HTML

```html
<svg xmlns="http://www.w3.org/2000/svg" viewBox="0 0 1600 912">
  <defs>
    <style>
      a > * { opacity: 0; }
    </style>
  </defs>
  <image width="1600" height="912" href="https://i.redd.it/lqay9nmlb4q21.jpg"/>
  <a href="https://miskatonic.edu/athletic-fields/" title="Athletic Fields">
    <polygon points="378.961 624.355 458.775 575.239 682.03 713.657 584.914 781.192 406.868 668.448 406.868 643.89 378.961 624.355"/>
  </a>
</svg>
```



You can either...

- link to `<svg>`
- inline (embed) `<svg>`

HTML

```html
<h2>H.P. Lovecraft</h2>
<img src="https://assets.codepen.io/122116/hpl.svg"
alt="H.P. Lovecraft" width="250" height="250">
```

CSS (SCSS)

JS

H.P. Lovecraft

If you are linking to an SVG document, then `<svg>` *must* include the `xmlns` attribute

```
<svg xmlns="http://www.w3.org/2000/svg" …>
```

HTML

```html
<h2>H.P. Lovecraft</h2>
<svg xmlns="http://www.w3.org/2000/svg" viewBox="0 0 500 500"
xml:space="preserve">
  <path d="M347.4 176.2c7.7-.5 11.3-19.6 11.6-24.8.6-11-2.3-
22.7-4.4-33.4-3.6-18.8-11.6-39.5-29.5-49.7-4.8 9.6 4 20.4 9.3
27.8 5.9 8.1 2.7 15 2.3 25.2a87.87 0 0 0 4.4 33c1 2.7 6.3 22 6.3
22zM290.9 353.3c-1.6-1.2-1.7-2.4-.4-3.7-6.2 2.9-40 18.3-44.9
8.1-.3-.7 37.6-8.3 3.6-13.4-7.4-1-29.5-.7-26.3-13.4 2.7-11.2
9.3-13.5 19.5-17.4 6.8-2.6 18.2-4.4 25-10.4 9.6-11.7 1-17.8-
11.1-17.2-7.3-4.6-9.9-9-4.4-16h42c-4.6-10.4-25.2-12.5-34.8-12
2.2-6.5 .7-
6.8-6.1 5-
7.2-6.8
16c-.3 -5.6
16.6a40 .6-
2.8-18. 0 0
20.6 15.6c9.6 3 14.7-2.6 21-9.1 9.7-10 22-18.3 22.7-33.3 1.6-
```

You can remove these if you are embedding (though it's OK to leave them)

CSS (SCSS)

```scss
svg {
  width: 250px;
  height: auto;
}
```

JS

H.P. Lovecraft

HTML

```html
<h2>H.P. Lovecraft</h2>
<svg viewBox="0 0 500 500">
  <path d="M347.4 176.2c7.7-.5 11.3-19.6 11.6-24.8.6-11-2.3-22.7-4.4-
33.4-3.6-18.8-11.6-39.5-29.5-49.7-4.8 9.6 4 20.4 9.3 27.8 5.9 8.1 2.7
15 2.3 25.2a87 87 0 0 0 4.4 33c1 2.7 6.3 22 6.3 22zM290.9 353.3c-1.6-
1.2-1.7-2.4-.4-3.7-6.2 2.9-40 18.3-44.9 8.1-.3-.7 37.6-8.3 3.6-13.4-
7.4-1-29.5-.7-26.3-13.4 2.7-11.2 9.3-13.5 19.5-17.4 6.8-2.6 18.2-4.4
23-10.4 9.6-11.7 1-17.8-11.1-17.2-7.3-4.6-9.9-9-4.4-16h42c-4.6-10.4-
25.2-12.5-34.8-12 2.2-6.5 15.1-11.2 15.4-17 .3-4.7-1.8-8.9 2.2-12.8
4.4-4.5-2.7-6.8-6.1-7.4-3.6-.6-6-2.8-9.6-3.6-5.6-1.3-10.7 1.9-15.9-2-
9.5-7.2-6.8 10-17.4 7.2-.4 9 1.5 15.8-3.3 23.8a31 31 0 0 0-3.5 16c-.3
8.2-7.4 3.2-7.2 7.7 1.7-.5 5.3 0 7 0-.1 2.3-1.1 18.2-5.6 16.6a40 40 0
0 1-15.7-13.8c-8-10.8-4.6-23.4-3.3-35.8 1.5-13.6-2.8-18.7-12.8-28.2-
11.5-10.9-11.1-12.2-1.7-24.2a39.8 39.8 0 0 0 20.6 15.6c9.6 3 14.7-2.6
21-9.1 9.7-10 22-18.3 22.7-33.3 1.6-30.5-53.1-21.2-67.2-8.5-2.6-9.5-
6.8-9.6-1-18.8 2.3-3.8 5-7.4 7.8-11-14.6-3.8-18.5-15.2-12.4-28.7 3.6-
7.9 9.5-9 16.8-13.6 6-3.8 12.6-10.1 19.5-12.1 11.1-3.3 21.9-7.7 32.7-
```

CSS (SCSS)

```scss
svg {
  width: 250px;
  height: auto;
}
```

JS

H.P. Lovecraft

Link

```
<img src="cthulhu.svg"
alt="Cthulhu"
width="400"
height="600">
```

Inline (embed)

```
<svg viewBox="0 0 400
600"
preserveAspectRatio=
"xMidYMid meet"
id="cthulhu" width="400"
height="600">
  <title>Cthulhu</title>
  <defs id="defs20"></
defs> …
```

Linking to 5 SVG images
= slower page load

```
<img src="hpl.svg">
<img src="cthulhu.svg">
<img src="ulthar.svg">
<img src="ryleh.svg">
<img src="hastur.svg">
```

Embedding 5 SVG images
= faster page load

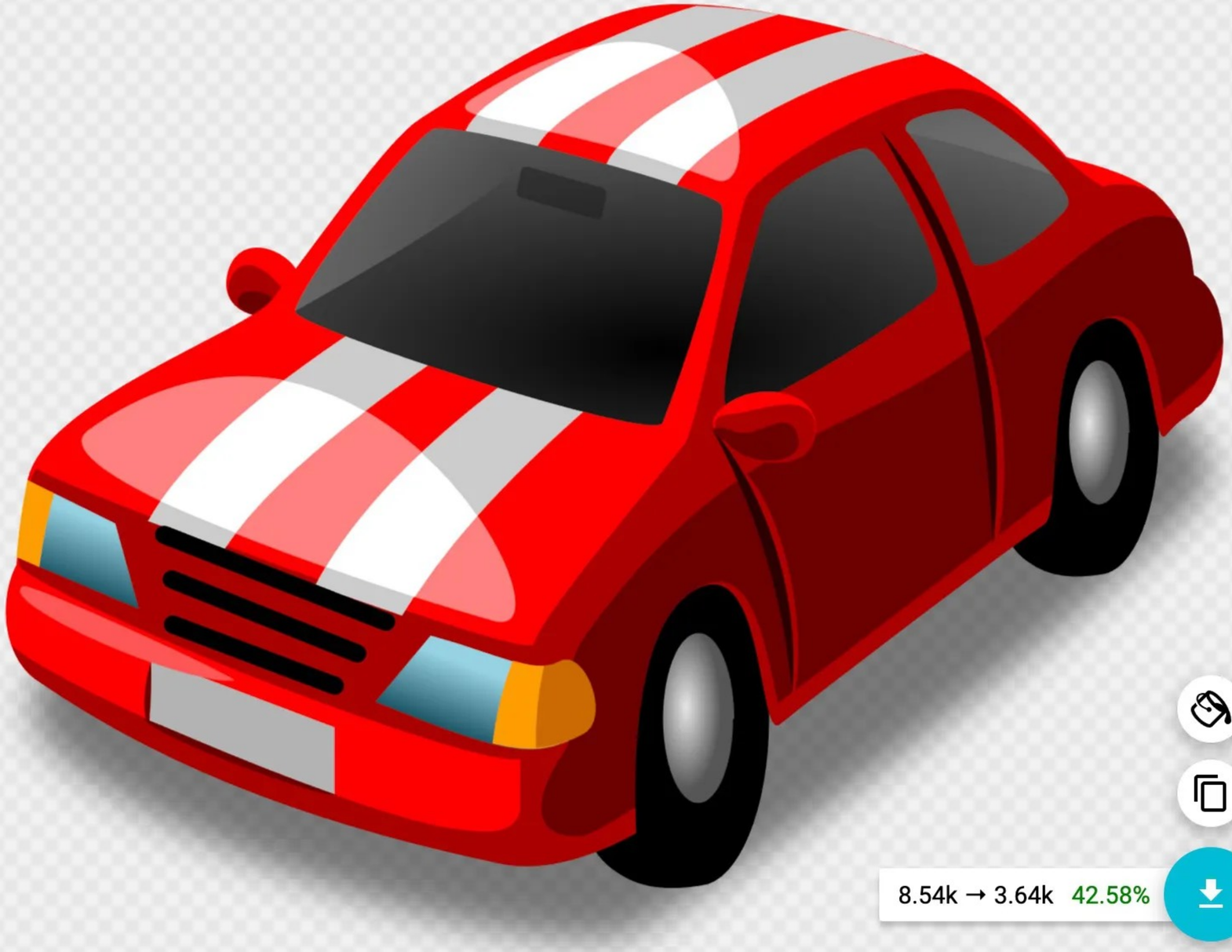
```
<svg…>…</svg>
<svg…>…</svg>
<svg…>…</svg>
<svg…>…</svg>
<svg…>…</svg>
```

✏️ SIDE NOTE

Before using an SVG, always run it through SVGOMG

jakearchibald.github.io/svgomg/

IMAGE MARKUP



8.54k → 3.64k 42.58%

Global settings

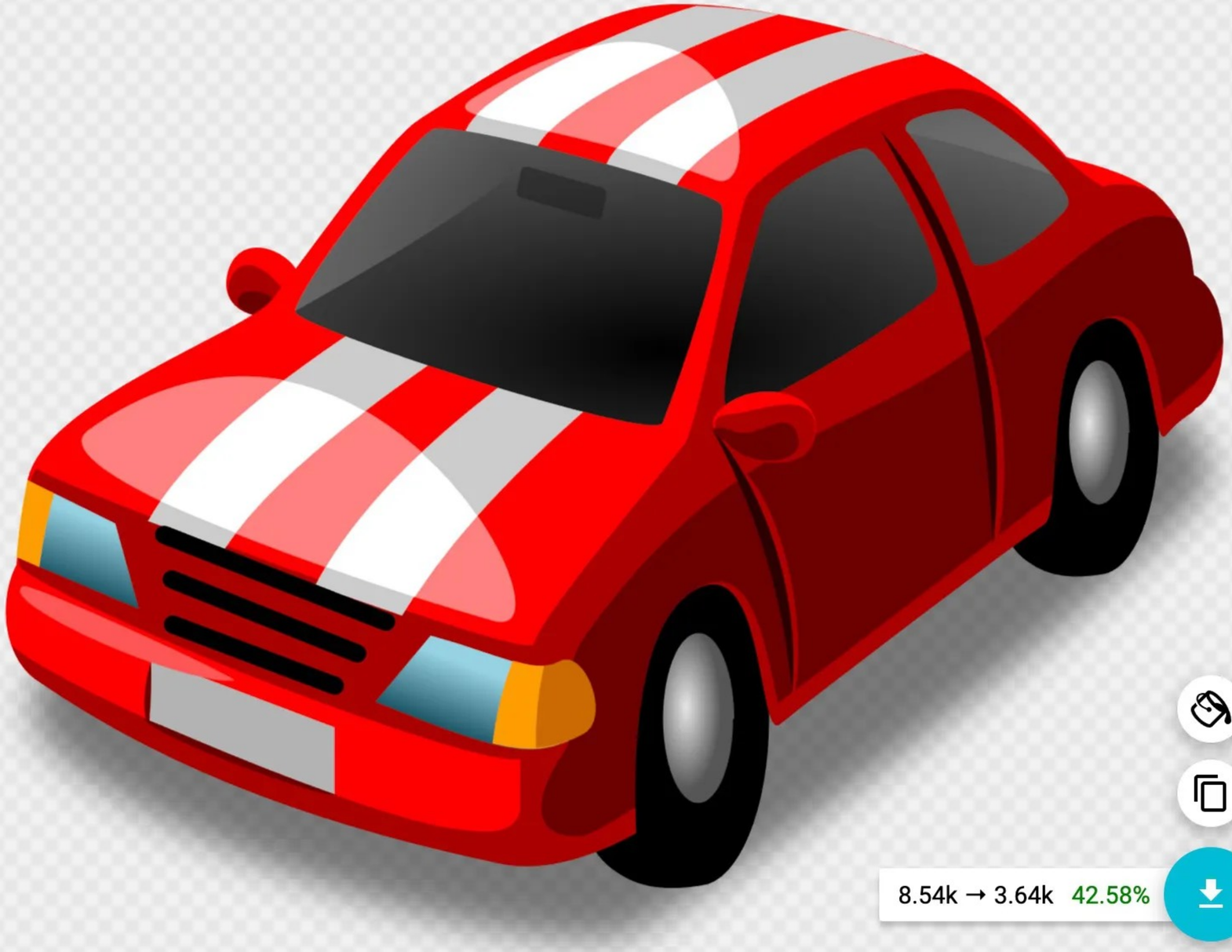
- Show original
- Compare gzipped
- Prettify markup
- Multipass

Precision

Features

- Remove doctype
- Remove XML instructions
- Remove comments
- Remove <metadata>

IMAGE MARKUP



8.54k → 3.64k 42.58%

Global settings

- Show original
- Compare gzipped
- Prettify markup
- Multipass

Precision

Features

- Remove doctype
- Remove XML instructions
- Remove comments
- Remove <metadata>

IMAGE MARKUP

8.54k → 3.64k 42.58%

Global settings

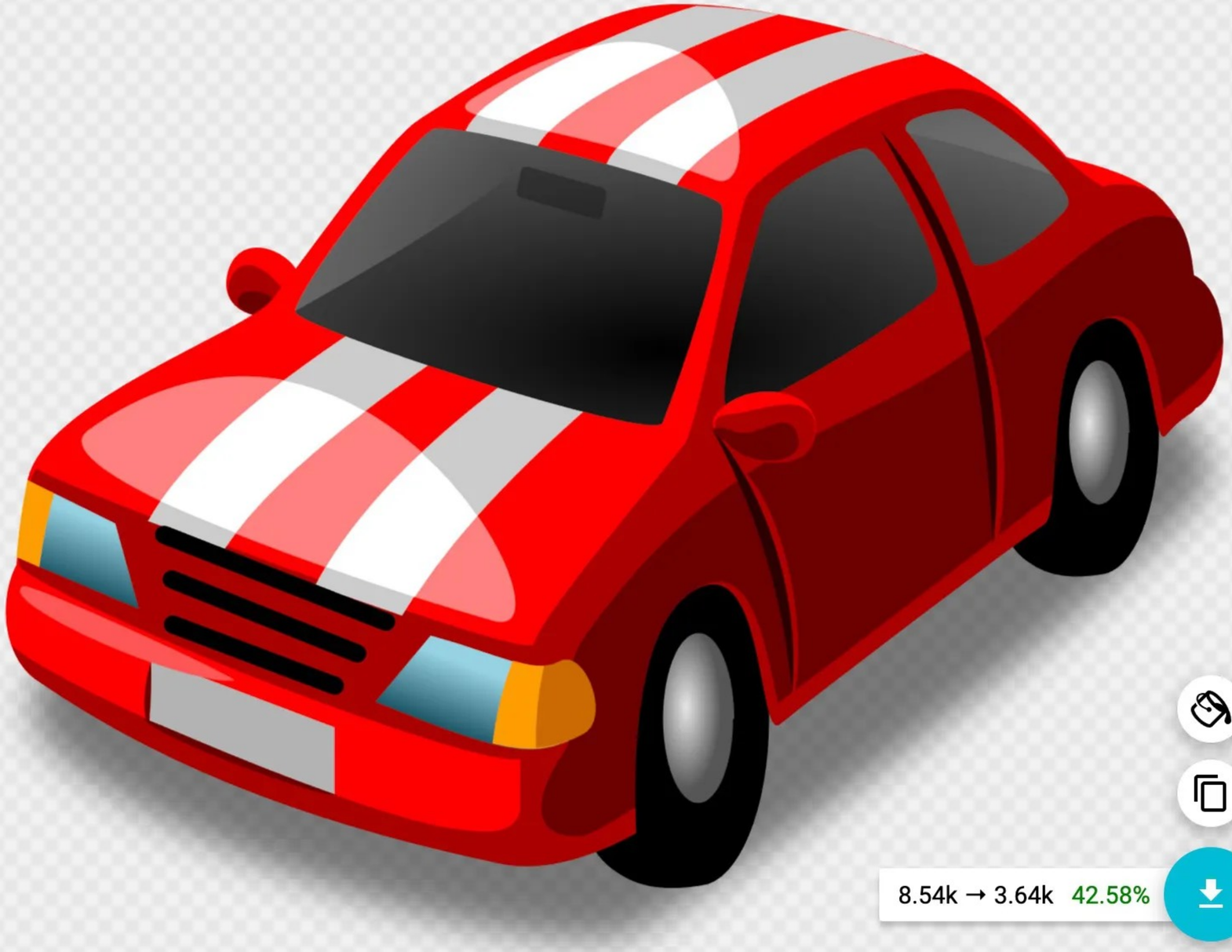
- Show original
- Compare gzipped
- Prettify markup
- Multipass

Precision

Features

- Remove doctype
- Remove XML instructions
- Remove comments
- Remove <metadata>

IMAGE MARKUP



8.54k → 3.64k 42.58%

Global settings

Show original

Compare gzipped

Prettify markup

Multipass

Precision

Features

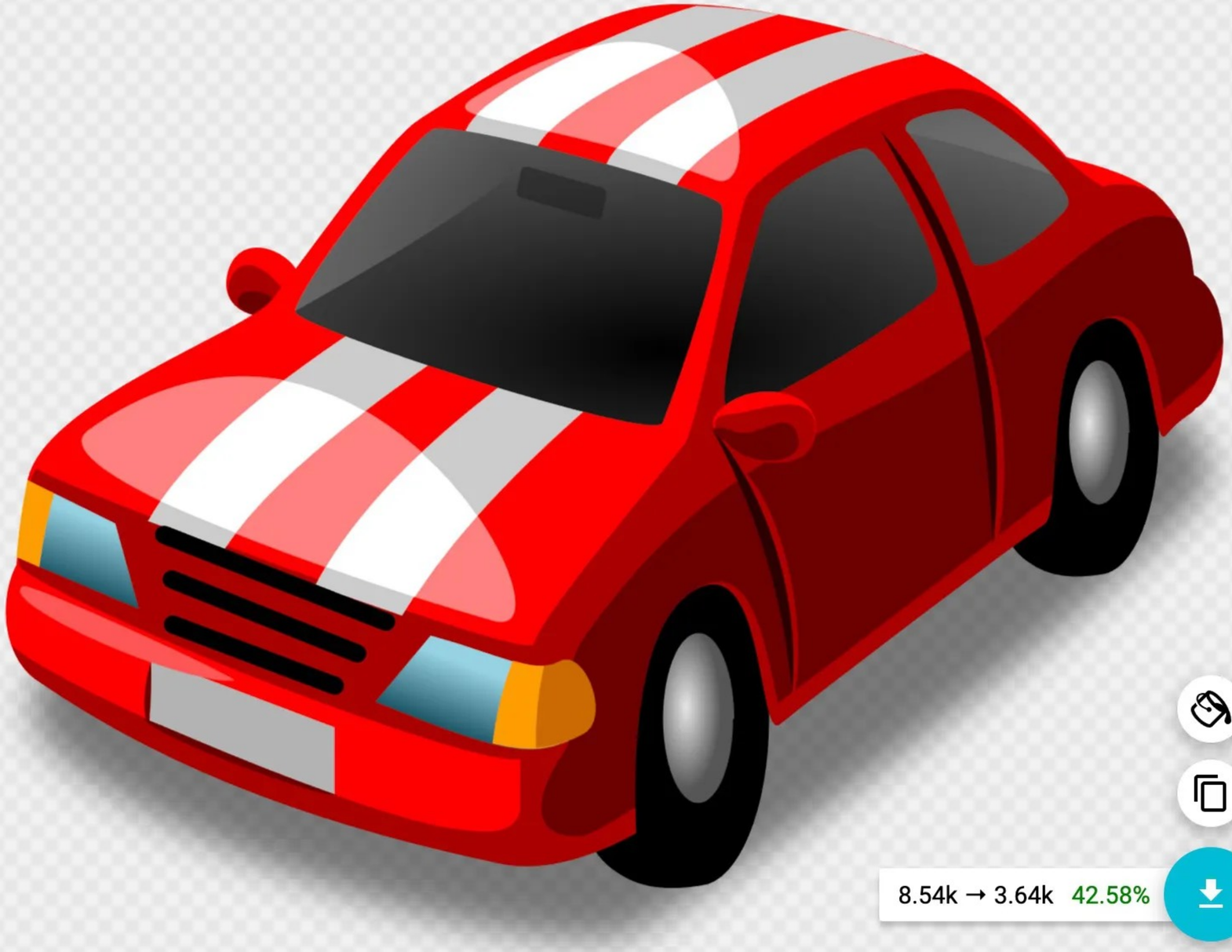
Remove doctype

Remove XML instructions

Remove comments

Remove <metadata>

IMAGE MARKUP



8.54k → 3.64k 42.58%

Global settings

Show original

Compare gzipped

Prettify markup

Multipass

Precision

Features

Remove doctype

Remove XML instructions

Remove comments

Remove <metadata>

IMAGE MARKUP

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<!-- Created with Inkscape (http://www.inkscape.org/) -->
<svg
   xmlns:dc="http://purl.org/dc/elements/1.1/"
   xmlns:cc="http://creativecommons.org/ns#"
   xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
   xmlns:svg="http://www.w3.org/2000/svg"
   xmlns="http://www.w3.org/2000/svg"
   xmlns:xlink="http://www.w3.org/1999/xlink"
   xmlns:sodipodi="http://sodipodi.sourceforge.net/DTD/sodipodi-0.dtd"
   xmlns:inkscape="http://www.inkscape.org/namespaces/inkscape"
   width="350.66"
   height="248"
   viewBox="0 0 1052.3622 744.09448"
   id="svg2957"
   version="1.1"
   inkscape:version="0.47 r22583"
   sodipodi:docname="little red racing car">
  <title
     id="title3157">little red racing car</title>
  <defs
     id="defs2959">
    <inkscape:perspective
       sodipodi:type="inkscape:persp3d"
       inkscape:vp_x="0 : 526.18109 : 1"
       inkscape:vp_y="0 : 1000 : 0"
```

8.54k

Global settings

- [x] Show original
- [x] Compare gzipped
- [x] Prettify markup
- [ ] Multipass

Precision

Features

- [x] Remove doctype
- [x] Remove XML instructions
- [x] Remove comments
- [x] Remove <metadata>

IMAGE MARKUP

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<!-- Created with Inkscape (http://www.inkscape.org/) -->
<svg
   xmlns:dc="http://purl.org/dc/elements/1.1/"
   xmlns:cc="http://creativecommons.org/ns#"
   xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
   xmlns:svg="http://www.w3.org/2000/svg"
   xmlns="http://www.w3.org/2000/svg"
   xmlns:xlink="http://www.w3.org/1999/xlink"
   xmlns:sodipodi="http://sodipodi.sourceforge.net/DTD/sodipodi-0.dtd"
   xmlns:inkscape="http://www.inkscape.org/namespaces/inkscape"
   width="350.66"
   height="248"
   viewBox="0 0 1052.3622 744.09448"
   id="svg2957"
   version="1.1"
   inkscape:version="0.47 r22583"
   sodipodi:docname="little red racing car">
  <title
     id="title3157">little red racing car</title>
  <defs
     id="defs2959">
    <inkscape:perspective
       sodipodi:type="inkscape:persp3d"
       inkscape:vp_x="0 : 526.18109 : 1"
       inkscape:vp_y="0 : 1000 : 0"
```

8.54k

Global settings

- [x] Show original
- [x] Compare gzipped
- [x] Prettify markup
- [ ] Multipass

Precision

Features

- [x] Remove doctype
- [x] Remove XML instructions
- [x] Remove comments
- [x] Remove <metadata>

IMAGE MARKUP

```
<svg xmlns="http://www.w3.org/2000/svg" xmlns:xlink="http://www.w3.org/1999/xlink" viewBox="0 0
1052.4 744.1">
  <defs>
    <radialGradient id="a" gradientUnits="userSpaceOnUse" cy="-15" cx="22.7"
gradientTransform="matrix(1 0 0 2.37143 0 20)" r="3.2">
      <stop stop-color="#e7e7e7" offset="0"/>
      <stop stop-color="#565656" offset="1"/>
    </radialGradient>
    <radialGradient id="c" gradientUnits="userSpaceOnUse" cy="30.7" cx="25.5"
gradientTransform="matrix(1.55222 0 0 .6192 -14 5.1)" r="15.2">
      <stop offset="0"/>
      <stop stop-color="#5e5e5e" offset="1"/>
    </radialGradient>
    <radialGradient xlink:href="#a" id="f" gradientUnits="userSpaceOnUse"
gradientTransform="matrix(1 0 0 2.37143 0 20)" cx="22.7" cy="-15" r="3.2"/>
    <radialGradient xlink:href="#a" id="g" gradientUnits="userSpaceOnUse"
gradientTransform="matrix(1 0 0 2.37143 0 20)" cx="22.7" cy="-15" r="3.2"/>
    <radialGradient xlink:href="#c" id="i" gradientUnits="userSpaceOnUse"
gradientTransform="matrix(29.1164 0 0 11.61495 -339.2 200.3)" cx="25.5" cy="30.7" r="15.2"/>
    <linearGradient id="b" y2="35.9" gradientUnits="userSpaceOnUse" x2="10.8"
gradient Transform="matrix(1.04306 0 0 1.04306 -1 -1.3)" y1="33.6" x1="11.7">
      <stop stop-color="#96d2e2" offset="0"/>
      <stop stop-color="#1d5868" offset="1"/>
    </linearGradient>
    <linearGradient id="d">
      <stop stop-color="#666" offset="0"/>
```

8.54k → 3.64k 42.58%

Global settings

- Show original
- Compare gzipped
- Prettify markup
- Multipass

Precision

Features

- Remove doctype
- Remove XML instructions
- Remove comments
- Remove <metadata>

IMAGE MARKUP

```
        id="path4039-2-9"
        style="color:#000000;fill:#000000;enable-background:accumulate"
        d="m 24.917,26.947 c -1.2562,0 -2.2785,2.4231 -2.2785,5.4022 0,2.4957 0.71996,4.5843
1.6905,5.2001 0.84522,0.63692 1.8156,0.65184 2.8113,0.49612 1.2147,-0.11163 2.1866,-2.4759
2.1866,-5.3838 0,-2.9791 -1.0222,-5.4022 -2.2785,-5.4022 -0.9418,0.53696 -1.2263,0.18836
-2.1315,-0.31237 z" />
      <path
        id="path4039"
        style="color:#000000;fill:url(#radialGradient3147);enable-background:accumulate"
        d="m 27.058,-14.548 a 3.24325,7.6912186 0 1 1 -6.4865,0 3.24325,7.6912186 0 1 1 6.4865,0
z"
        transform="matrix(0.35279561,0,0,0.35279561,18.643998,37.786412)" />
    </g>
    <path
      id="path4856-7-1-3"
      d="m 119.91129,525.04128 c -5.30962,10.07566 -26.593136,4.82088 -27.099606,-3.33551
-0.91633,-14.79671 32.479386,-6.8732 27.099606,3.33551 z"
      style="fill:#6d0000" />
    <path
      id="path4146"
      style="color:#000000;fill:#ff0000;fill-rule:nonzero;enable-background:accumulate"
      d="m 410.02178,303.7349 c -9.52172,0.28773 -18.21566,1.36139 -25.67965,3.05725
-59.71406,13.57125 -136.31028,67.17964 -158.02449,80.7511 -24.89555,15.56024 -76.26
-108.83363,132.6787 -18.261986,22.8266 -166.486192,74.01712 -178.26056,131.41444 -4
-6.917369,43.97436 -7.948495,61.14356 -0.01151,0.1931 0.01113,0.42096 0,0.61214 -4.
-7.948495,21.16068 -7.948495,34.85032 0,23.63495 10.340697,41.20929 21.399068,48.91323
```

Up to 8 decimal places!

8.54k

Global settings

- Show original
- Compare gzipped
- Prettify markup
- Multipass

Precision

Features

- Remove doctype
- Remove XML instructions
- Remove comments
- Remove <metadata>

IMAGE MARKUP

```
fill="url(#i)"/>
    <path d="M-72.385 772.702c4.026 11.193 10.369 19.755 17.12 24.457 103.03 71.774 222.019 110.383
343.627 135.736 9.288 1.6 18.857 1.07 28.125 0-2.7-29.592-14.867-63.45-16.508-43.411-2.028 24.753-
29.868 19.664-52.582 16.508-59.313-8.234-274.73-95.853-319.767-133.294z" color="#000" fill="#a00"
enable-background="accumulate"/>
    <path d="m29.48 781.613-.893 48.115 135.141 52.662-.085-50.013L29.48 781.613z" fill="#b3b3b3"/>
    <path d="M39.063 691.574 201.52 755.3" fill="none" stroke="#000" stroke-width="13.345" stroke-
linecap="round"/>
    <path d="M764.04 458.432c-22.346 1.498-53.664 23.344-112.502 78.262-91.333 85.247-185.91 64.9-
303.26 226.84-27.264 37.624 2.906 57.765-18.85 90.4-21.757 32.636-20.49 59.99 13.959 58.176
5.852-.307 21.343-9.102 40.354-21.4-.878-38.078 1.034-127.43 38.52-155.302 45.844-34.085 55.594
32.093 65.598 79.309C553.949 765.273 623 712.677 688.85 661.425c3.638-36.68 2.343-106.116 27.514-
122.897 35.004-23.336 47.68 18.97 53.444 61.361 7.36-5.616 13.093-11.454 19.316-16.114 11.573-8.666
19.852-20.05 24.457-33.018v-.612c-.158-23.36-9.17-42.862-21.399-48.302-1.613-15.62-4.71-30.36-
11.617-40.354-4.992-2.308-10.519-3.459-16.509-3.057h-.015z" fill="#6d0000"/>
    <path d="M-60.768 651.639c-4.484 21.858-6.755 40.099-7.949 56.251l16.509 7.337c3.183-23.654
7.531-41.811 11.005-53.798l-19.564-9.791zM331.76 783.094c-1.19.174-2.471.582-3.669 1.223-9.451
5.062-19.893 3.5-34.24-.612-7.366 19.133-12.411 41.359-14.675 60.531 29.95 7.495 44.573 3.933
66.034-6.725 20.236-10.05 4.406-57.04-13.451-54.417z" fill="#ff9e00"/>
    <path d="M622.193 380.174c-13.571 0-49.793 6.363-39.131 17.73 33.143 7.089 73.44 19.477 [illegible]776
30.573-19.35-21.795-57.174-48.302-66.645-48.302z" fill="url(#j)"/>
    <path d="M240.656 394.242c-2.29.014-3.8.174-4.891.612-16.068 6.372-98.25 113.977-100.886 [illegible].29
111.49-62.302 150.825-91.69 181.975-119.883-33.34-8.125-63.447-14.095- [illegible]
fill="url(#k)"/>
    <path d="M-64.037 729.184c5.315-2.867 160.52 68.315 154.108 68.896-38.86 3.52-175.432-57.594-
154.108-68.896z" fill="#f55"/>
```

8.54k → 5.11k 59.77%

Global settings

- Show original
- Compare gzipped
- Prettify markup
- Multipass

Precision

3 decimal places

- Remove XML instructions
- Remove comments
- Remove <metadata>

IMAGE MARKUP

```
226.84-27.27 37.63 2.9 57.77-18.85 90.4-21.76 32.64-20.5 60 13.96 58.18 5.85-.3 21.34-9.1 40.35-
21.4-.88-38.08 1.04-127.43 38.52-155.3 45.84-34.09 55.6 32.1 65.6 79.3a13451.32 13451.32 0 0 0
200.99-153.29c3.64-36.67 2.34-106.11 27.51-122.9 35-23.33 47.68 18.98 53.45 61.37 7.36-5.62 13.1-
11.46 19.31-16.12a70.49 70.49 0 0 0 24.46-33.01v-.62c-.16-23.35-9.17-42.86-21.4-48.3-1.61-15.62-4.7-
30.36-11.62-40.35-4.99-2.3-10.51-3.46-16.5-3.06h-.02z" fill="#6d0000"/>
    <path d="M-60.77 651.64a435.07 435.07 0 0 0-7.95 56.25l16.51 7.34c3.19-23.66 7.53-41.81 11-
53.8l-19.56-9.8zm392.53 131.45c-1.19.18-2.47.59-3.67 1.23-9.45 5.06-19.9 3.5-34.24-.62-7.36 19.14-
12.4 41.36-14.67 60.54 29.95 7.5 44.57 3.93 66.03-6.73 20.24-10.05 4.4-57.04-13.45-54.42z"
fill="#ff9e00"/>
    <path d="M622.2 380.17c-13.58 0-49.8 6.37-39.14 17.73 33.15 7.1 73.44 19.48 105.78 30.58-19.35-
21.8-57.18-48.3-66.65-48.3z" fill="url(#j)"/>
    <path d="M240.66 394.24c-2.3.02-3.8.18-4.9.61-16.06 6.38-98.25 113.98-100.88 133.3 111.49-62.3
150.82-91.7 181.97-119.89-33.34-8.12-63.44-14.1-76.2-14.02z" fill="url(#k)"/>
    <path d="M-64.04 729.18c5.32-2.86 160.52 68.32 154.11 68.9-38.86 3.52-175.43-57.4-154.1-68.9z"
fill="#f55"/>
    <path d="M371.51 331.25c-6.59.44-13.33 2.03-20.79 3.67-33.72 15.36-67.54 33.27-83.15 49.53 9.7
3.55 28.14 6.83 53.2 12.22 18.73-19.08 58.91-40.56 95.99-57.47-9.5-4.52-20.4-7.5-33.63-7.95-
3.65-.11-7.67-.26-11.62 0zm70.93 27.52c-31.4 16.01-58.67 34.38-72.15 50.13 16.2 4.37 33.59 10.11
51.97 16.51 8.8-9.7 21.9-19.77 36.68-29.35-2.06-12.3-7.2-25.8-16.5-37.3zm-316.11 220.1c-31.96 35-
66.93 55.04-89.88 88.05 16.12 7.78 35.13 15.28 55.03 23.23 24.49-32.24 61.8-63.43 94.77-88.65 33-
10.61-38.31-18.65-59.92-22.63zm100.88 52.59c-24.93 23.38-50.6 52.05-69.7 83.76 22.31 7.84 43
15.38 64.81 22.01a517.8 517.8 0 0 1 45.86-59.3 273.06 273.06 0 0 0-40.97-46.48z" fill="#fff"/>
    <path d="M631.14 532.24c8.6 48.95 12.82 110.93 15.74 169.85 10.5-3
169.85z" fill="#a00"/>
    <path d="M562.97 396.12c59.88 105.57 72.68 148.11 82.32 302.26 14.6-126.88-27.41-238.42-82.32-
302.26z" fill="#2b0000"/>
```

8.54k → 4.45k 52.13%

Global settings

- Show original
- Compare gzipped
- Prettify markup
- Multipass

Precision

2 decimal places

- Remove XML instructions
- Remove comments
- Remove <metadata>

IMAGE MARKUP

```
<path d="M371.5 331.3c-6.6.4-13.3 2-20.8 3.6-33.7 15.4-67.5 33.3-83.1 49.5 9.7 3.6 28.1 6.9 53.2
12.3 18.7-19.1 58.9-40.6 96-57.5a83.1 83.1 0 0 0-33.7-8c-3.6 0-7.6-.2-11.6 0zm71 27.5c-31.5 16-58.7
34.4-72.2 50.1a770.6 770.6 0 0 1 52 16.5c8.8-9.7 21.9-19.8 36.6-29.3a81 81 0 0 0-16.5-37.3zm-316.2
220c-32 24.4-66.9 55.1-89.9 88.1 16.2 7.8 35.2 15.3 55 23.3 24.6-32.3 61.9-63.5 94.8-88.7a187.2
187.2 0 0 0-59.9-22.6zm101 52.7c-25 23.3-50.7 52-69.8 83.7a2270 2270 0 0 0 64.8 22 517.8 517.8 0 0 1
45.9-59.3 273 273 0 0 0-41-46.4z" fill="#fff"/>
<path d="M631.1 532.2c8.6 49 12.9 111 15.8 169.9 10.5-34.4 10.7-123.3-15.8-169.9z" fill="#a00"/>
<path d="M563 396.1c59.9 105.6 72.6 148.1 82.3 302.3C659.9 571.5 617.9 460 563 396z"
fill="#2b0000"/>
<path d="M460.2 642.1c22.2 56.2 40 120 38.4 172.6 13.2-48-4.7-142.3-38.4-172.6z" fill="#a00"/>
<path d="M439.2 613a485.8 485.8 0 0 1 59.1 194.3c7-75.1-21.9-151.4-59.1-194.3z" fill="#2b0000"/>
<path d="M449.3 622.8c10.7 17.8 62.6 26.8 66.2-5.4 3.6-32.2-39.4-35.8-59-25-31.3 17-7.2 28.6-7.2
30.4z" fill="red"/>
<path d="M449.3 622.8c9 18.3 66.1 27.7 66-8-.2-32.4-42.2-12.7-61.8-11.4-20.2 1.5-9.4 15.8-4.2
19.4z" fill="#a00"/>
<path d="M449.3 622.8c17.2 22.2 59.2 17.4 53.6-2.5-7-24.9-29.4 2.7-47.2-4.3-23-8.9-13.3 5.4-6.4
6.8z" fill="#6d0000"/>
<rect transform="matrix(.96122 .27577 -.20533 .9787 0 0)" rx="5.3" ry="3.9" height="23.2"
width="64.8" y="322.8" x="382.1" opacity=".5" color="#000" fill="#1a1a1a" enable-
background="accumulate"/>
<path d="M29.6 784.4c-3.7 10.6-8.2 36.8-1.7 45.8 1.5-12.2 2-28.4 1.7-45.8z" fill="#6d0000
<path d="M24.5 826.3c3.4 11.3 130.5 59 141.2 55.7-76.4-26.9-139-56.7-141.2-55.7z"
fill="#6d0000"/>
<path d="M332 782.8c-1.1.2-3 .6-4.2 1.3-3.4 1.8-7 2.7-10.8 3a249.7
0 0 0 34.3-9.6c20.3-10 4.6-57.6-13.2-55z" style="marker:none" opacity=".5" color="#000"
fill="#963500" overflow="visible" enable-background="accumulate"/>
```

8.54k → 3.64k 42.58%

Global settings

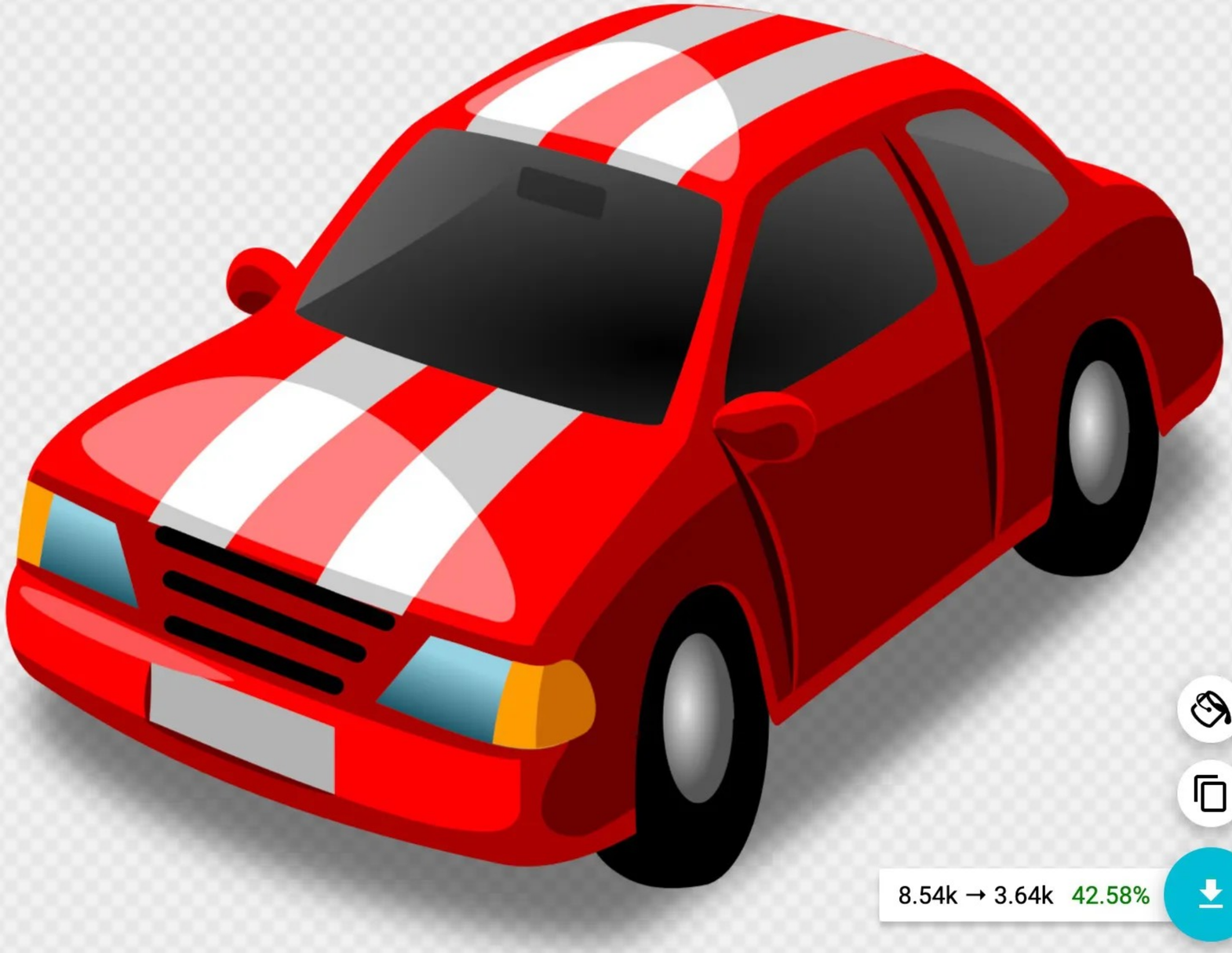
- Show original
- Compare gzipped
- Prettify markup
- Multipass

Precision

1 decimal place

- Remove XML instructions
- Remove comments
- Remove <metadata>

IMAGE MARKUP



8.54k → 3.64k 42.58%

Global settings

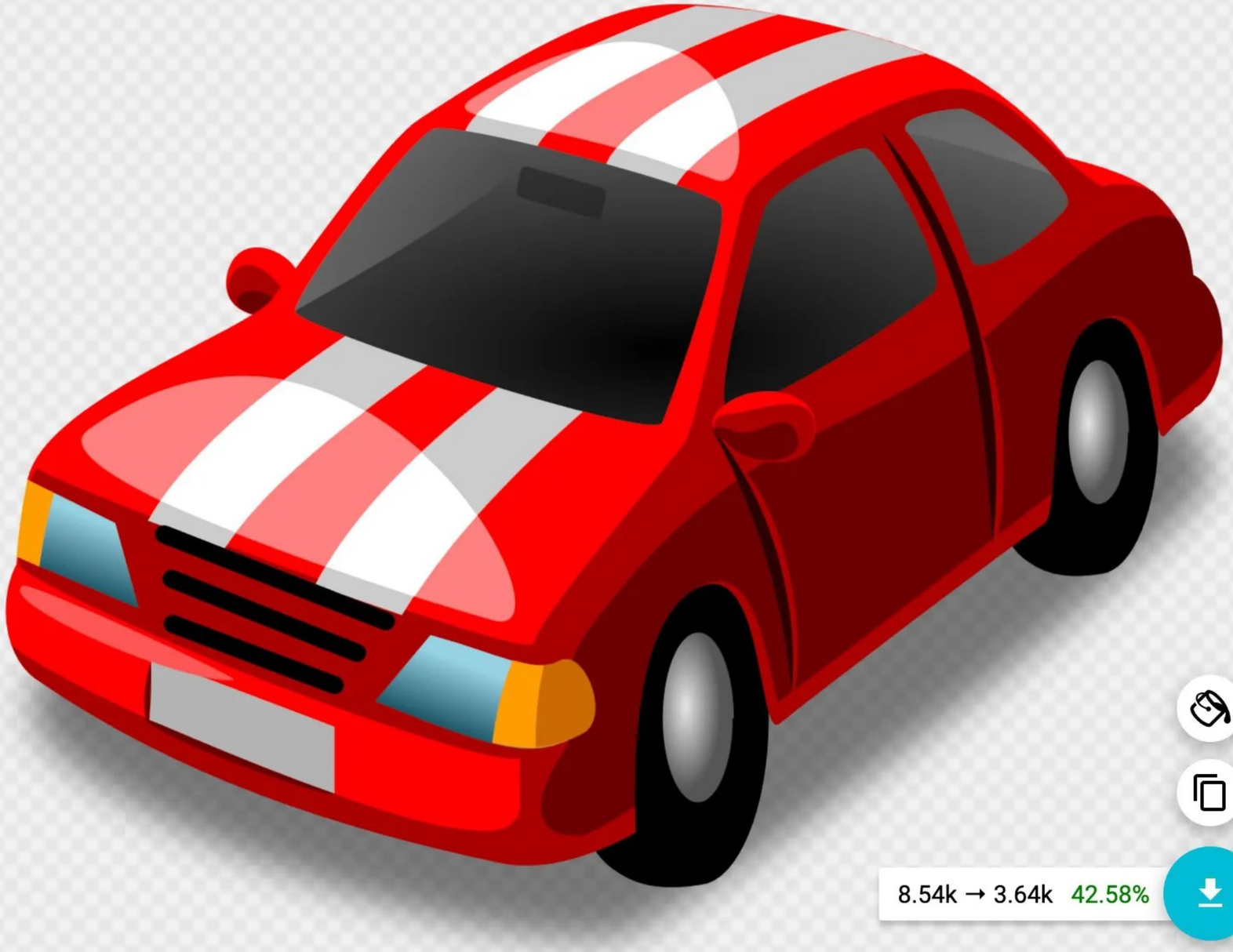
- Show original
- Compare gzipped
- Prettify markup
- Multipass

Precision

Features

- Remove doctype
- Remove XML instructions
- Remove comments
- Remove <metadata>

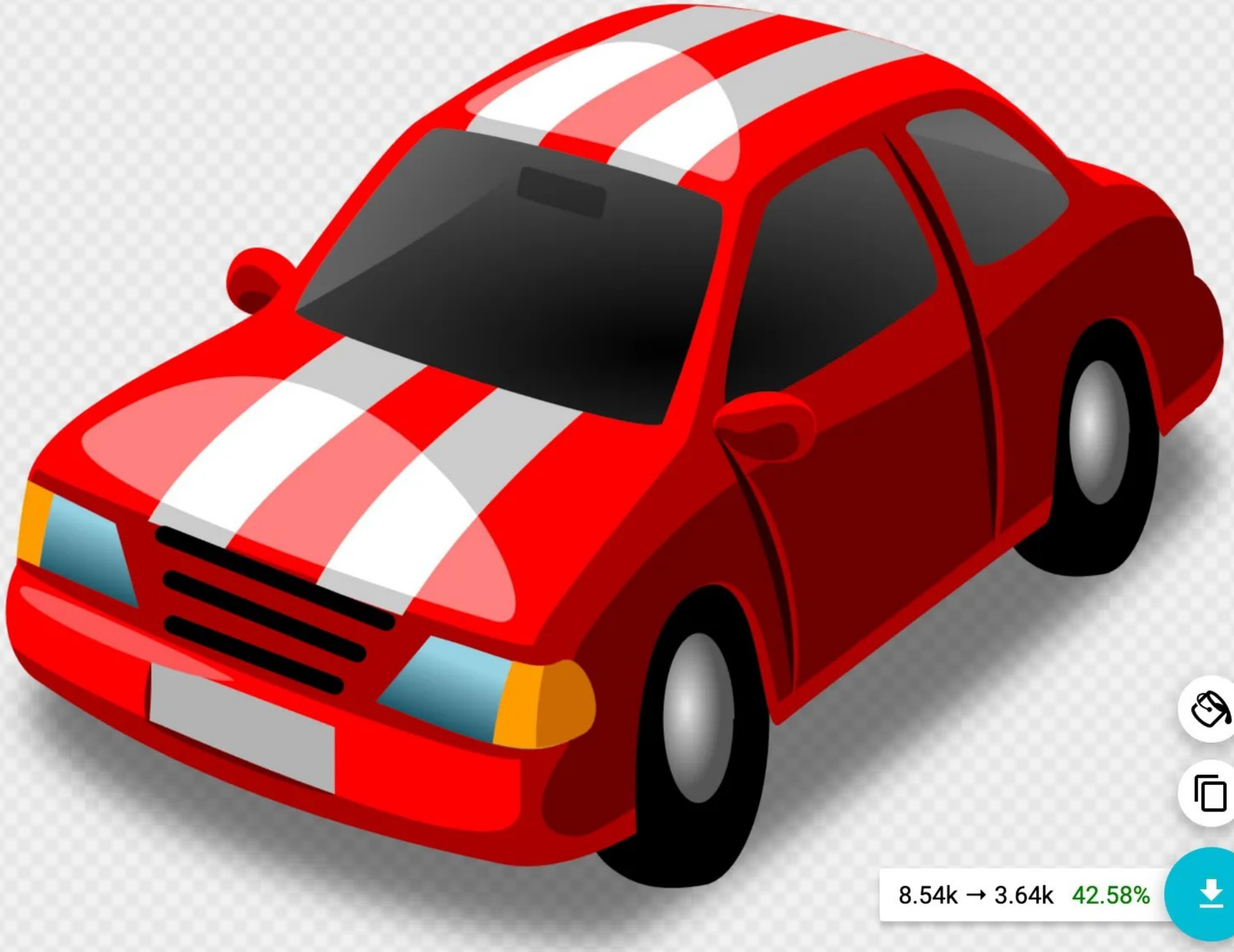
IMAGE MARKUP



8.54k → 3.64k 42.58%

- [ ] Remove xmlns
- [x] Remove editor data
- [x] Cleanup attribute whitespace
- [x] Merge styles
- [x] Inline styles
- [x] Minify styles
- [x] Style to attributes
- [x] Clean IDs
- [x] Remove raster images
- [x] Remove unused defs
- [x] Round/rewrite numbers

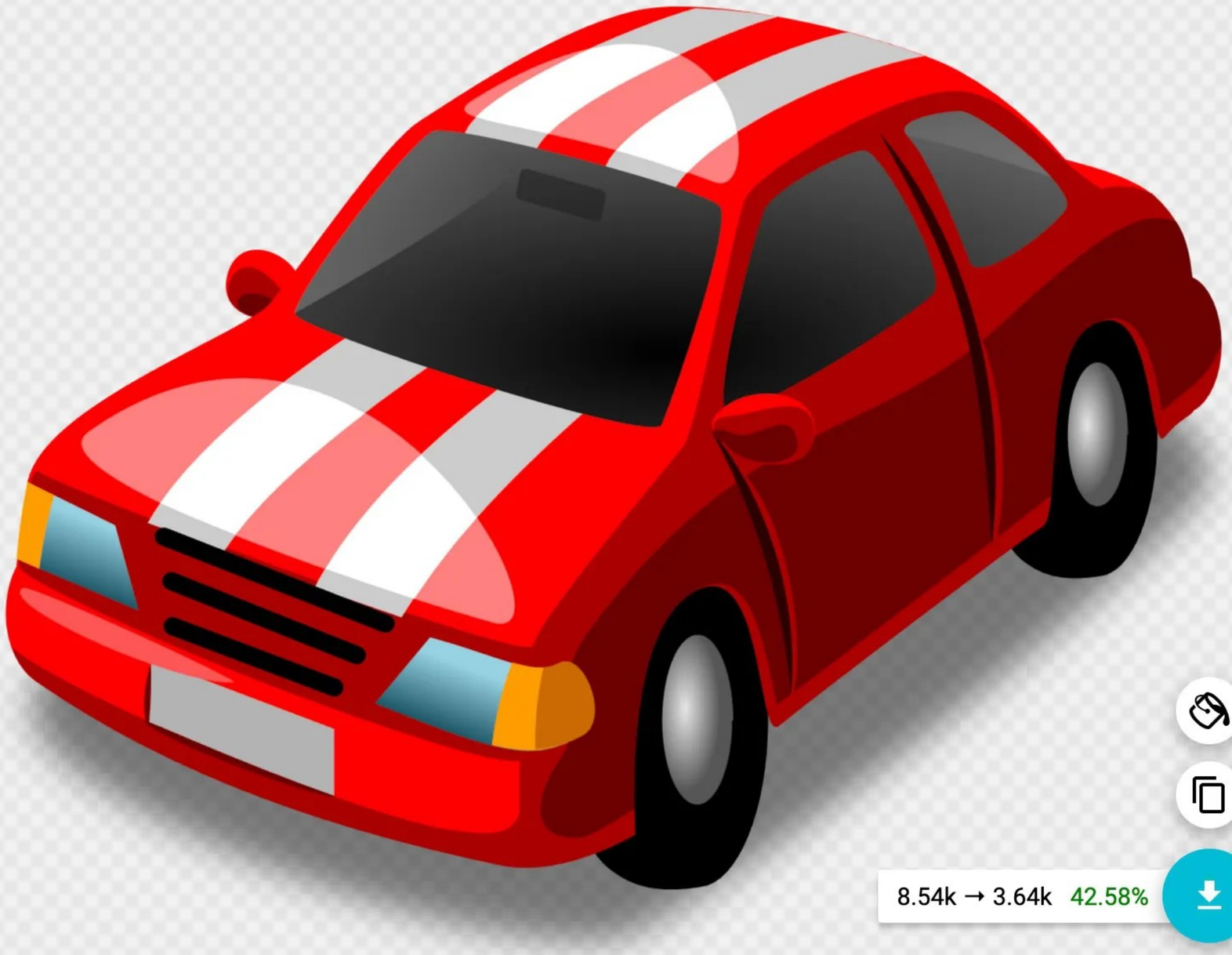
IMAGE MARKUP



8.54k → 3.64k 42.58%

- [ ] Round/rewrite number lists
- [x] Minify colours
- [x] Remove unknowns & defaults
- [x] Remove unneeded group attrs
- [x] Remove useless stroke & fill
- [ ] Remove viewBox
- [x] Remove/tidy enable-background
- [x] Remove hidden elements
- [x] Remove empty text
- [x] Shapes to (smaller) paths
- [x] Move attrs to parent group

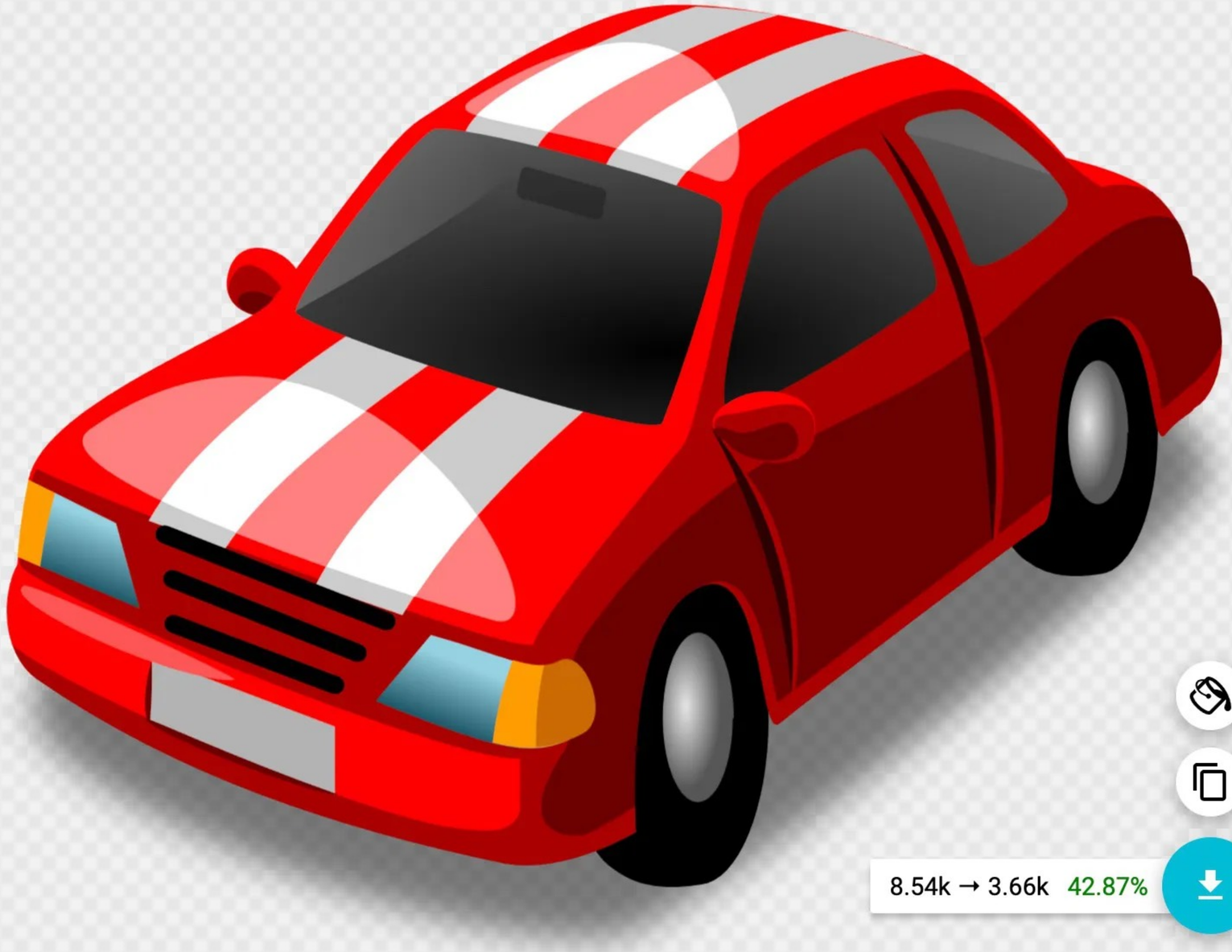
IMAGE MARKUP



8.54k → 3.64k 42.58%

- [x] Move group attrs to elements
- [x] Collapse useless groups
- [x] Round/rewrite paths
- [x] Convert non-eccentric <ellipse> to <circle>
- [x] Round/rewrite transforms
- [x] Remove empty attrs
- [x] Remove empty containers
- [x] Merge paths
- [x] Remove unused namespaces
- [ ] Replace duplicate elements with links
- [ ] Sort attrs

IMAGE MARKUP



8.54k → 3.66k 42.87%

- [x] Merge paths
- [x] Remove unused namespaces
- [ ] Replace duplicate elements with links
- [ ] Sort attrs
- [x] Sort children of <defs>
- [ ] Remove <title>
- [x] Remove <desc>
- [x] Prefer viewBox to width/height
- [x] Remove style elements
- [ ] Remove script elements

RESET ALL

`<video> … </video>`

Allows the browser to *play video*, completely obsoleting the need to use Flash or other plugins

Attributes

`width` & `height`
Pixels only — no percentages

`src="url"`
If multiple, use `<source>` instead (more soon!)

`poster="cthulhu.webp"`
Display image before video loads; otherwise, 1st frame

`controls`

Show ▶, ⏸, 🔊, ⧉, & other user controls

Since `controls` is a boolean attribute, all of these make user controls appear

- `controls="controls"`
- `controls=""`
- `controls`

No `controls`? No controls

HTML

```html
<h2>With <code>controls</code></h2>
<div>
  <video controls
poster="https://granneman.com/downloads/demos/2010-05-18-KMOV-News-4.png"
src="https://granneman.com/downloads/demos/2010-05-18-KMOV-News-4.mp4"></video>
</div>
```

CSS (SCSS)

JS

With controls

HTML

```html
<h2>Without <code>controls</code></h2>
<div>
  <video
poster="https://granneman.com/downloads/demos/2010-05-18-KMOV-News-4.png"
src="https://granneman.com/downloads/demos/2010-05-18-KMOV-News-4.mp4"></video>
</div>
```

CSS (SCSS)

JS

Without **controls**

HTML

```html
<video controls="controls" poster="http://files.granneman.com/interviews/2010-0518-KMOV-News-4.png"
src="http://files.granneman.com/interviews/2010-0518-KMOV-News-4.mp4" width="640" height="360">
</video>
```

`loop`

Repeat video for ∞

`loop` is a boolean attribute (like `controls`), so all of these work:

- `loop="loop"`
- `loop=""`
- `loop`

`preload`

Hint to browser as to what (if any) content to preload so video is ready to play ASAP when user presses ▶

Values

- `none`: do not preload
- `metadata`: only preload metadata, e.g., length & size (default for all but Safari on iOS)
- `auto`: preload entire video
- `preload=""`: same as `auto`

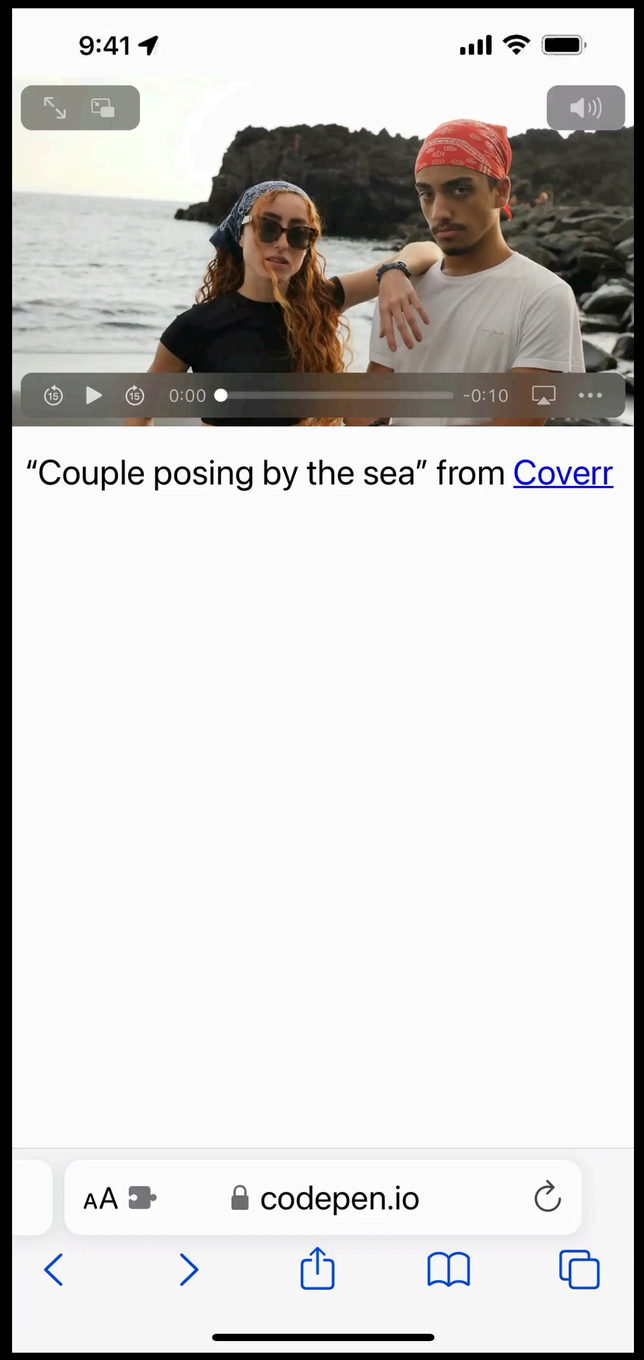
`playsinline`

Play video in place instead of full-screen

So what does this mean?

Browsers play `<video>` either full-screen & inline

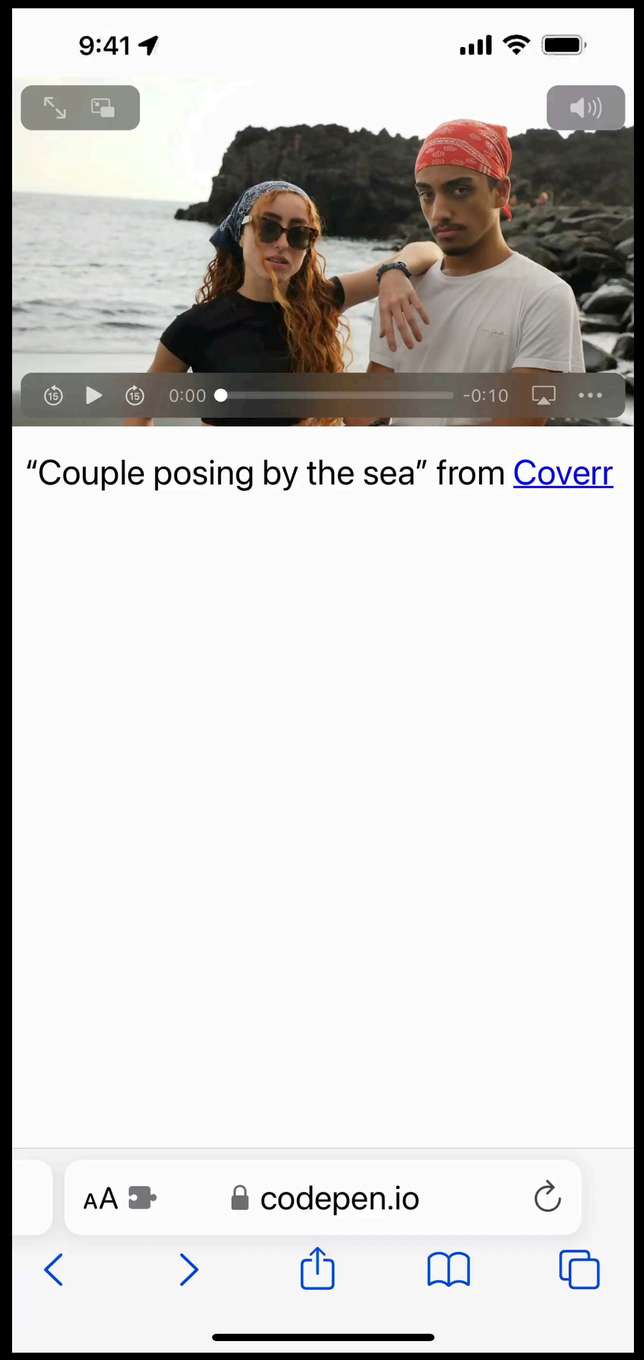
- *Full-screen* videos take up the entire screen & hide the rest of the webpage content
- *Inline* videos play where they are located in the webpage & do not hide the rest of the webpage content



Inline is the default for all desktop & mobile browsers *except* for iOS (iPhone)

iPhone plays full-screen when users press ▶️

```
<video src="couple-posing-by-the-sea-coverr.mp4" autoplay controls loop></video>
```



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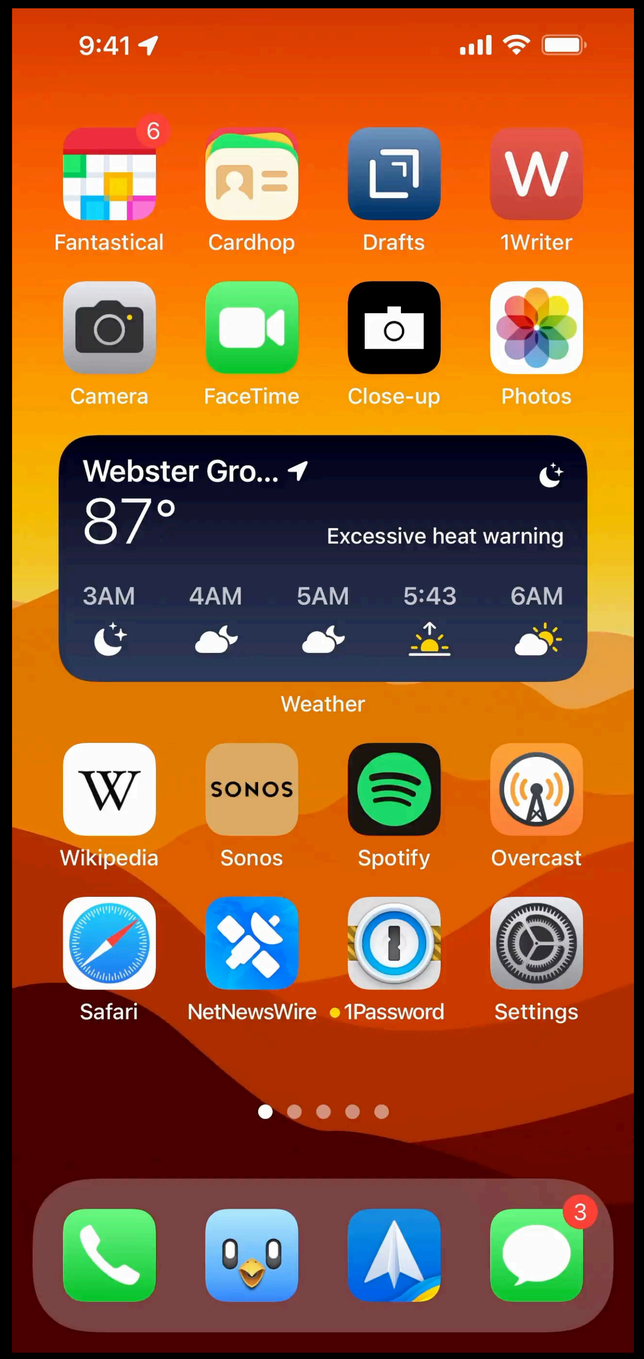
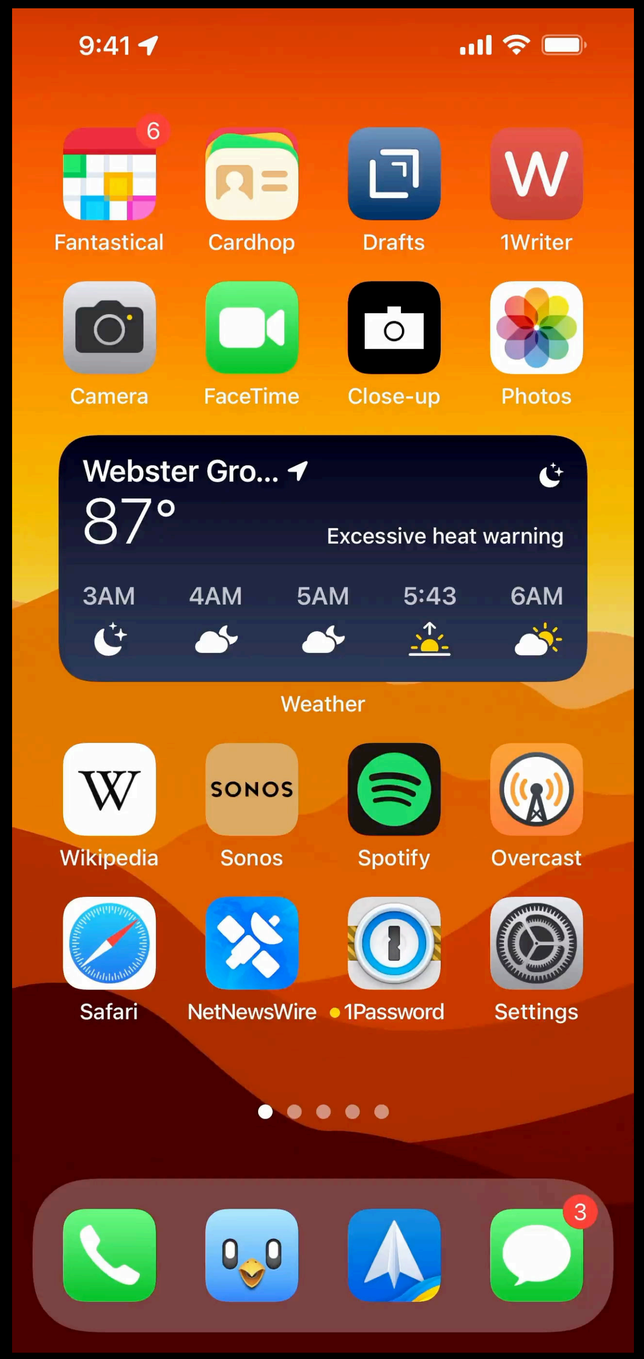
```
<video src="couple-posing-by-the-sea-coverr.mp4" autoplay controls loop></video>
```



If you want iPhone to play `<video>` inline, `<video>` *must* contain the `playsinline` attribute

```
<video src="couple-posing-by-the-sea-coverr.mp4" autoplay controls loop playsinline>
</video>
```



If you want iPhone to play `<video>` inline, `<video>` *must* contain the `playsinline` attribute

```
<video src="couple-posing-by-the-sea-coverr.mp4" autoplay controls loop playsinline>
</video>
```

✏️ SIDE NOTE

Remember, full-screen play is available either by...

» user pressing the full-screen control, e.g., ⤡ or ⛶
» developer using the Fullscreen API

`muted`

Audio doesn’t play until user initiates it

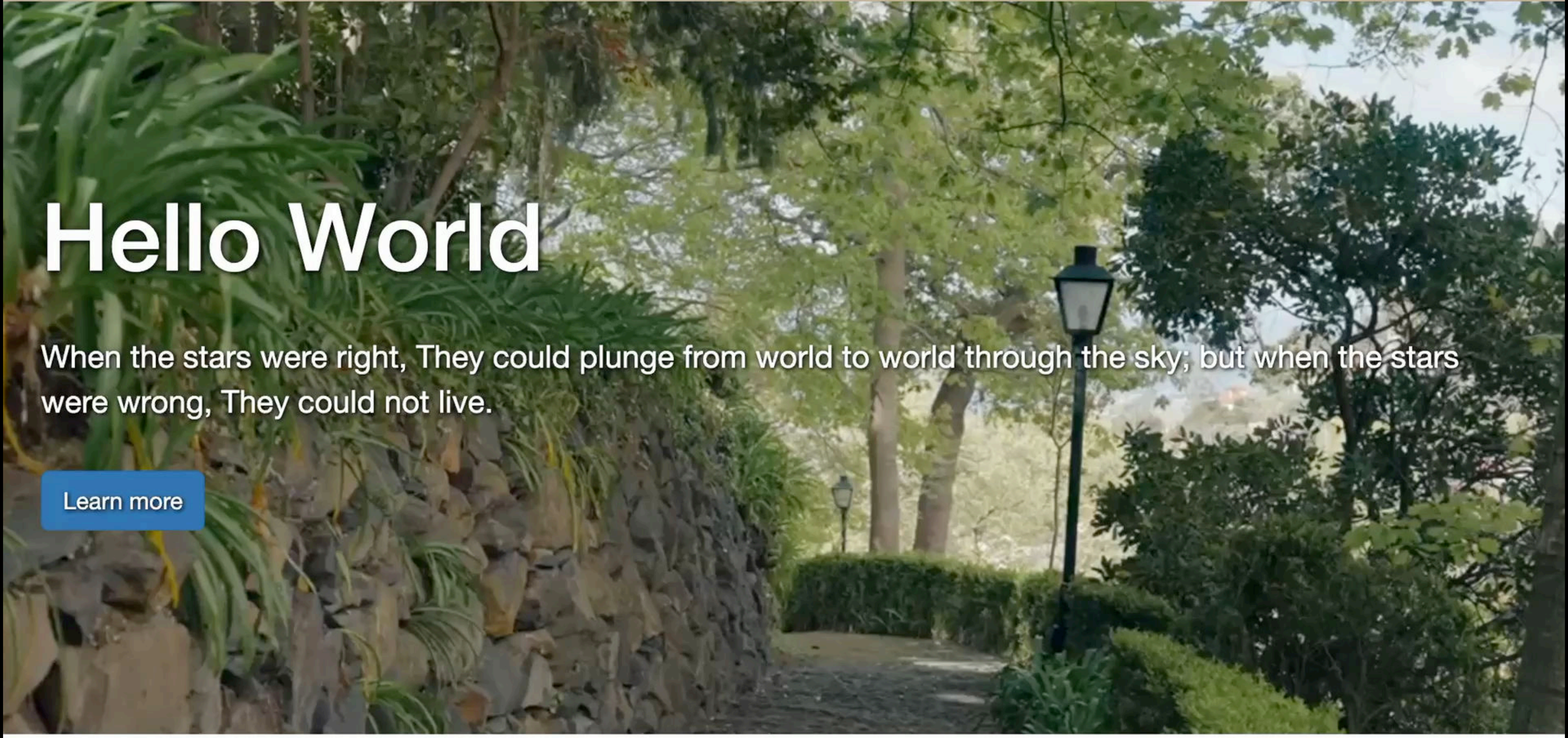
Another boolean attribute (like `controls` or `loop`), so all of these work:

- `muted="muted"`
- `muted=""`
- `muted`

`autoplay`

Automatically plays the video on page load

This is often used with hero videos



Hello World

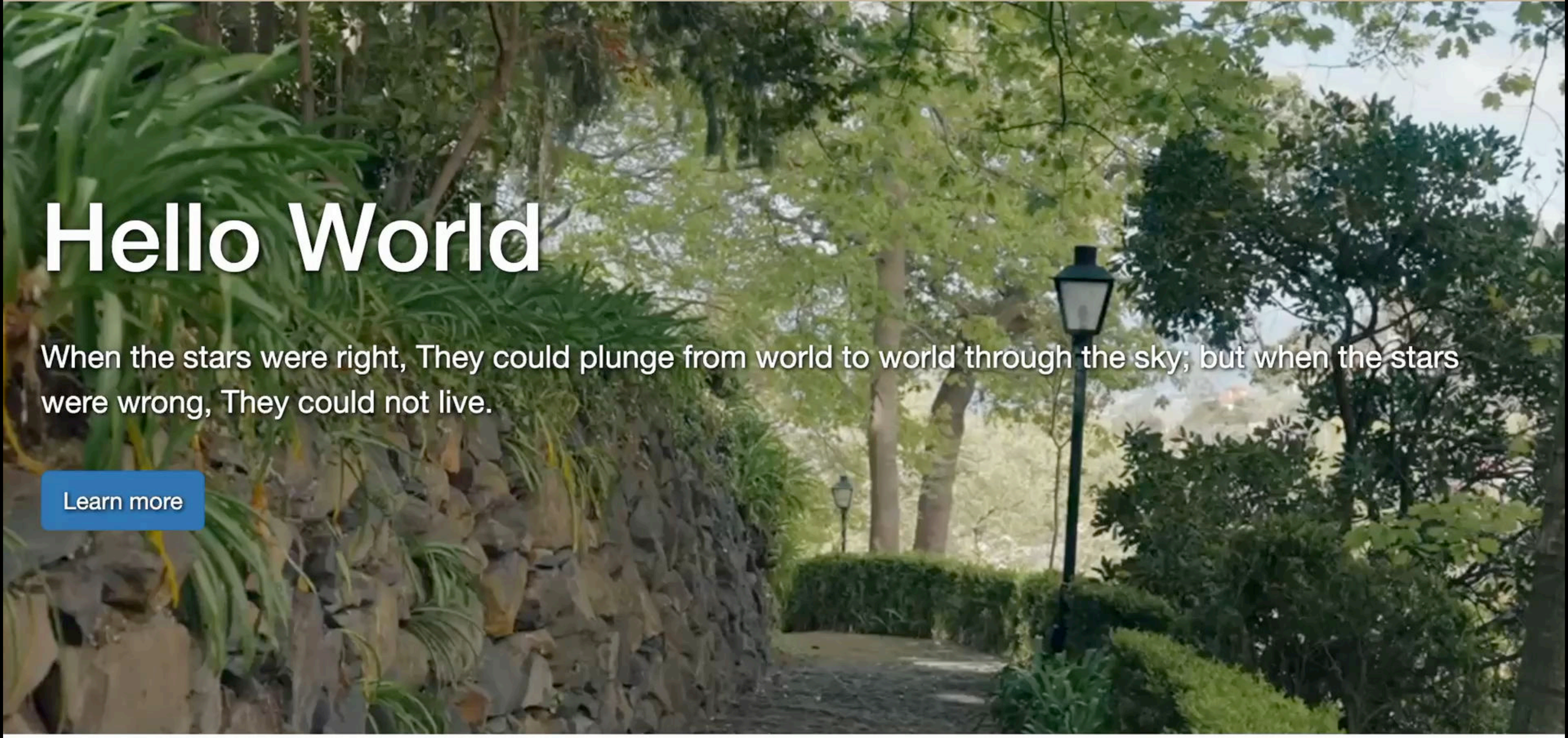
When the stars were right, They could plunge from world to world through the sky; but when the stars were wrong, They could not live.

Learn more

On 1 November 1907, there had come to New Orleans police a frantic summons from the swamp and lagoon country to the south. The squatters there, mostly primitive but good-natured

Yet all this was only the prologue of the actual Dunwich horror. Formalities were gone through by bewildered officials, abnormal details were duly kept from press and public, and men were sent to

Earl Sawyer, who tended the horse and cattle during Wilbur's absence, had developed a woefully acute case of nerves. The officials devised excuses not to enter the noisome



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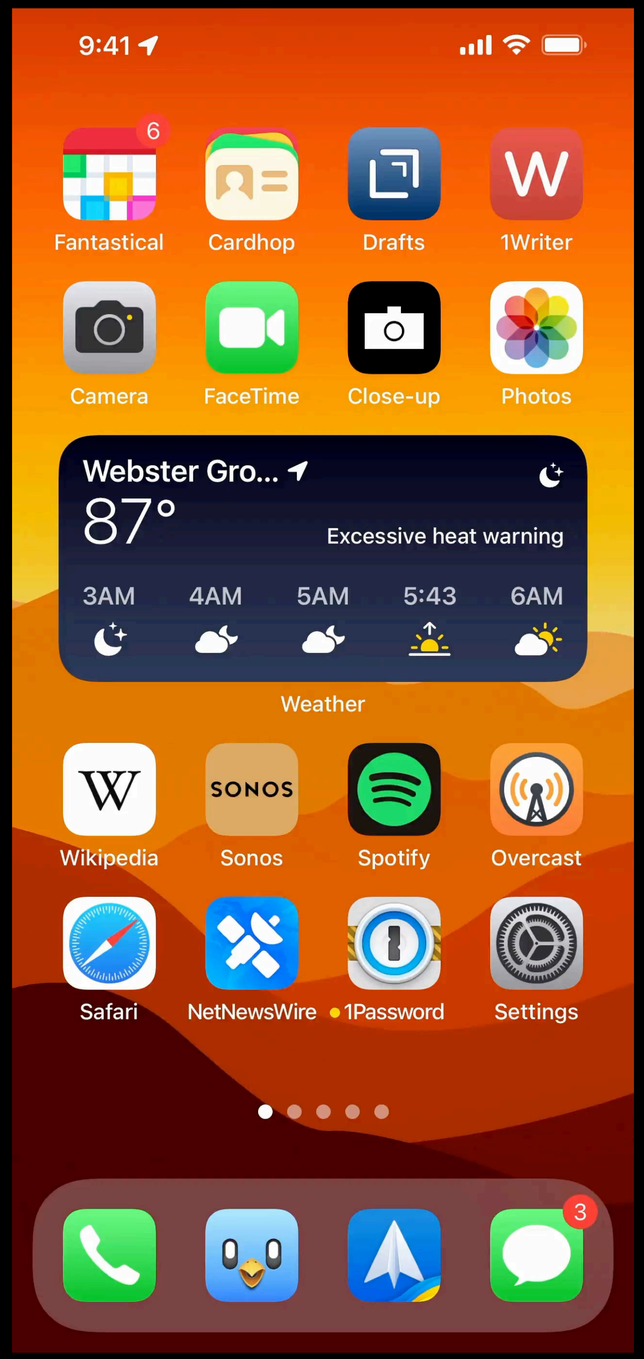
Earl Sawyer, who tended the horse and cattle during Wilbur's absence, had developed a woefully acute case of nerves. The officials devised excuses not to enter the noisome

On Safari for Mac & iPadOS, `autoplay` works only if either…

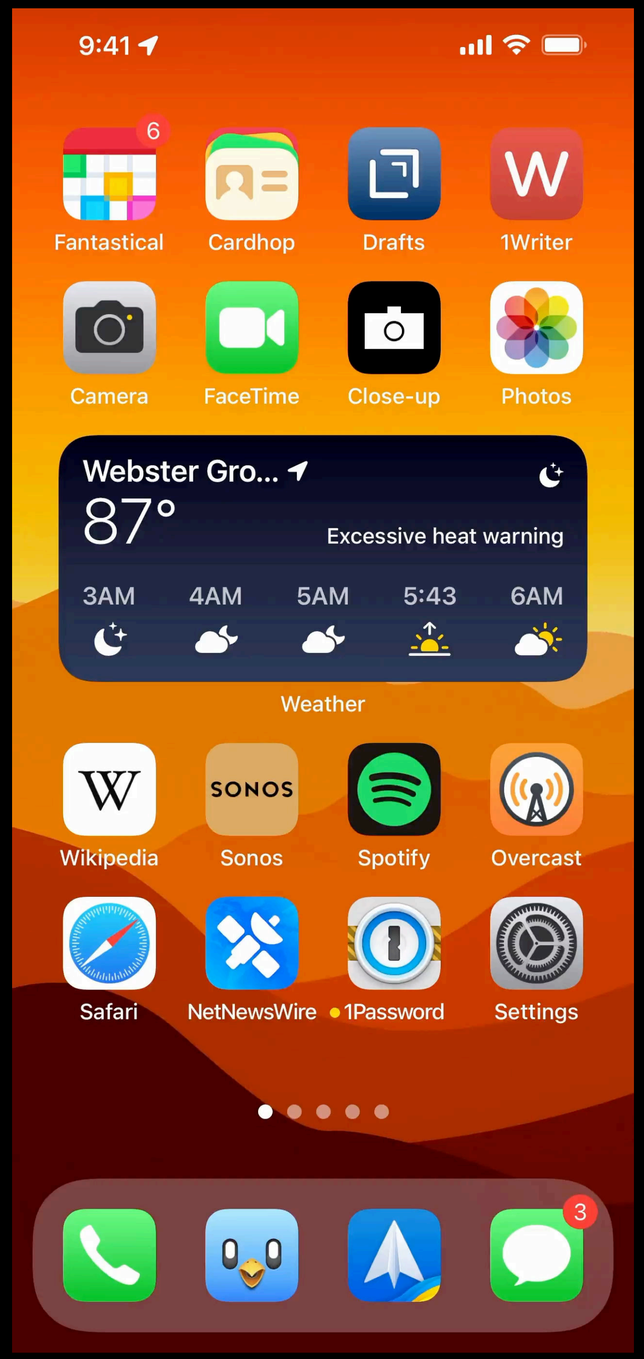
» video doesn’t contain audio track, *or*
» `<video>` includes `muted` attribute



On iOS (iPhone), `autoplay` requires that `<video>` must *also* include `playsinline` attribute

```
<video src="couple-posing-by-the-sea-coverr.mp4" autoplay controls loop playsinline>
</video>
```

I didn't need `muted` because the video lacks an audio track!



On iOS (iPhone), `autoplay` requires that `<video>` must *also* include `playsinline` attribute

```
<video src="couple-posing-by-the-sea-coverr.mp4" autoplay controls loop playsinline>
</video>
```

I didn't need `muted` because the video lacks an audio track!

Playback pauses if…

- video gains audio
- video becomes unmuted without user’s interaction
- video is no longer onscreen due to user scrolling or CSS

`<source>`

Enables authors to specify *multiple media resources* for `<picture>`, `<video>`, & `<audio>`

Does nothing on its own

Always a child of `<video>` & `<audio>`

No `</source>`!

`type`

Attribute *specifying MIME/media type of the resource*, optionally with a codecs parameter

In other words

```
<source src="cthulhu.webm" type="video/webm">
<source src="cthulhu.mp4" type="video/mp4">
<source src="cthulhu.ogv" type="video/ogg">
```

✏️ SIDE NOTE

What's a *MIME type*?

Originally defined in 1996 as the MIME (*Multipurpose Internet Mail Extensions*) specification for identifying types of email message content & attachments

Now just called *media types*

✏️ SIDE NOTE

Always specified as `type/subtype`

Allowed types: `application`, `audio`, `example`, `font`, `image`, `message`, `model`, `multipart`, `text`, & `video`

Examples: `application/pdf`, `image/jpeg`, `text/css`, & `video/mp4`

List overseen by Internet Assigned Numbers Authority (IANA)

RELATED TOPICS

HTTP

Guides:

- Resources and URIs
- HTTP guide
- HTTP security

HTTP access control (CORS)
HTTP authentication
HTTP caching
HTTP compression
HTTP conditional requests
HTTP content negotiation
HTTP cookies
HTTP range requests
HTTP redirects

Common MIME types

This topic lists most common MIME types, with corresponding document types, ordered by their common extensions.

Two primary MIME types are important for the role of default types:

- `text/plain` is the default value for textual files. A textual file should be human-readable and must not contain binary data.
- `application/octet-stream` is the default value for all other cases. An unknown file type should use this type. Browsers pay a particular care when manipulating these files, to protect users from software vulnerabilities and possible dangerous behavior.

IANA is the official registry of MIME media types and maintains a list of all the official MIME types. This table lists important MIME types for the Web:

RELATED TOPICS

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Internet Assigned Numbers Authority

Full list of all MIME/media types

Media Types

Last Updated
2022-04-01
Registration Procedure(s)
Expert Review for Vendor and Personal Trees.
Expert(s)
Ned Freed, Alexey Melnikov, Murray Kucherawy (backup)
Reference
[RFC6838][RFC4855]
Note
Per Section 3.1 of [RFC6838], Standards Tree requests made through IETF documents will be reviewed and approved by the IESG, while requests made by other recognized standards organizations will be reviewed by the Designated Expert in accordance with the Specification Required policy. IANA will verify that this organization is recognized as a standards organization by the IESG.
Note
[RFC2046] specifies that Media Types (formerly known as MIME types) and Media Subtypes will be assigned and listed by the IANA.

Procedures for registering Media Types can be found in [RFC6838], [RFC4289], and [RFC6657]. Additional procedures for registering media types for transfer via Real-time Transport Protocol (RTP) can be found in [RFC4855].

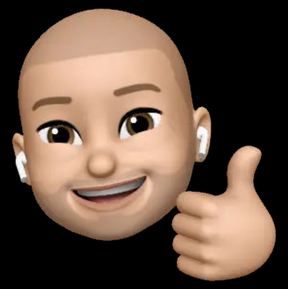
The following is the list of Directories of Content Types and Subtypes. If you wish to

If you leave `type` out...

1. Rendering engine queries server for media's type, checks to see if it can play the type, & then does if it can
2. If rendering engine cannot play the type, it checks the next `<source>` & repeats step 1
3. ∞

If you specify a value for `type`...

1. Rendering engine checks to see if it can play the type & then does if it can
2. If rendering engine cannot play the type, the server is *not* queried & it checks the next `<source>` & repeats step 1



Therefore...

» always include `type` to reduce server calls
» the order of your `<source>` elements matter

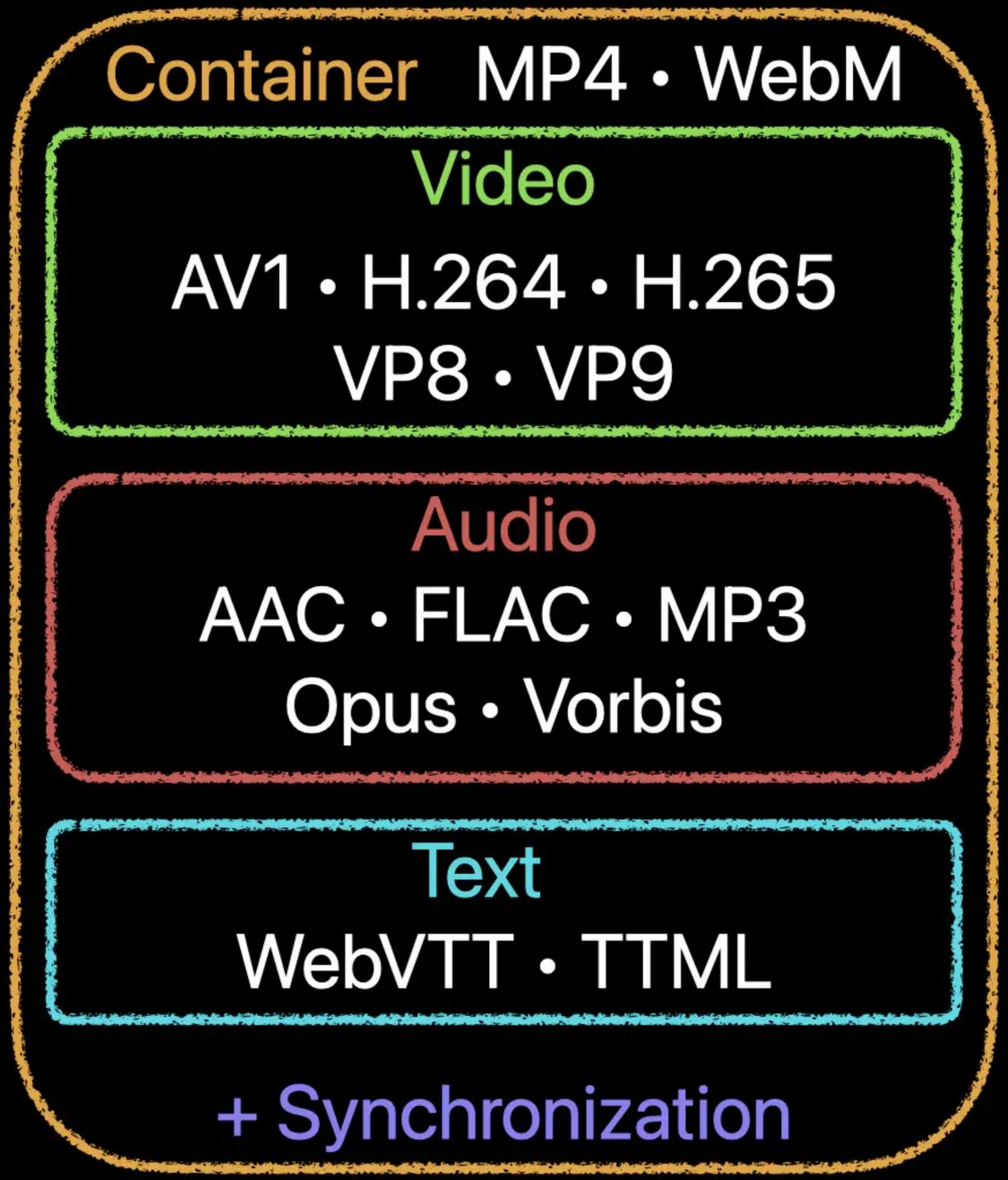
Video Formats

What kinds of video formats can you use with `<video>`?

To understand that, we need to learn about *containers* & *codecs*

A *codec* — short for *coder-decoder* or *compressor-decompressor* — is a device or computer program that encodes or decodes a digital data stream or signal

A *container* is a file format that can contain various types of data, such as audio, video, & metadata



Containers consist of digital data encoded by codecs

Containers might contain…

» video streams (encoded via codecs)
» audio streams (encoded via codecs)
» subtitles (text files)
» + a way to keep everything in sync

2 containers for videos on the Web: `mp4` & `webm`

Both are well-supported & excellent

(`ogv` is still around, but unnecessary unless you need to support ancient browsers*)

* e.g., Firefox 3.5–27, Chrome 4–24, Android 2.3–4.3

5 codecs for video on the Web

`H.264 AVC`: most widely-supported; great fallback

`H.265 HEVC`: newer, but lots of browser caveats

`VP8`: aging, but suitable for legacy browsers

`VP9`: great, with mostly good browser support

`AV1`: best; growing adoption but still maturing

Codec \ Container	.mp4	.webm
H.264 AVC	✓	
H.265 HEVC	✓	
VP8		✓
VP9		✓
AV1	✓	✓

Codec / Container	Video					Audio			
	H.264	H.265	VP8	VP9	AV1	AAC	MP3	Opus	Vorbis
.mp4	✓	✓			✓	✓	✓		
.webm			✓	✓	✓			✓	✓

Use this order for video formats using `<source>`:

`.webm` (use VP9+Opus): Smallest size, but not well-supported on older versions of Safari

`.mp4` (use H.264+MP3): Larger than `.webm`, but supported by all but ancient browsers

`.ogv`: Safe to ignore except in rare circumstances

HTML

```html
<video controls="controls" poster="https://granneman.com/downloads/demos/2010-05-18-KMOV-News-4.png" width="640" height="360">
  <source src="https://granneman.com/downloads/demos/2010-05-18-KMOV-News-4.webm" type="video/webm">
  <source src="https://granneman.com/downloads/demos/2010-05-18-KMOV-News-4.mp4" type="video/mp4">
  <source src="https://granneman.com/downloads/demos/2010-05-18-KMOV-News-4.ogv" type="video/ogg">
</video>
```

Important! Remember!

Only 1 video file/format? Use the `src` attribute

```
<video src="/videos/hpl.mp4">
```

2 or more video files/formats? Use `<source>`

```
<video>
  <source src="hpl.webm" type="video/webm">
  <source src="hpl.mp4" type="video/mp4">
</video>
```

`<track>`

Enables authors to specify *multiple timed text resources* for `<video>` & `<audio>`

Does nothing on its own

Always a child of `<video>` & `<audio>`

No `</track>`!

Attributes

- » `src`: link to file that is either *Web Video Timed Text* (WebVTT) or *Timed Text Markup Language* (TTML)
- » `srclang`: language of the `src` file, e.g., `en`, `es`, `fr`
- » `kind`: type of text content (`subtitles`, `captions`, `descriptions`, `chapters`, or `metadata`)
- » `label`: text displayed to a user selecting a track
- » `default`: enables a single `<track>` automatically

Sample WebVTT (`2010-09-27-KMOV-News-4.vtt`) file:

```
WEBVTT

1
00:00:00.000 --> 00:00:03.000
…book, addicted to your Blackberry, or use
Skype,

2
00:00:03.000 --> 00:00:04.500
we have some news for you.
```

5 kinds of text tracks:

- `subtitles`: translation + extra background info
- `captions`: transcription + sound effects for deaf viewers
- `descriptions`: spoken narration of content for blind users
- `chapters`: titles for navigating the content
- `metadata`: for use by scripts, so not visible to users

descriptions

A literal description of what appears on the screen

Can you visualize what is being described in this excerpt?

descriptions

A literal description of what appears on the screen

Can you visualize what is being described in this excerpt?

Now in a black sky, a sliver of sunlight crests the Earth. Rays of light shoot off the continents and a three-dimensional word orbits the planet: Universal. A web address appears: www.universalstudios.com.

HTML

```html
<video controls="controls" poster="https://assets.codepen.io/122116/2010-09-27-KMOV-News-4.webp" width="640" height="360" crossorigin="anonymous">
  <source src="https://assets.codepen.io/122116/2010-09-27-KMOV-News-4.webm" type="video/webm">
  <source src="https://assets.codepen.io/122116/2010-0927-KMOV-News-4.mp4" type="video/mp4">
  <track src="https://assets.codepen.io/122116/2010-09-27-KMOV-News-4.vtt" kind="subtitles" srclang="en" label="Testola" default>
</video>
```

CSS

JS

Permute • $15

software.charliemonroe.net/permute/

Adapter • $0

www.macroplant.com/adapter/

Adapter • $0

www.macroplant.com/adapter/

Video conversion software

📦 FORMATTING GUIDE

```
<p>
  <video …>
    <track …>
  </video>
</p>
```

👎

Never surround `<video>` & `<audio>` with `<p>`

.....

```
<video …>
  <track …>
</video>
```

👍

💡 PRO TIP

If you have videos at YouTube or Vimeo, you will use their embed code to insert the video into your site, e.g.:

```
<iframe width="560" height="315" src="https://
www.youtube-nocookie.com/embed/nsBH_wqn-Bo"
title="YouTube video player" frameborder="0"
allow="accelerometer; autoplay; clipboard-
write; encrypted-media; gyroscope; picture-in-
picture; web-share" allowfullscreen></iframe>
```

💡 PRO TIP

If your videos are on YouTube or Vimeo, you won't use `<video>` because the videos aren't on your site

Why learn `<video>`? So you can host local video if you need to (lots of organizations wouldn't want their videos available on public websites)

				iOS		
<video>	9	3.5	4	3.2	4	2.3
<audio>	9	3.5	4	4	4	2.3
<source>	9	3.5	3.1	Y	Y	Y
<track>	10	31	6	6	23	25

<video>: video codecs					iOS		
H.264 (MP4)	9	12	21	3.2	3.2	4	4.4
H.265/HEVC (MP4)	11*	12† 79*	121*#	11‡ 13	11	107¶	5
AV1 (MP4)	–	121	67	17Δ	17Δ	70	10
AV1 (WebM)	–	Y	68	17Δ	17Δ	Y	Y
VP8 & VP9 (WebM)	–	79	28	12.1§ 14.1| 16	12.2§ 17.4	25	2.3 (8) 4.4 (9)

* Requires hardware support on Windows † 12–18 only ‡ macOS 10.13 High Sierra or later
§ Only in WebRTC | macOS 11.3 or later ¶ Requires hardware support on Windows & ChromeOS
# Windows only Δ Requires hardware decoder on (A17 Pro, M3, M4)

`<video>`: audio codecs					iOS		
AAC (MP4)	9	12	22*	4	4	12	3
MP3 (MP4)	9	12	22	4	4	4	2.3
Opus (WebM)	–	14	15	15	15†	33	33
Vorbis (WebM)	–	17	3.5	14.1‡§	17.4§	4	1

* Only in MP4 container & only if OS has codecs installed † macOS 10.13 High Sierra or later in CAF file
‡ macOS 11.3 Big Sur or later § Supports codec, but not Ogg container

woolyss

WEB DEVELOPMENT

HTML5 audio/video tester

A free online file type player and MIME type tester, mainly for Chromium and Firefox browsers

How to use this tool?

https://woolyss.com/f/avc-mp3-sita.mov

MIME (ex: audio/mp3) • (optional)

☐ Loop

Test

MIME type: undefined, but could be `video/quicktime; codecs="avc1.64001f,mp3"` → Test this MIME type

`<figure> … </figure>`

Self-contained content, usually referenced as a single unit

Used to display…

» Illustrations
» Diagrams
» Photos
» Code listings
» Charts

BREALEY MYERS ALLEN

Principles *of* Corporate Finance

TENTH EDITION

2-1 Future Values and Present Values

Calculating Future Values

Money can be invested to earn interest. So, if you are offered the choice between $100 today and $100 next year, you naturally take the money now to get a year's interest. Financial managers make the same point when they say that money has a *time value* or when they quote the most basic principle of finance: *a dollar today is worth more than a dollar tomorrow.*

Suppose you invest $100 in a bank account that pays interest of $r = 7\%$ a year. In the first year you will earn interest of $.07 \times \$100 = \$7$ and the value of your investment will grow to $107:

$$\text{Value of investment after 1 year} = \$100 \times (1 + r) = 100 \times 1.07 = \$107$$

By investing, you give up the opportunity to spend $100 today and you gain the chance to spend $107 next year.

If you leave your money in the bank for a second year, you earn interest of $.07 \times \$107 = \$7.49$ and your investment will grow to $114.49:

$$\text{Value of investment after 2 years} = \$107 \times 1.07 = \$100 \times 1.07^2 = \$114.49$$

Today		Year 2
$100	$\times 1.07^2$ →	$114.49

Notice that in the second year you earn interest on both your initial investment ($100) and the previous year's interest ($7). Thus your wealth grows at a *compound rate* and the interest that you earn is called **compound interest.**

If you invest your $100 for t years, your investment will continue to grow at a 7% compound rate to $\$100 \times (1.07)^t$. For any interest rate r, the future value of your $100 investment will be

$$\text{Future value of } \$100 = \$100 \times (1 + r)^t$$

The higher the interest rate, the faster your savings will grow. Figure 2.1 shows that a few percentage points added to the interest rate can do wonders for your future wealth. For example, by the end of 20 years $100 invested at 10% will grow to $\$100 \times (1.10)^{20} = \$672.75$. If it is invested at 5%, it will grow to only $\$100 \times (1.05)^{20} = \$265.33$.

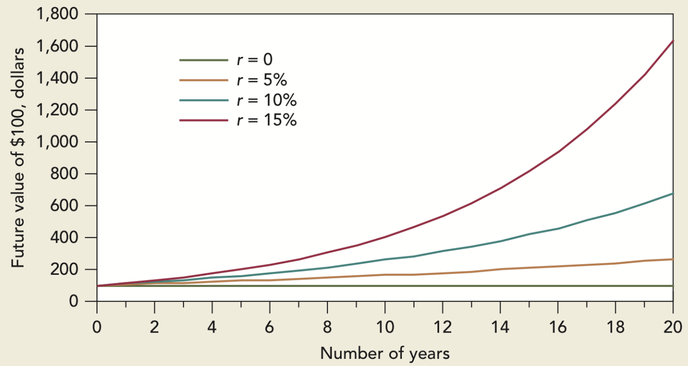


FIGURE 2.1
How an investment of $100 grows with compound interest at different interest rates.

ment will be

$$\text{Future value of \$100} = \$100 \times (1 + r)^t$$

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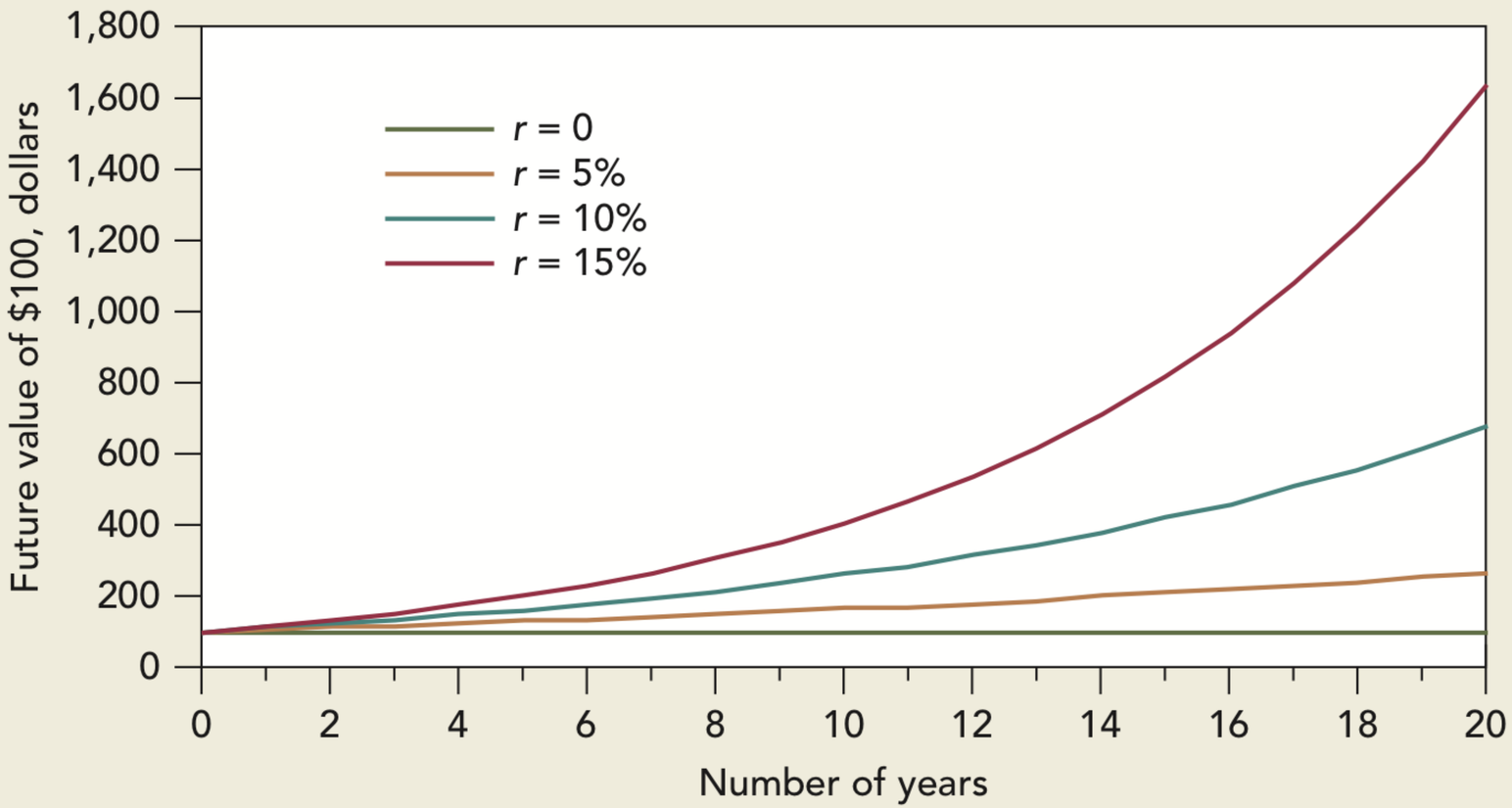


FIGURE 2.1

How an investment of \$100 grows with compound interest at different interest rates.

Referred to in main content, but could be moved elsewhere, to…

» Sidebar
» Dedicated page
» Appendix

If it is tangentially related, it should be in an `<aside>`, not `<figure>`

`<figcaption>`

Optional *caption or legend* associated with a `<figure>`

Can be first *or* last element inside `<figure>`

HTML

```html
<p>
  My dog Libby was a wonderful dog, & very cute, as you can see:
</p>

<figure>
  <img src="https://s3-us-west-2.amazonaws.com/s.cdpn.io/122116/Libby.nov98.jpg" alt="My dog Libby" width="500" height="363">
  <figcaption>
    Libby when she was a few months old
  </figcaption>
</figure>
```

CSS

JS

My dog Libby was a wonderful dog, & very cute, as you can see:

Libby when she was a few months old

Typically a `<figure>` is referenced in the text

```
<p>
  Cthulhu's followers speak a near-unintelligible
chant, as shown in Figure 1.
</p>
<figure>
  Ph'nglui mglw'nafh Cthulhu R'lyeh wgah'nagl
fhtagn!
  <figcaption>
    Figure 1: Cthulhu cultists' chant.
  </figcaption>
</figure>
```

```
<figure>
  <img src="cthulhu.jpg">
</figure>
```

`<figure>` can contain images, but *do not automatically put every image in a* `<figure>` (unless it is referenced in the text))

```
<p>
  …as you can see in Figure 3.
<p>
<figure>
  <img src="cthulhu.jpg">
</figure>
```

📦 FORMATTING GUIDE

```
<p>
  <figure>
  </figure>
</p>
```

👎

Never surround `<figure>` with `<p>`

.....

```
<figure>
  hp@lovecraft.com
</figure>
```

👍

FORMATTING GUIDE

Of course, it's perfectly OK for `<figure>` to have multiple paragraphs in it

```
<figure>
  <p>
    It is at night,
      especially…
  </p>
  <p>
    The end is near.
  </p>
  <figcaption>
    “Dagon” by H.P.
      Lovecraft
  <figcaption>
</figure>
```

✏️ SIDE NOTE

How do you put a caption on an image that is not a `<figure>`?

HTML

```html
<p>
  Among the dogs in my life, I’ve been lucky enough to have the companionship of Alex, Libby, Buddy, & Dobie.
</p>

<p>
  <img src="https://s3-us-west-2.amazonaws.com/s.cdpn.io/122116/Libby.nov98.jpg" alt="My dog Libby" width="500" height="363">
  <br><i>Libby when she was a few months old</i>
</p>
```

CSS

JS

Among the dogs in my life, I’ve been lucky enough to have the companionship of Alex, Libby, Buddy, & Dobie.

Libby when she was a few months old

Links

```
<a>

<nav>
```

`<a> … </a>`

Anchor that defines a hyperlink

`href` attribute (*hypertext reference*) is required

No `href`? No blue color, no underline… & no link!

By default, links are blue if unvisited & purple if visited (you can change that with CSS)

HTML

```html
<p>
  Don’t blame me—I voted for <a
href="http://cthulhu-for-prez.com">Cthulhu</a>!
</p>

<p>
  <a href="https://www.hplovecraft.com"><img
src="https://assets.codepen.io/122116/hpl.svg"
alt="H. P. Lovecraft"></a>
</p>
```

Don’t blame me — I voted for Cthulhu!

You can turn text or images into clickable links

<a> around text & <img> — note the 👆

CSS

JS

World Wide Web

The WorldWideWeb (W3) is a wide-area hypermedia information retrieval initiative aiming to give universal access to a large universe of documents.

Everything there is online about W3 is linked directly or indirectly to this document, including an executive summary of the project, Mailing lists , Policy , November's W3 news , Frequently Asked Questions .

What's out there?
Pointers to the world's online information, subjects , W3 servers, etc.

Help
on the browser you are using

Software Products
A list of W3 project components and their current state. (e.g. Line Mode ,X11 Viola , NeXTStep , Servers , Tools , Mail robot , Library)

Technical
Details of protocols, formats, program internals etc

Bibliography
Paper documentation on W3 and references.

People
A list of some people involved in the project.

History
A summary of the history of the project.

How can I help ?
If you would like to support the web..

Getting code
Getting the code by anonymous FTP , etc.

Links were featured on the very first website by Tim Berners-Lee hosted at CERN, dating back to 3 November 1992

2 places to link to with `<a>`

- External: to another website, via *absolute URLs**
- Internal: to other pages on your website, via *root-relative* or *document-relative* URLs

* Yes, you can use absolute URLs to link to pages of the site you're already on, but you shouldn't

Absolute	`https://cthulhu.com/hpl.html`	Complete URL
Root-relative	`/hpl.html` `/dagon/hastur.html`	Web server fills in scheme & domain
Document-relative	`hpl.html`	Same directory
	`dagon/hastur.html`	Down into sub-directory
	`../dagon/hastur.html`	Up into parent directory

Absolute	`https://cthulhu.com/hpl.html`	Complete URL
Root-relative	`/hpl.html` `/dagon/hastur.html`	Web server fills in scheme & domain
Document-relative	`hpl.html`	Same directory
	`dagon/hastur.html`	Down into sub-directory
	`../dagon/hastur.html`	Up into parent directory

Absolute URLs

`https://cthulhu.com/hpl.html`

Absolute (complete) URL

Only way to create external links to other websites

You can use it for internal linking, but don’t

HTML

```html
<p>
  I grew up in <a
href="https://en.wikipedia.org/wiki/Marshall,_Missouri">a small
rural town in mid-Missouri</a> & came to St. Louis in 1985 to
attend college at <a href="https://wustl.edu">Washington
University in St. Louis</a>. I started teaching high school
English at 21 while I was enrolled at WUSTL working on my Masters
and then a Ph.D. I quit that in 1996 to focus on Web development.
For the last 20 years, off and on, I have taught <a
href="https://granneman.com/teaching/washingtonuniversity">courses
at WUSTL</a> (Web Development, The Politics of Encryption, &
Technology &amp; the Law, to name a few) & <a
href="https://granneman.com/teaching/websteruniversity">at Webster
University</a> (Web Development, Introduction to Interactive
Digital Media, & Getting More From Your Mac). I also do a lot of
<a href="https://granneman.com/presentations/all-
presentations">speaking to groups</a> & <a
href="https://granneman.com/presentations/interviews">interviews
on TV</a>.
</p>
```

CSS (SCSS)

JS

From `codepen.io`, all links are *external* & therefore *absolute*

I grew up in a small rural town in mid-Missouri & came to St. Louis in 1985 to attend college at Washington University in St. Louis. I started teaching high school English at 21 while I was enrolled at WUSTL working on my Masters and then a Ph.D. I quit that in 1996 to focus on Web development. For the last 20 years, off and on, I have taught courses at WUSTL (Web Development, The Politics of Encryption, & Technology & the Law, to name a few) & at Webster University (Web Development, Introduction to Interactive Digital Media, & Getting More From Your Mac). I also do a lot of speaking to groups & interviews on TV.

Root-Relative URLs

`/hpl.html`
`/dagon/hastur.html`

Root-relative URL

Web server fills in scheme (`https://`) & domain (`foo.com`)

Always starts at root of website & continues from there

You're on `https://cthulhu.com/hpl.html`

You click on `<a href="/dagon/hastur.html">`

Your browser sees `/` at beginning & thinks, "This link points to another page at `https://cthulhu.com`"

The link is evaluated as `https://cthulhu.com/dagon/hastur.html`

You're on `https://granneman.com`

All of these links...

- `/presentations/html-css-responsive-web-design/`
- `/writing/books/`
- `/personal/bio/`

...are evaluated as having `https://granneman.com` in front of them

I need to link `index.html` to `main.css`

`css` will *always* be located at `/css`

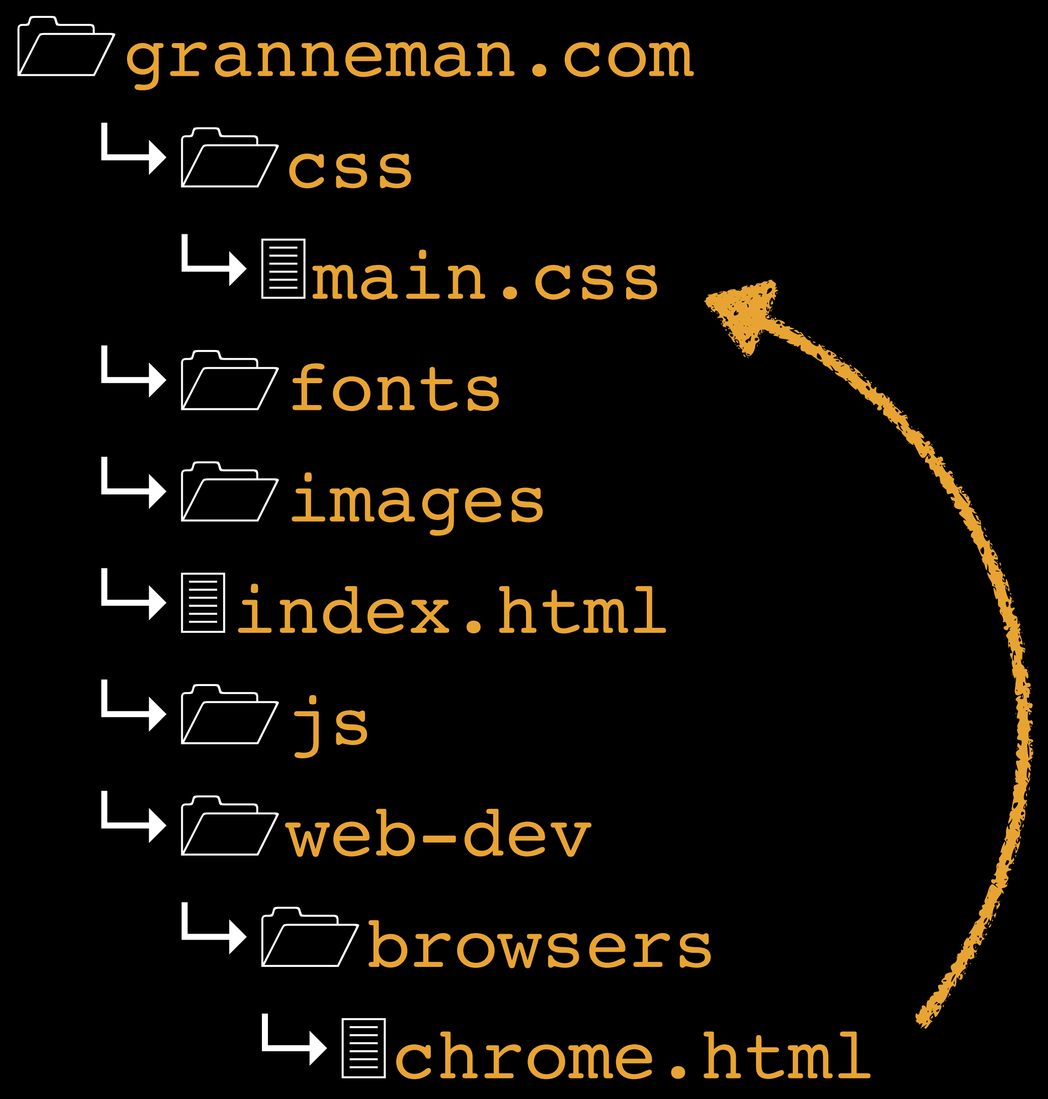
`main.css` is the child of `/css`

Therefore, I can use: `<link href="/css/main.css">`

In fact, I can use this link for *every* page on the website:

```
<link href="/css/main.css">
```

Why? Because it will always be true — `css` will *always* be located at `/css` — no matter where the webpage is in the site!



`images` will *always* be located at `/images`

So can link to images using a root-relative URL too:

```
<img src="/images/bg.webp">
```

Again, you can use that link on *every* page on the website & it *always* works

index.html — herbert-west

seasonal.html U | index.html services U | index.html ./ U | landscape-maintenance.

services > index.html > html > body > main

```
21
22  <img src="/images/services/services.jpg" alt="Garden scene" width="1500"
      height="500" srcset="/images/services/services.webp">
23
24  <h1>Find Out What We Can Do For You</h1>
25
26  <h2>Let's make your lawn look great, eh?</h2>
27
28  <img src="/images/services/maintenance-full.jpg" alt="Lawnmower cutting
      grass" width="500" height="281" srcset="/images/services/maintenance-full.
      webp">
29
30  <h3>Landscape Maintenance</h3>
31
32  <p>…
34  </p>
35
36  <img src="/images/services/seasonal-full.jpg" alt="Autumn leaves"
      width="500" height="281" srcset="/images/services/seasonal-full.webp">
37
38  <h3>Seasonal</h3>
```

main* 0↓ 3↑ ⊗ 0 ⚠ 0 ⓘ 14 1 Live Share Git Graph GIST [github] W3C validation No project

This holds true for font files in `/fonts` & scripts in `/js` as well

From *any* page on your site, you can use links to `/fonts/Foo.woff` or `/js/main.js` — & they will *always* work

This is why I consistently use root-relative URLs!*

- granneman.com
  - ↳ css
  - ↳ fonts
    - ↳ Foo.woff
  - ↳ images
  - ↳ index.html
  - ↳ js
    - ↳ main.js

*Pretty much always; there are exceptions

demo

EXPLORER

OPEN EDITORS 1 unsaved

index.html

DEMO

.vscode

index.html

patheon

lesser

outer-ones

OUTLINE

TIMELINE

TEMPLATES

index.html

index.html > html

```
    <link rel="stylesheet" href="/css/main.css">
  </head>

  <body>

    </p>

  </body>

</html>
```

Visual Studio Code auto-completes root-relative paths for you!

0 0 0 GIST [github] Ln 3, Col 1 Spaces: 2 UTF-8 LF HTML Rsync: Go Live

demo

EXPLORER

OPEN EDITORS 1 unsaved

- index.html

DEMO

- .vscode
- index.html
- patheon
  - great-old-ones
    - cthulhu.html
    - tsathoggua.html
  - lesser
  - outer-ones

OUT

TIM

TEMPLATES

index.html

index.html > html

```
  <link rel="stylesheet" href="/css/main.css">
</head>

<body>

  <p>
    Cthulhu
  </p>

</body>
```

Whatever you are linking to internally — webpage, image, audio, video, CSS, or JS — always start with a / so VS Code can autocomplete the path for you

0 0 0 GIST [github] Ln 3, Col 1 Spaces: 2 UTF-8 LF HTML Rsync: Go Live

📦 FORMATTING GUIDE

Generally, `<a>` goes *inside* elements like `<p>`, `<ul>`, `<li>`

```
<a href="cthulhu.html">
  <li>Cthulhu</li>
</a>
```

👎

```
<li>
  <a href="cthulhu.html">Cthulhu</a>
</li>
```

👍

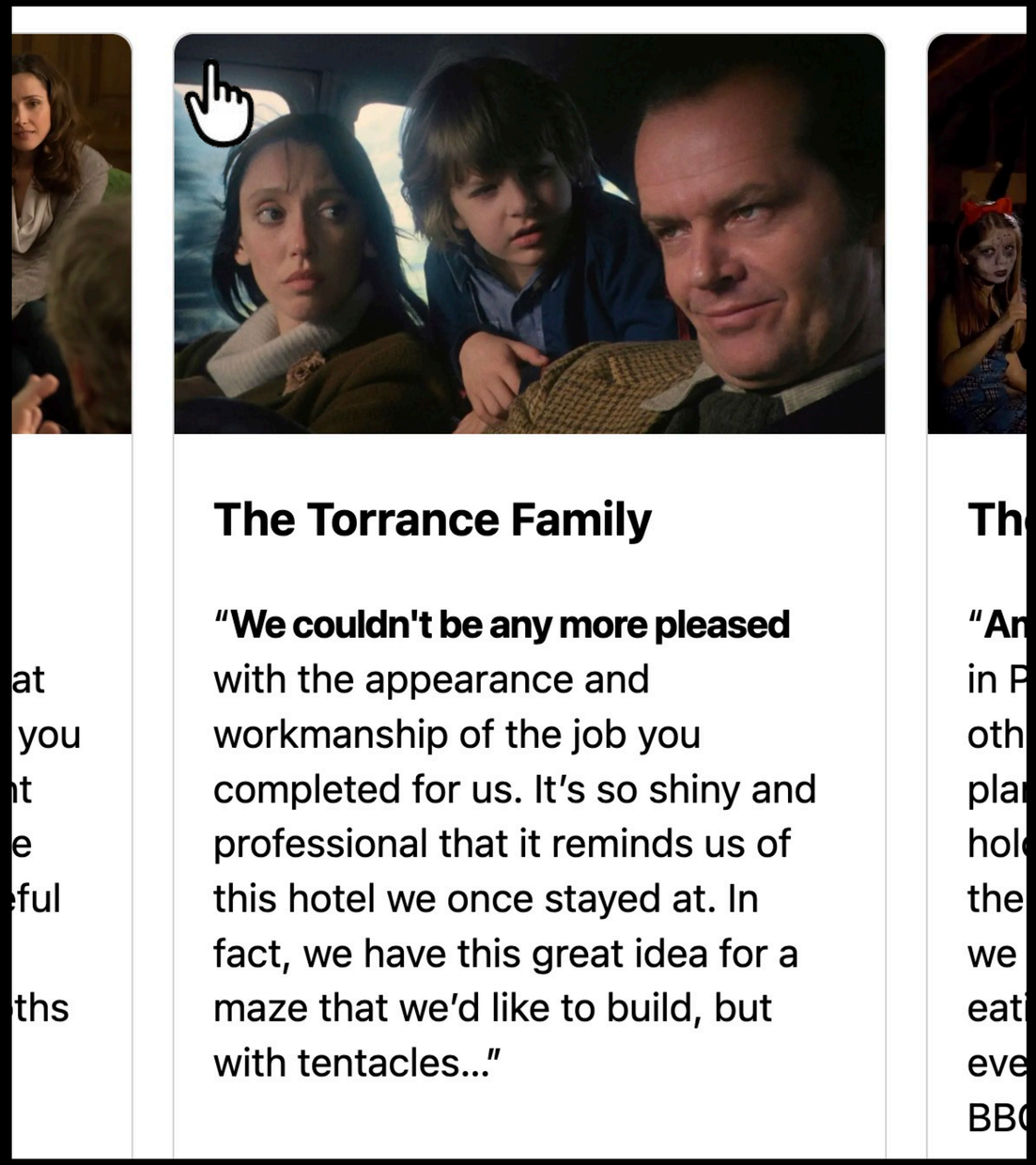
```
<li><a href="cthulhu.html">Cthulhu</a></li>
```

👍

However, if 2 or more nodes link to the same thing, you can do this:

```
<a href="cthulhu.html">
  <p>
    When the doctor reached my house…
  </p>
  <p>
    On the polished top were scratches…
  </p>
</a>
```

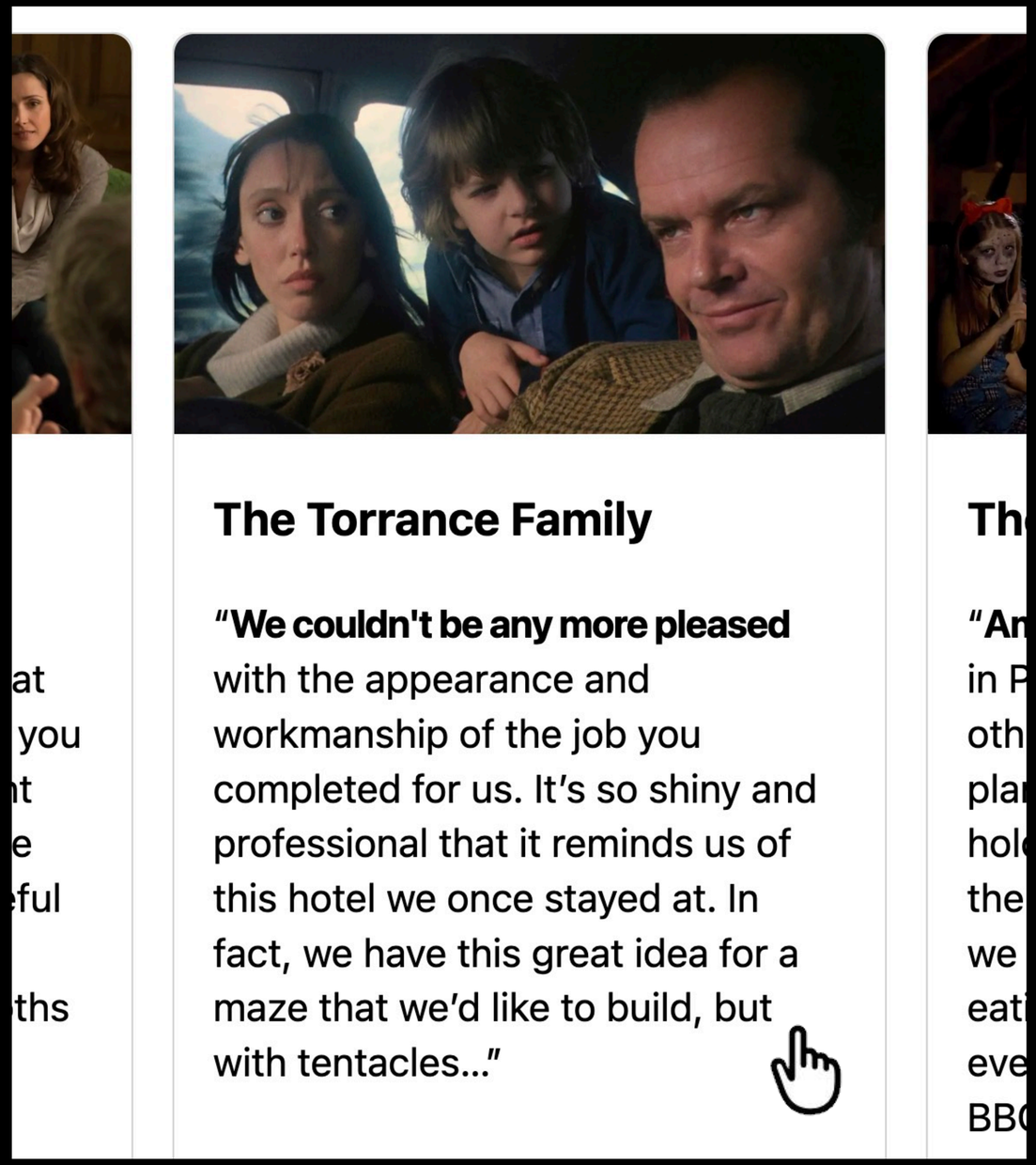
FORMATTING GUIDE



Or this:

```
<div>
  <a href="cthulhu.
    html">
    <img src="hpl.jpg">
    <h3>Card Title</h3>
    <p>
      On the polished
top were scratches…
    </p>
  </a>
</div>
```

FORMATTING GUIDE



Or this:

```
<div>
  <a href="cthulhu.
    html">
    <img src="hpl.jpg">
    <h3>Card Title</h3>
    <p>
      On the polished
top were scratches…
    </p>
  </a>
</div>
```

Links That Will Not Work

(In other words, do not do this!)

These might work on *your computer*, but *none* of these will ever work on the public Web, so *never* use them as the value of `href`:

- `C:\Users\HPL\Documents\cthulhu.html`
- `\Documents\cthulhu.html`
- `\cthulhu.html`
- `file:///anything`

Do not use `\` (backslashes), Windows drives (e.g., `C:` or `D:`), or `file:///` — all are tell-tale signs links won't work on the Web

Default Pages

Understand *default* (or *main*, or *index*) pages

Type `websanity.com` & press Enter — where do you end up?

WebSanity

SERVICES PORTFOLIO ABOUT TEAM CONTACT

On a webpage — but all you typed was a domain

We empower and enlighten!

WebSanity works closely with clients to plan, develop, and host attractive, usable websites that enable editors to manage all aspects of their sites.

LEARN MORE

https://websanity.com

Type `granneman.com/teaching/` & press Enter — where do you end up?

Scott Granneman

On a webpage — but all you typed was a domain & a folder

Wri … rch

Teaching

Current Courses
Webster University
St. Louis Community College
Web Development The Granneman Way
SIUE: Southern Illinois University Edwardsville
Student Evaluations
Washington University
Technology & Leadership Center
Archives

Home ➤ Teaching

Current Courses

Courses I'm teaching this term.

Web Development The G…

A complete course on Web De…

https://granneman.com/teaching/

Object not found!

The requested URL was not found on this server. If you entered the URL manually please check your spelling and try again.

If you think this is a server error, please contact the webmaster.

Error 404

www.janscarton.com
Mon Sep 29 14:16:21 2008
Apache/2.2.8 (Unix) mod_ssl/2.2.8 OpenSSL/0.9.7l DAV/2 PHP/5.2.6

In all cases, you ended up at a webpage

You didn’t get an Error 404

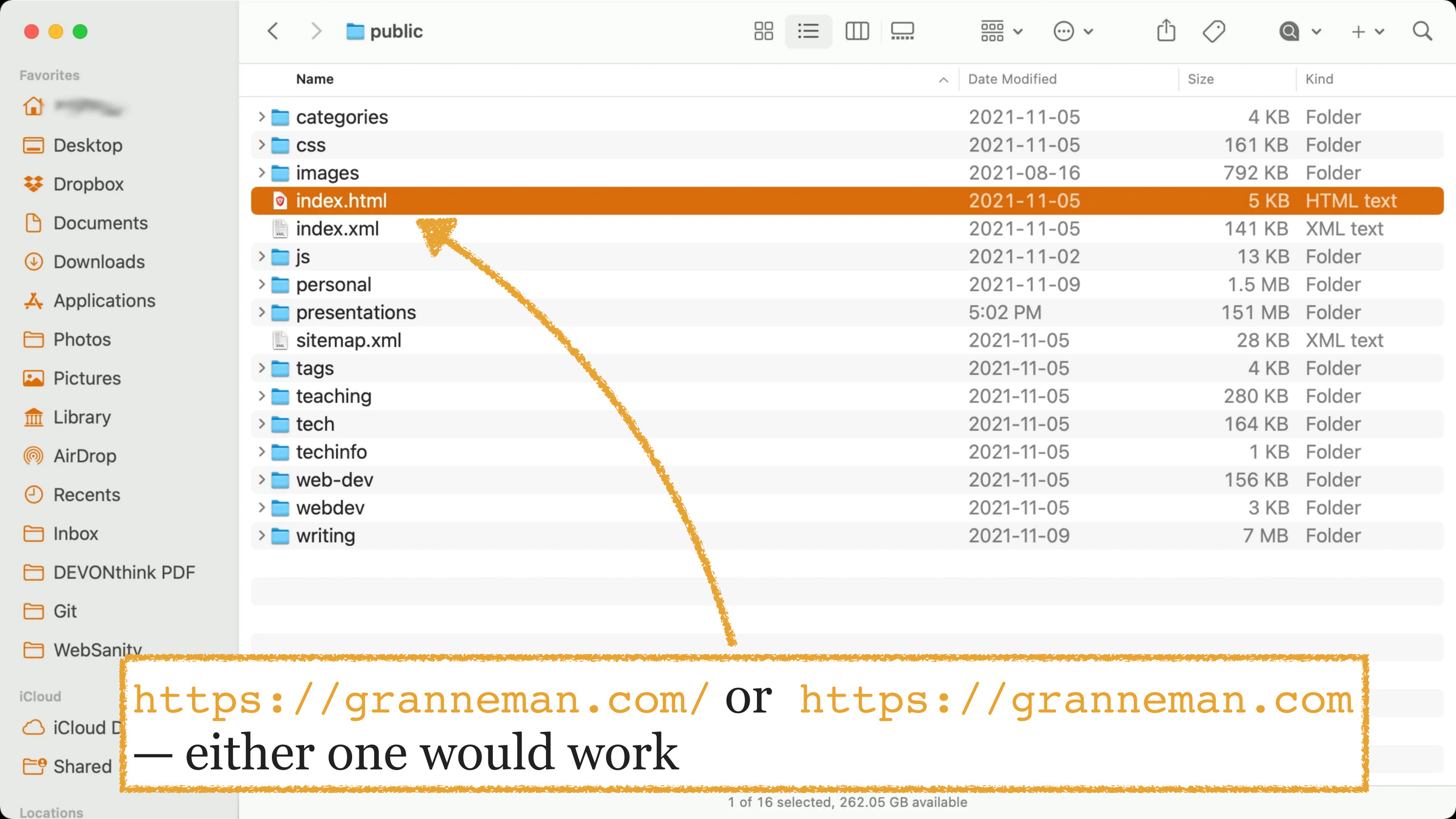
When you request a URL that points to a folder, instead of specifying a webpage, the web server will (usually) serve a *default* (AKA *main* or *index*) page

Apache	IIS	Nginx
`index.html`	`default.htm`	`index.html`
	`default.asp`	
	`index.htm`	
	`index.html`	
	`iisstart.htm`	

Web server defaults for default pages ...

Apache	IIS	Nginx
index.html	default.htm	index.html
index.php	default.asp	index.htm
index.htm	default.aspx	index.php
index.shtml	index.htm	
	index.html	
	iisstart.htm	

… but you can enter any you want — & order matters!


public
Favorites
Desktop
Dropbox
Documents
Downloads
Applications
Photos
Pictures
Library
AirDrop
Recents
Inbox
DEVONthink PDF
Git
WebSanity
iCloud
iCloud D
Shared
Locations
Name
Date Modified
Size
Kind
categories 2021-11-05 4 KB Folder
css 2021-11-05 161 KB Folder
images 2021-08-16 792 KB Folder
index.html 2021-11-05 5 KB HTML text
index.xml 2021-11-05 141 KB XML text
js 2021-11-02 13 KB Folder
personal 2021-11-09 1.5 MB Folder
presentations 5:02 PM 151 MB Folder
sitemap.xml 2021-11-05 28 KB XML text
tags 2021-11-05 4 KB Folder
teaching 2021-11-05 280 KB Folder
tech 2021-11-05 164 KB Folder
techinfo 2021-11-05 1 KB Folder
web-dev 2021-11-05 156 KB Folder
webdev 2021-11-05 3 KB Folder
writing 2021-11-09 7 MB Folder
https://granneman.com/ or https://granneman.com
— either one would work
1 of 16 selected, 262.05 GB available

public

Favorites

- Desktop
- Dropbox
- Documents
- Downloads
- Applications
- Photos
- Pictures
- Library
- AirDrop
- Recents
- Inbox
- DEVONthink PDF
- Git
- WebSanity

iCloud

- iCloud Drive
- Shared

Locations

Name	Date Modified	Size	Kind
categories	2021-11-05	4 KB	Folder
css	2021-11-05	161 KB	Folder
images	2021-08-16	792 KB	Folder
index.html	2021-11-05	5 KB	HTML text
index.xml	2021-11-05	141 KB	XML text
js	2021-11-02	13 KB	Folder
personal	2021-11-09	1.5 MB	Folder
bio	2021-11-05	149 KB	Folder
commonplace-book	2021-11-09	209 KB	Folder
commonplacebook	2021-11-09	18 KB	Folder
home	2021-11-05	4 KB	Folder
images	2021-11-05	35 KB	Folder
index.html	2021-11-05	5 KB	HTML text
index.xml	2021-11-05	1 KB	XML text
journals	2021-11-09	116 KB	Folder
movies	2021-11-09	193 KB	Folder
music	2021-11-09	68 KB	Folder
op-ed	2021-11-05	14 KB	Folder
opinionseditorials	2021-11-05	668 bytes	Folder
photos	2021-11-09	344 KB	Folder
		62 KB	Folder
		41 KB	Folder
		85 KB	Folder
weddings-funerals	2021-11-09	115 KB	Folder

https://granneman.com/personal/

2 of 34 selected, 262.05 GB available

public

Favorites

- [illegible]
- Desktop
- Dropbox
- Documents
- Downloads
- Applications
- Photos
- Pictures
- Library
- AirDrop
- Recents
- Inbox
- DEVONthink PDF
- Git
- WebSanity

iCloud

- iCloud Drive
- Shared

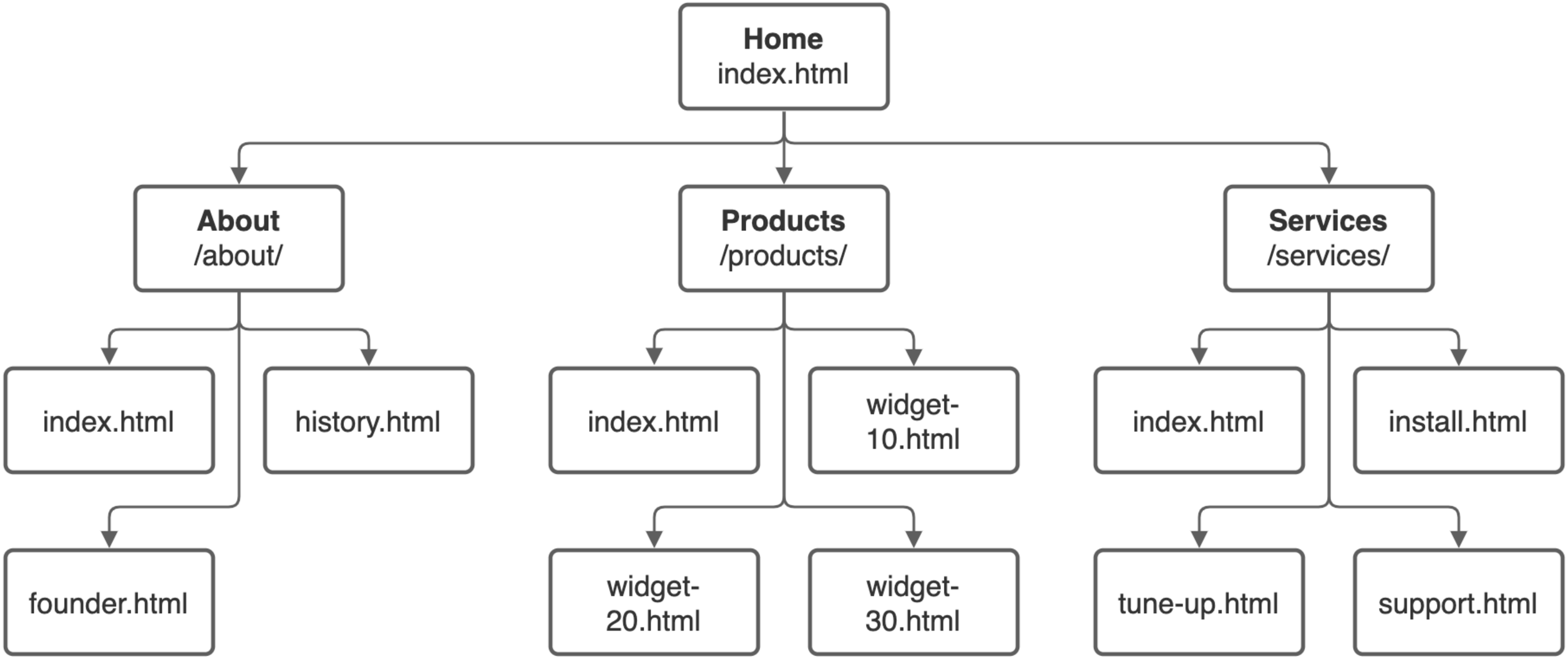
Locations

Name	Date Modified	Size	Kind
categories	2021-11-05	4 KB	Folder
css	2021-11-05	161 KB	Folder
images	2021-08-16	792 KB	Folder
index.html	2021-11-05	5 KB	HTML text
index.xml	2021-11-05	141 KB	XML text
js	2021-11-02	13 KB	Folder
personal	2021-11-09	1.5 MB	Folder
bio	2021-11-05	149 KB	Folder
images	2021-11-05	23 KB	Folder
index.html	2021-11-05	11 KB	HTML text
Scott-Granne[illegible]n-CV.pdf	2021-11-05	115 KB	PDF
commonplace-book	2021-11-09	209 KB	Folder
commonplacebook	2021-11-09	18 KB	Folder
home	2021-11-05	4 KB	Folder
images	2021-11-05	35 KB	Folder
index.html	2021-11-05	5 KB	HTML text
index.xml	2021-11-05	1 KB	XML text
journals	2021-11-09	116 KB	Folder
movies	2021-11-09	193 KB	Folder
music	2021-11-09	68 KB	Folder
[illegible]	[illegible]	14 KB	Folder
[illegible]	[illegible]	668 bytes	Folder
[illegible]	[illegible]	344 KB	Folder
poetry	2021-11-09	62 KB	Folder
[illegible]	[illegible]	[illegible]	[illegible]

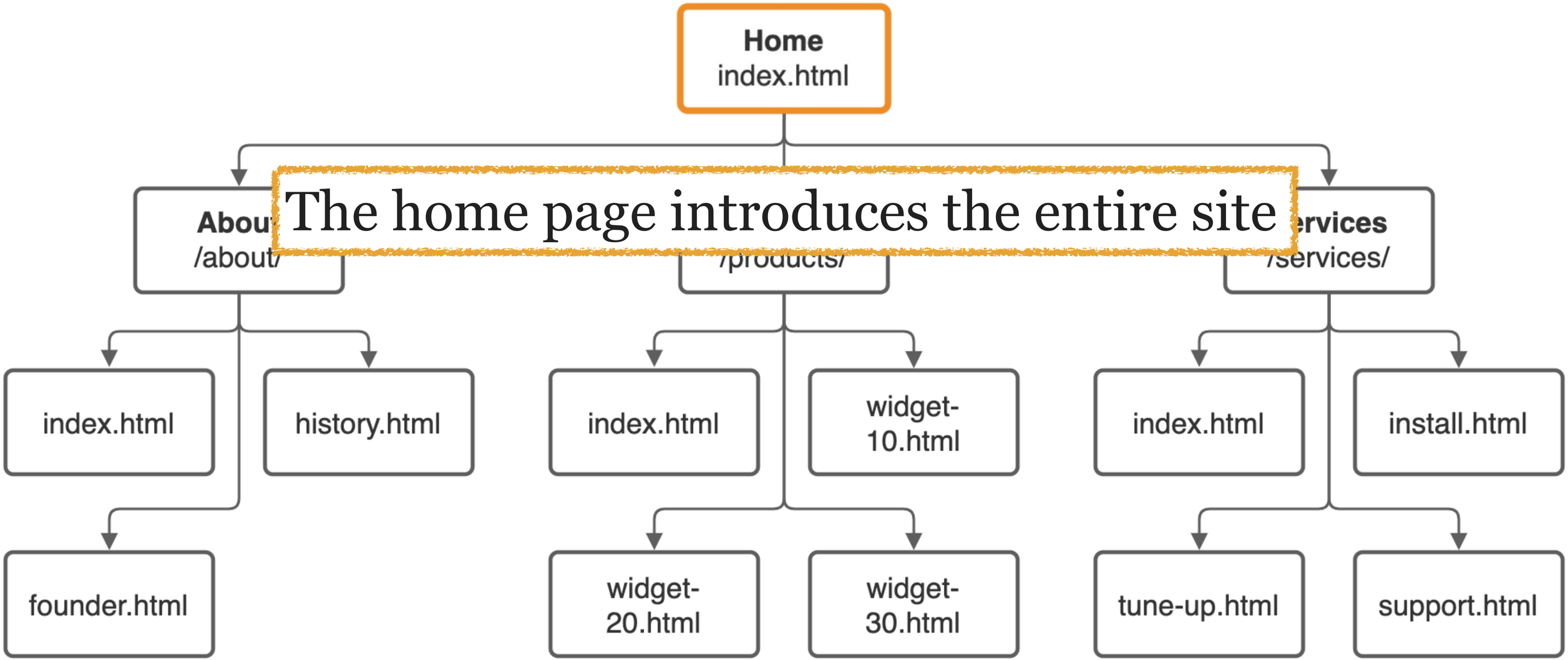
https://granneman.com/personal/bio/

3 of 37 selected, 262.04 GB available

https://rubberrain.com



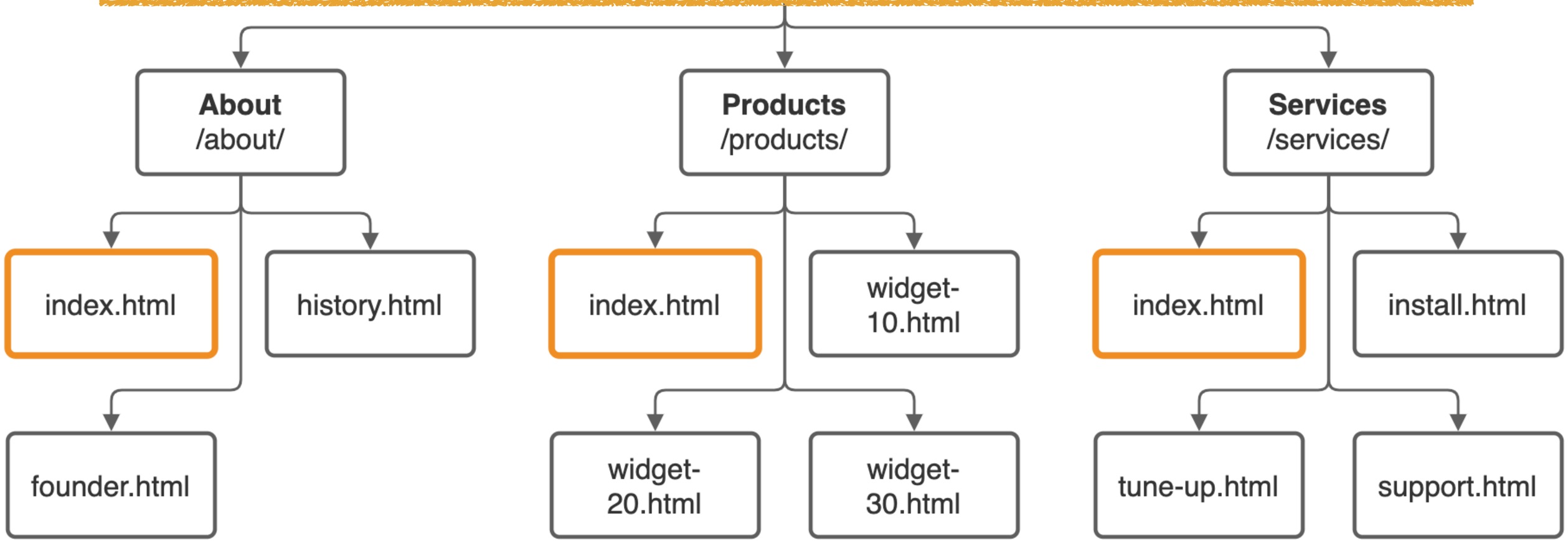
https://rubberrain.com



The home page introduces the entire site

https://rubberrain.com

Other index pages act as overviews that introduce each section & provide links to other pages in that section



💡 PRO TIP

To link to an `index.html` page (or any default page), you never need to specify it

In other words, you do *not* need to do this (although it will of course work):

```
<a href="/services/index.html">
<a href="/index.html">
```

Just do this:

```
<a href="/services/">
<a href="/">
```

Open Links in New Tabs

(Don’t do this)

Sometimes websites think it’s a good idea to have clicked-on links automatically open as new tabs

For instance, a lot of colleges & universities use Canvas for classes, which does this automatically for off-site links

CPM-160-01.23/SP > Modules

Student View

Spring 2023

Collapse All | View Progress

SCC Welcome Module — Complete All Items

1/24 Introductions — Prerequisites: SCC Welcome Module

1/26 Web Dev Intro — Prerequisites: 1/24 Introductions

CPM-160-01.23/SP > Modules

Student View

Spring 2023

Collapse All | View Progress

SCC Welcome Module — Complete All Items

1/24 Introductions — Prerequisites: SCC Welcome Module

1/26 Web Dev Intro — Prerequisites: 1/24 Introductions

Opening a clicked-upon link in another tab is often very confusing &/or annoying to users — & it breaks the Back button

Do *not* do this unless you have a very good reason (& your “good reason” probably isn’t)!

✏️ SIDE NOTE

Remember, *users* can always open a link in a background tab when they want to

1. Middle-click on a link by pressing down on their mouse wheel, or

2. Hold down ⌘ (macOS) or Ctrl (Windows) & click a link, or

3. Right-click on a link & choose *Open Link in New Tab*

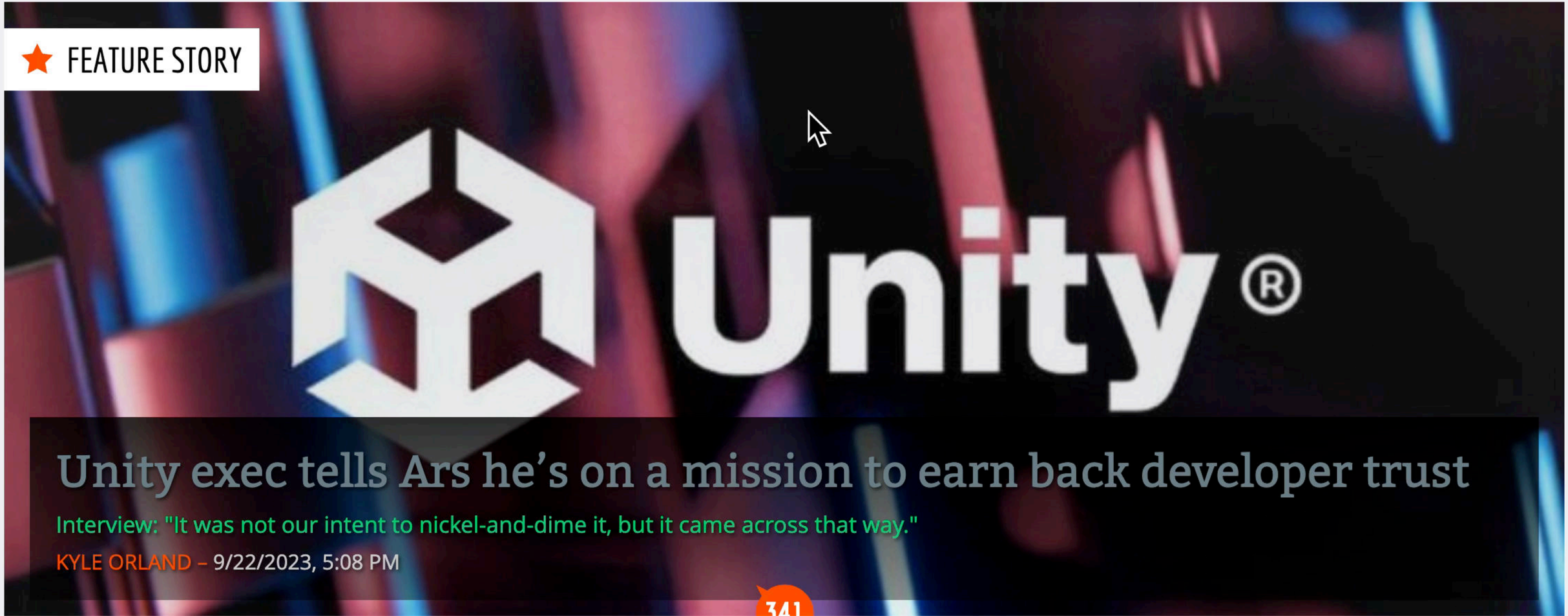
✏️ SIDE NOTE

I use these manual methods constantly

For instance, I created a script on my Mac that runs at 9 a.m. every morning & opens up several webpages in my default browser for me to review

I click on links I want to read using ⌘-click (or middle-click) so they open up as background tabs

FEATURE STORY



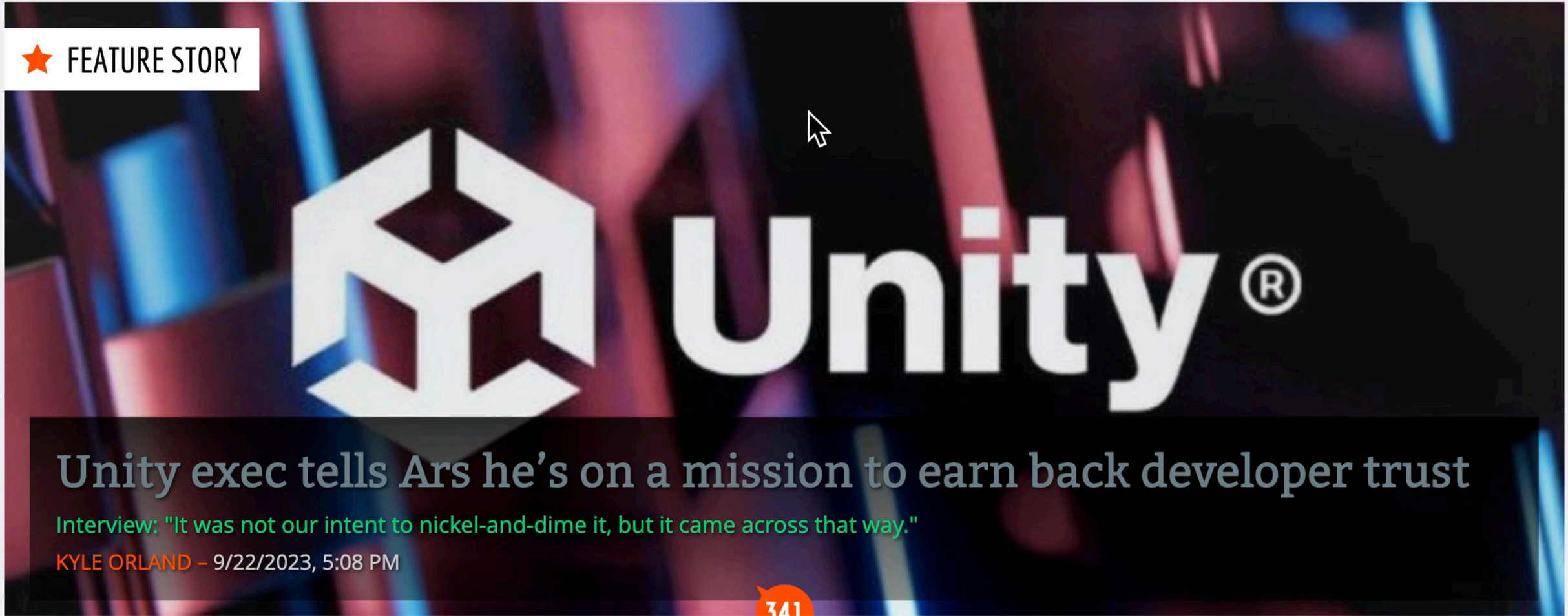
Unity exec tells Ars he's on a mission to earn back developer trust

Interview: "It was not our intent to nickel-and-dime it, but it came across that way."

KYLE ORLAND – 9/22/2023, 5:08 PM

341

FEATURE STORY



Unity exec tells Ars he's on a mission to earn back developer trust

Interview: "It was not our intent to nickel-and-dime it, but it came across that way."

KYLE ORLAND – 9/22/2023, 5:08 PM

341

A developer can automatically open a link in a new browser tab by adding `target="_blank"` to the `<a>`

```
<a href="cthulhu.html" target="_blank">
```

Again, you probably should not do this!

Fake Links

Want to create a fake link that looks like a hyperlink but doesn’t go anywhere so you can show clients what their design will look like?

Do not use `<a href="#">Oops</a>`, as that will jump to the top of the page when clicked

Use one of 3 different methods

Method 1: Use an emoji 👍

```
<a href="#❌">Fake!</a>
```

← Jans likes this

```
<a href="#😃">Nope – doesn't go anywhere</a>
```

Method 2: Use a fragment pointing to an `id` that doesn't exist

```
<a href="#gone-like-the-dodo">Fake!</a>

<a href="#googly-moogly">Fake!</a>

<a href="#_">Fake!</a>

<a href="#0">Fake!</a>
```

← I'm lazy, so I use this

Method 3: Use JavaScript — either of these 2 methods will work

```
<a href="javascript:void(0)">Fake!</a>

<a href="#" onClick="return false;">Fake!</a>
```

Links to Email, Phone Numbers, FaceTime, & Maps

Email Addresses

For email links, use
`href="mailto:name@example.com"`

You can also include a subject & CC addresses, but those are not as widely supported

HTML

```html
<h3>Email address</h3>
<p>
  <a
  href="mailto:cthulhu@rlyeh.com">Email
  Cthulhu</a>
</p>

<h3>Email address with Subject</h3>
<p>
  <a href="mailto:cthulhu@rlyeh.com
?subject=Stay%20sleeping">Email
Cthulhu</a>
</p>

<h3>Email address with Subject & CC</h3>
<p>
  <a href="mailto:cthulhu@rlyeh.com
?subject=Stay%20sleeping
&Cc=herbert.west@miskatonic.edu">Email
Cthulhu</a>
</p>
```

CSS

JS

Email address

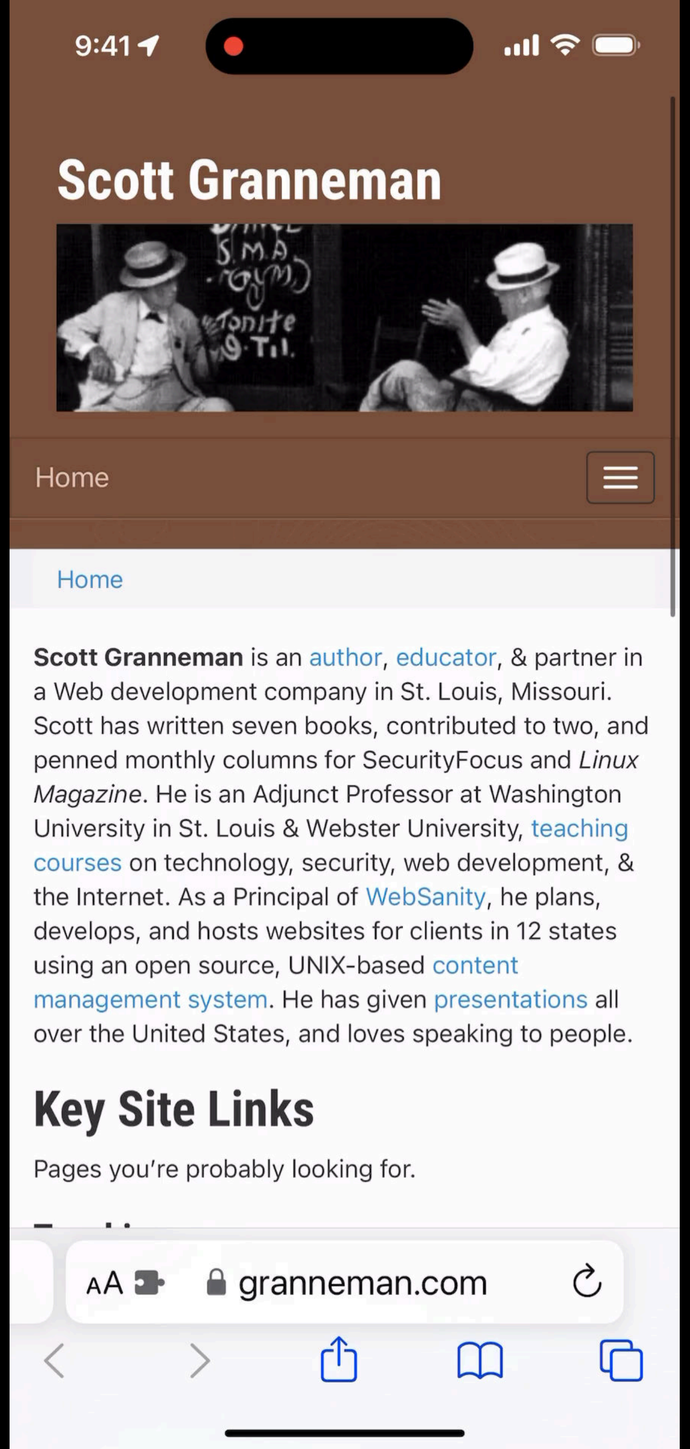
Email Cthulhu

Email address with Subject

Email Cthulhu

Email address with Subject & CC

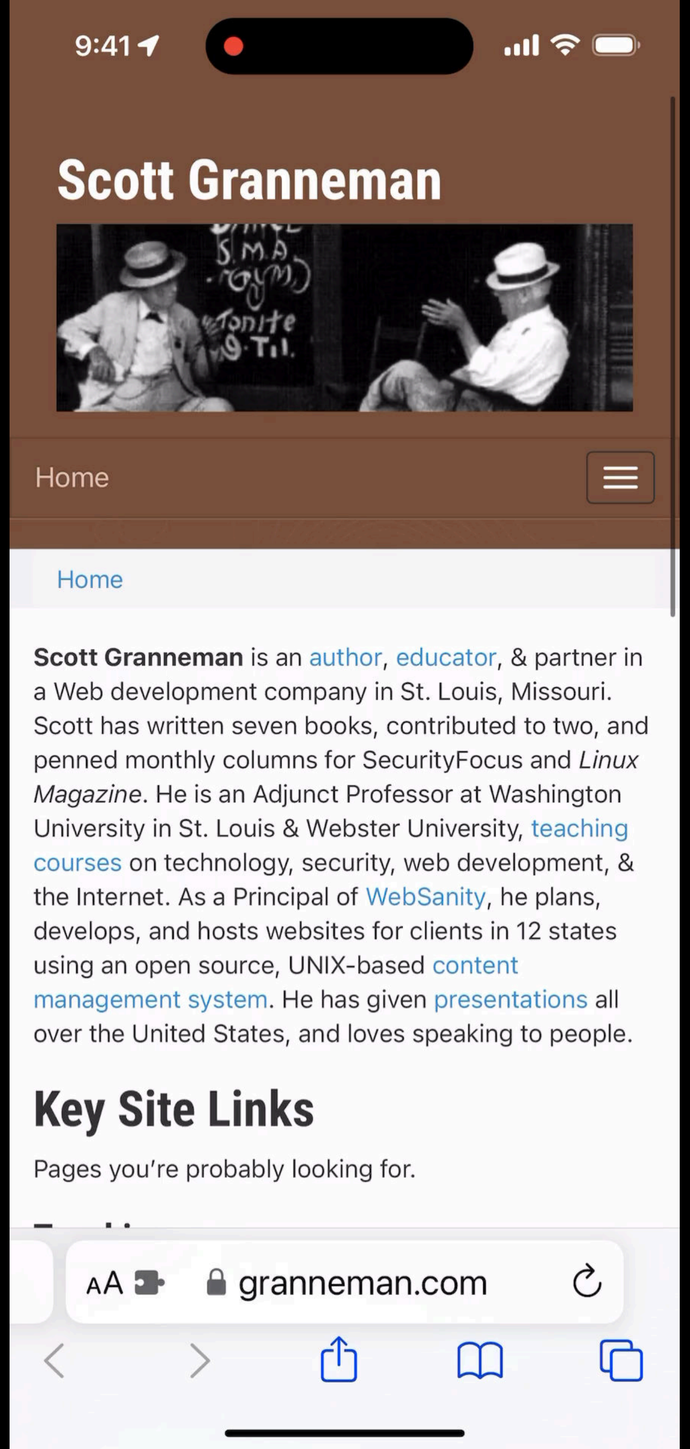
Email Cthulhu



If you click on a `mailto` link while you're on a mobile device, it will open in your default mail app

📱: Apple Mail
🤖: Gmail app

Exactly what you want!



If you click on a `mailto` link while you're on a mobile device, it will open in your default mail app

📱: Apple Mail
🤖: Gmail app

Exactly what you want!

If you have set up and use an email *app* on your computer — e.g., Apple Mail or Outlook — then clicking on a `mailto` link will open up a new mail message in your app with the `TO:` filled in

Exactly what you want!

But what if you use Gmail or outlook.com or any other *webmail* service in a Web browser on your computer?

Then you have a problem

If you use webmail in a browser on your *computer* (e.g., Gmail, Yahoo, Outlook.com), clicking on a `mailto` link probably won't open a new email in your web browser

Instead, it will try to open a mail *app*, like Apple Mail or Outlook — not what you want

The user (not the developer — you can't do anything) has to do some configuration to get `mailto` to open using their webmail provider of choice

Find in Settings

General

Home

Search

Privacy & Security

Sync

More from Mozilla

Applications

Choose how Firefox handles the files you download from the web or the applications you use while browsing.

Search file types or applications

Content Type	Action
AV1 Image File (AVIF)	Open in Firefox
ext+treestyletab	Always ask
Extensible Markup Language (XML)	Save File
mailto	Use other...
Portable Document Format (PDF)	Open in Firefox
Scalable Vector Graphics (SVG)	Save File
WebP Image	Open in Firefox
zoommtg	Use zoom.us (default)

Settings > General > scroll down to Applications

What should Firefox do with other files?

Save files

Find in Settings

General

Home

Search

Privacy & Security

Sync

More from Mozilla

Applications

Choose how Firefox handles the files you download from the web or the applications you use while browsing.

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AV1 Image File (AVIF)	Open in Firefox
ext+treestyletab	Always ask
Extensible Markup Language (XML)	Use MailMate (default)
mailto	Use Gmail
Portable Document Format (PDF)	Use other...
Scalable Vector Graphics (SVG)	Application Details...
WebP Image	Save File
zoommtg	Open in Firefox
	Use zoom.us (default)

What should Firefox do with other files?

Save files

Firefox Browser
ADD-ONS

Extensions Themes More...

webmail outlook.com

25 results found for "webmail outlook.com"

Filter results

Sort by
Relevance

Add-on Type
All

Badging
Any

Search results

Outlook.com mailto — 1,729 users
Add Outlook.com as a default email provider for all mailto links.
Wesley Branton

Outlook Mail - mailto and Email Link Fix — 391 users
Right-click an email link to compose a new message on Outlook webmail. Right-click a blank area of the page to share a link to it. Pop-out style new tab needs to be closed after sending/discarding your message. Not an official Microsoft add-on.
jscher2000

For other webmail services, search Firefox Add-Ons for `webmail name-of-service`, e.g., `webmail yahoo`

chrome web store

Discover Extensions Themes

mailto

Sign

Works with all Chromium-based browsers, e.g., Chrome, Brave, Edge

Filter by

- [ ] Featured extensions
- [ ] Established publishers

Ratings

★★★★★

★★★★☆ & up

★★★☆☆ & up

Mailto: for Gmail™

Featured

3.8 ★ (406)

Makes mailto: links open a Gmail™ compose window. Nothing more, nothing less.

MailtOWA: Mailto O365 Webmail / OutlookWebApp

jonroig.com

3.8 ★ (14)

Mailto links open Microsoft Office 365 Webmail / Outlook Web Application Compose by default

Mailto: Set Default Email to Gmail by cloudHQ

cloudhq.net Featured

Mac users need to get the Open In Webmail app for $2

safari mailto

- Discover
- Arcade
- Create
- Work
- Play
- Develop
- Categories
- Updates

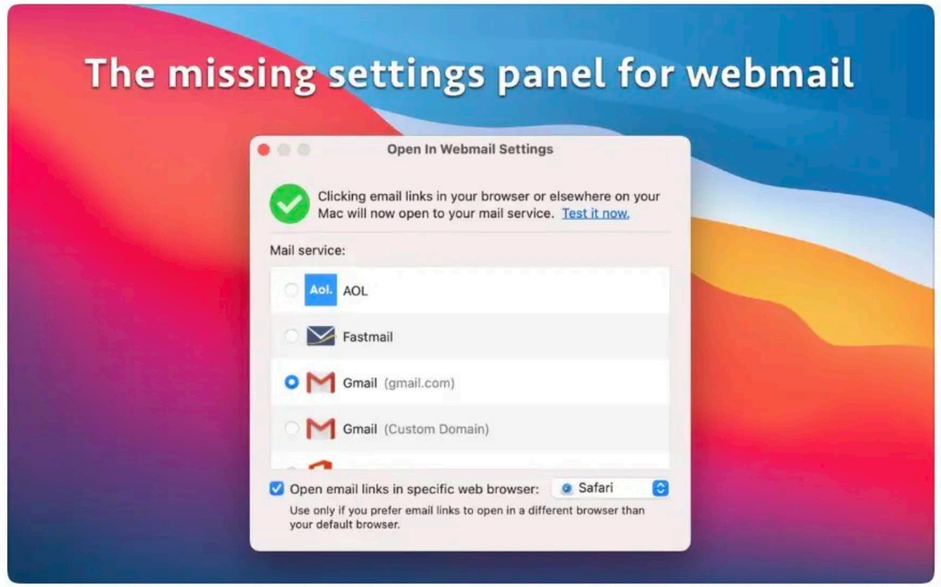
Scott Granneman

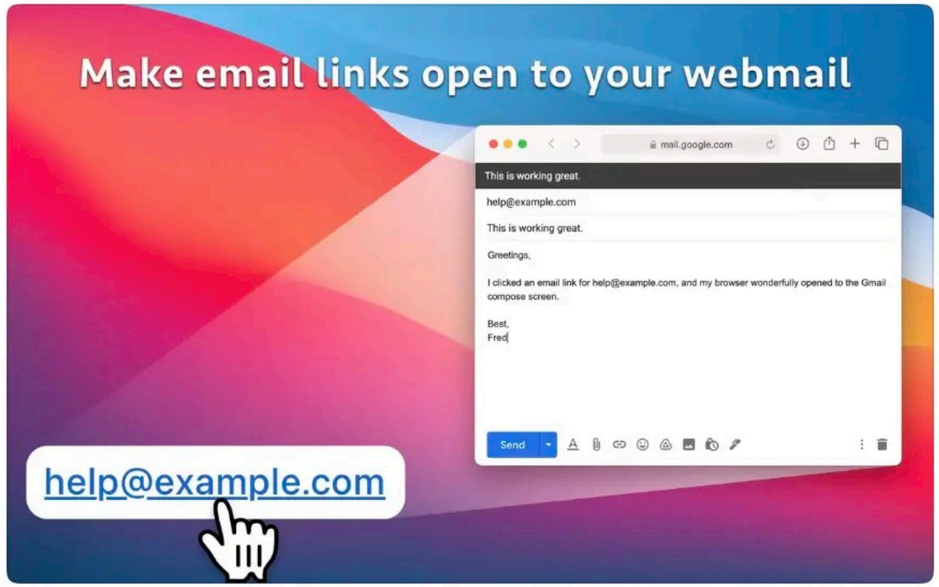
Open In Webmail

Works with Gmail, Yahoo, etc.

$1.99

45 RATINGS	AGE	CATEGORY	DEVELOPER	LANGUAGE	SIZE
4.9 ★★★★★	4+ Years Old	Utilities	Fred Potter	EN English	2 MB





Mac

A fantastically simple tool to make email links open to your webmail service of choice.

Fred Potter

A fantastically simple tool to make email links open to your webmail service of choice.

If you're frustrated that Apple Mail opens every time you click an email address in your web browser, this is the solution!

Works out of the box with popular services like Gmail, AOL, Outlook, Yahoo, Office365, Fastmail, Zoho, and Yandex.

Do you use a different service? There's a "Copy to Clipboard" option for you. It saves you a few clicks by copying the To: address to your clipboard so you can paste it wherever you like.

If your favorite email service is not supported, you're welcome to email fpotter@gmail.com and I'll see if I can add it. (Sorry Protonmail fans; yours cannot be supported unless Protonmail adds a needed feature.)

Works with Safari, Chrome, Firefox, and others. Because Open In Webmail is an app and not a browser-plugin, it works system-wide.

Concerned about privacy? I am, too. That's why this app is "sandboxed" such that it cannot collect or transmit any of your data. That's how it should be.

Fred Potter

Support

Ratings & Reviews

See All

4.9 out of 5

45 Ratings

YAY ! ! ! ! ! ! ! 3y ago
★★★★★ ohbejoyful

Ever since Safari/MacOS dropped support for unverifiable extensions like the old mail:to, I have been soooo frustrated. I love using Safari for many reasons

Makes a Hard Thing Easy! 3y ago
★★★★★ /carlos

It's so frustrating that Safari offers no extension to handle mailto URLs with gmail. Google away and find nothing but disappointment in the search results. Comes

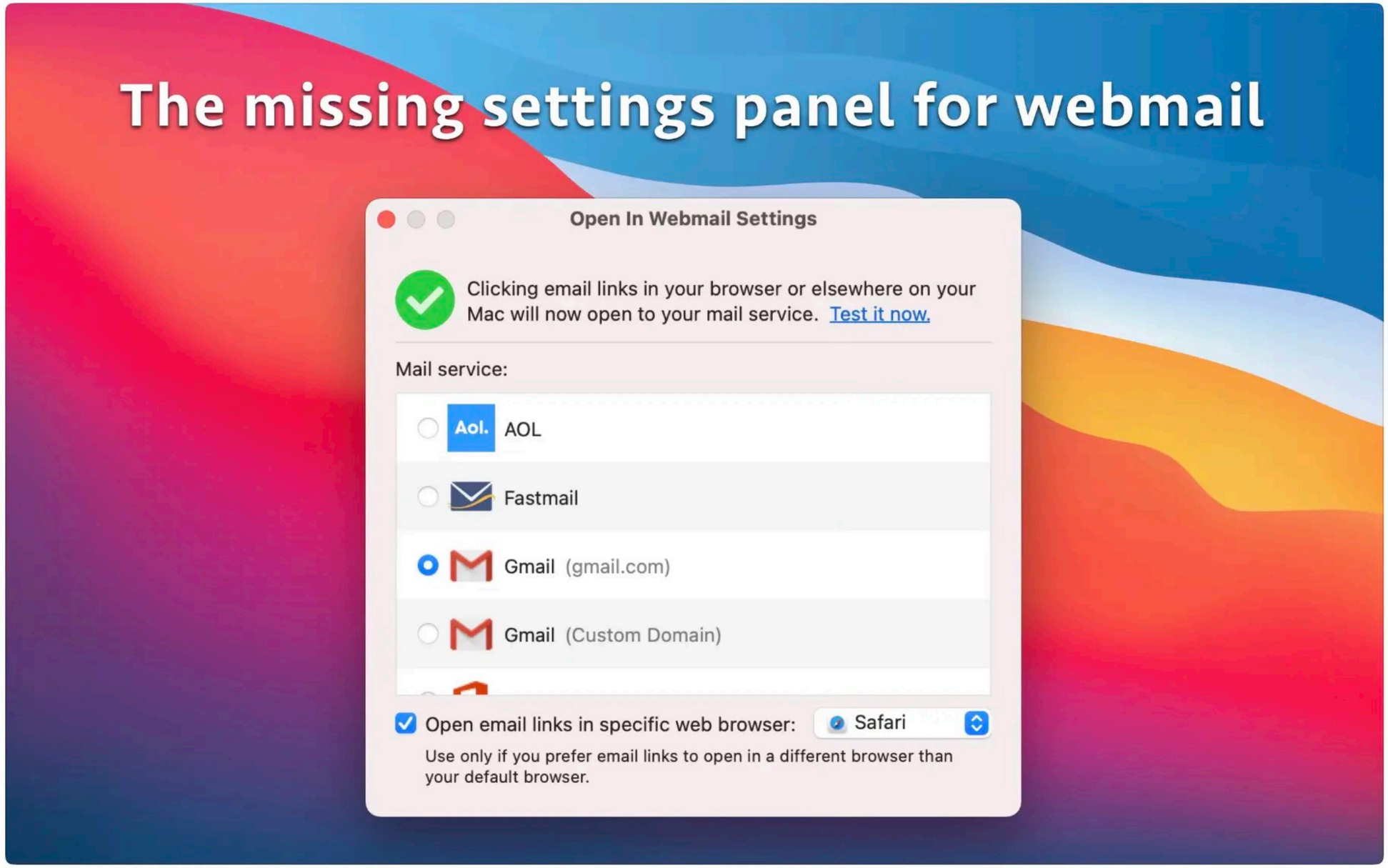
safari mailto

- Discover
- Arcade
- Create
- Work
- Play
- Develop
- Categories
- Updates

Scott Granneman

Open In Webmail

$1.99



App Privacy

See Details

The developer, **Fred Potter**, indicated that the app's privacy practices may include handling of data as described below. For more information, see the developer's privacy policy.

Data Not Collected

The developer does not collect any data from this app.

Privacy practices may vary, for example, based on the features you use or your age. Learn More

Information

Seller Fred Potter	Size 2 MB
Category Utilities	Compatibility Works on this MacBook Pro
Languages English	Age Rating 4+

Telephone Numbers

For phone numbers, use:

```
<a href="tel:+18005551212">Call me!</a>
```

You must include the `+`, then the country code (`1` for the US), & then the 10-digit phone number

Global country calling codes

List of country calling codes

From Wikipedia, the free encyclopedia

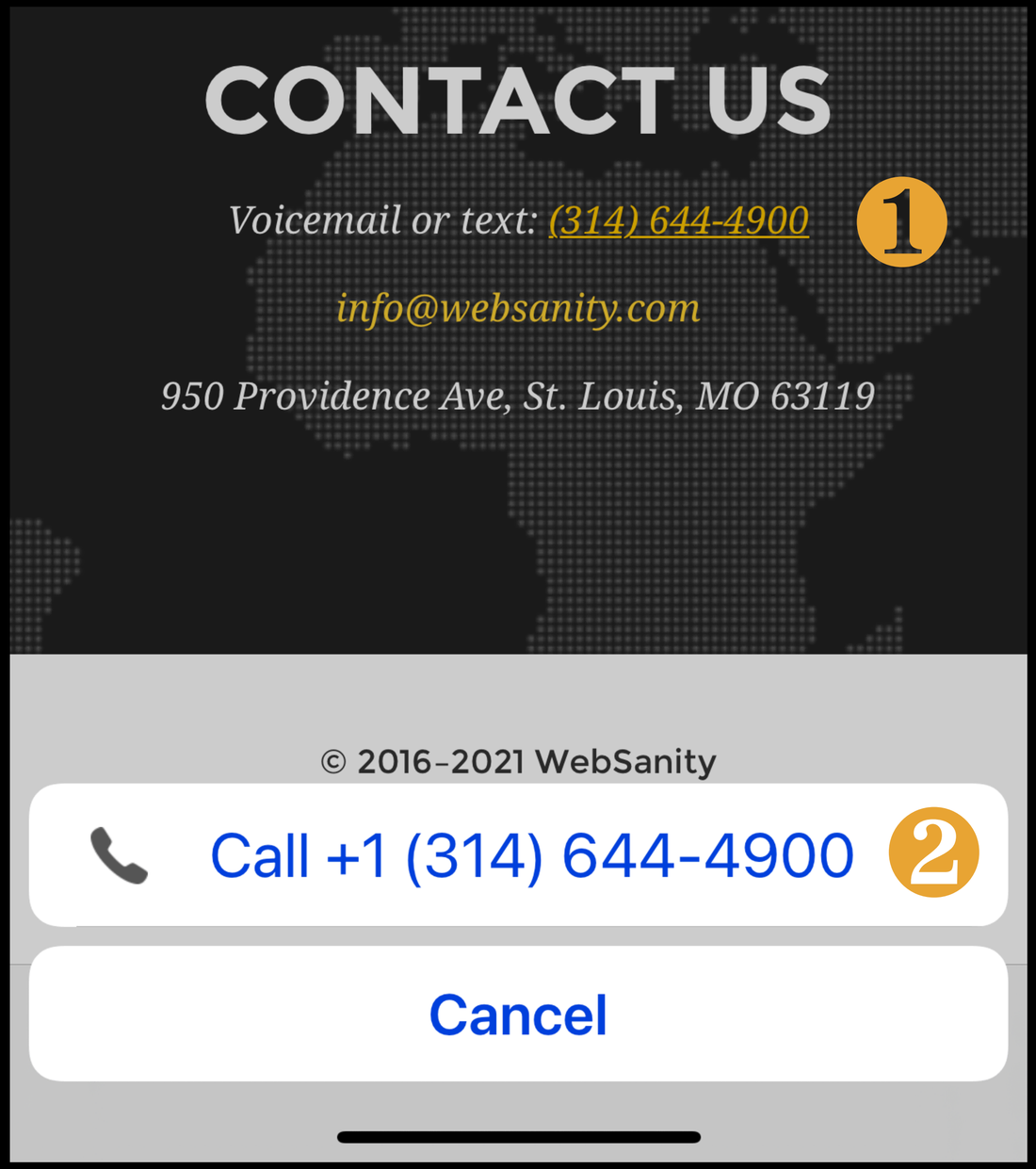
Country calling codes or **country dial-in codes** are telephone number prefixes for reaching telephone subscribers in the networks of the member countries or regions of the International Telecommunication Union (ITU). The codes are defined by the ITU-T in standards E.123 and E.164. The prefixes enable international direct dialing (IDD) and are also referred to as *international subscriber dialing* (ISD) codes.

Worldwide distribution of country calling codes. Regions are coloured by first digit

Country codes are a component of the international telephone numbering plan

You can separate numbers with `-` or `.` for code readability:

```
<a href="tel:+1-800-555-1212">Call me!</a>
```



On mobile devices, clicking on the `tel:` link opens your phone app

Open FaceTime.app?

https://websanity.com wants to open this application.

Always allow websanity.com to open links of this type in the associated app

Cancel Open FaceTime.app

2

CONTACT US

Voicemail or text: (314) 644-4900

1

info@websanity.com

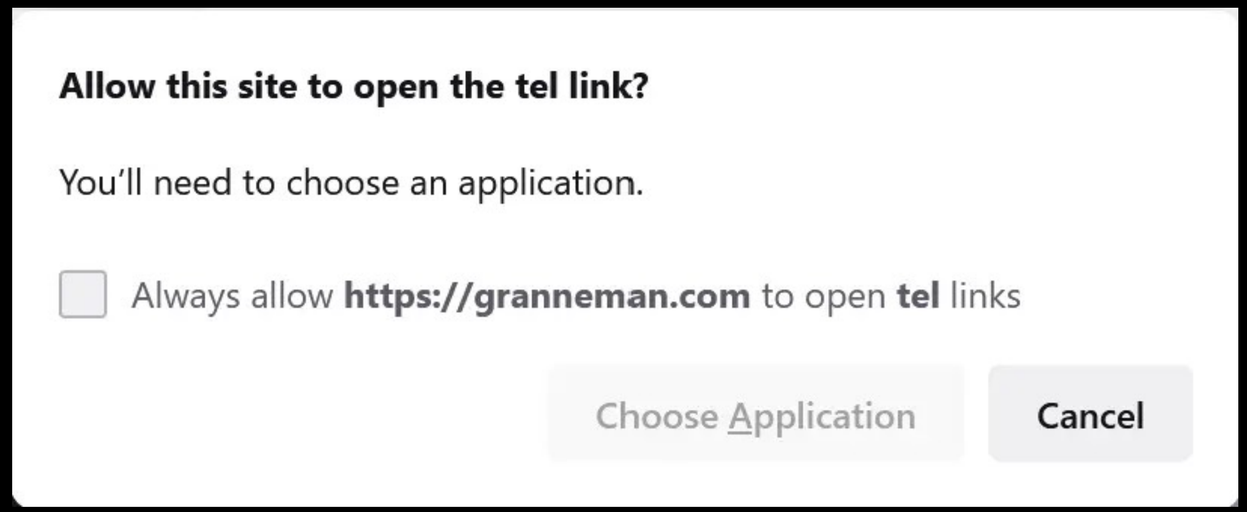
950 Providence Ave, St. Louis, MO 63119

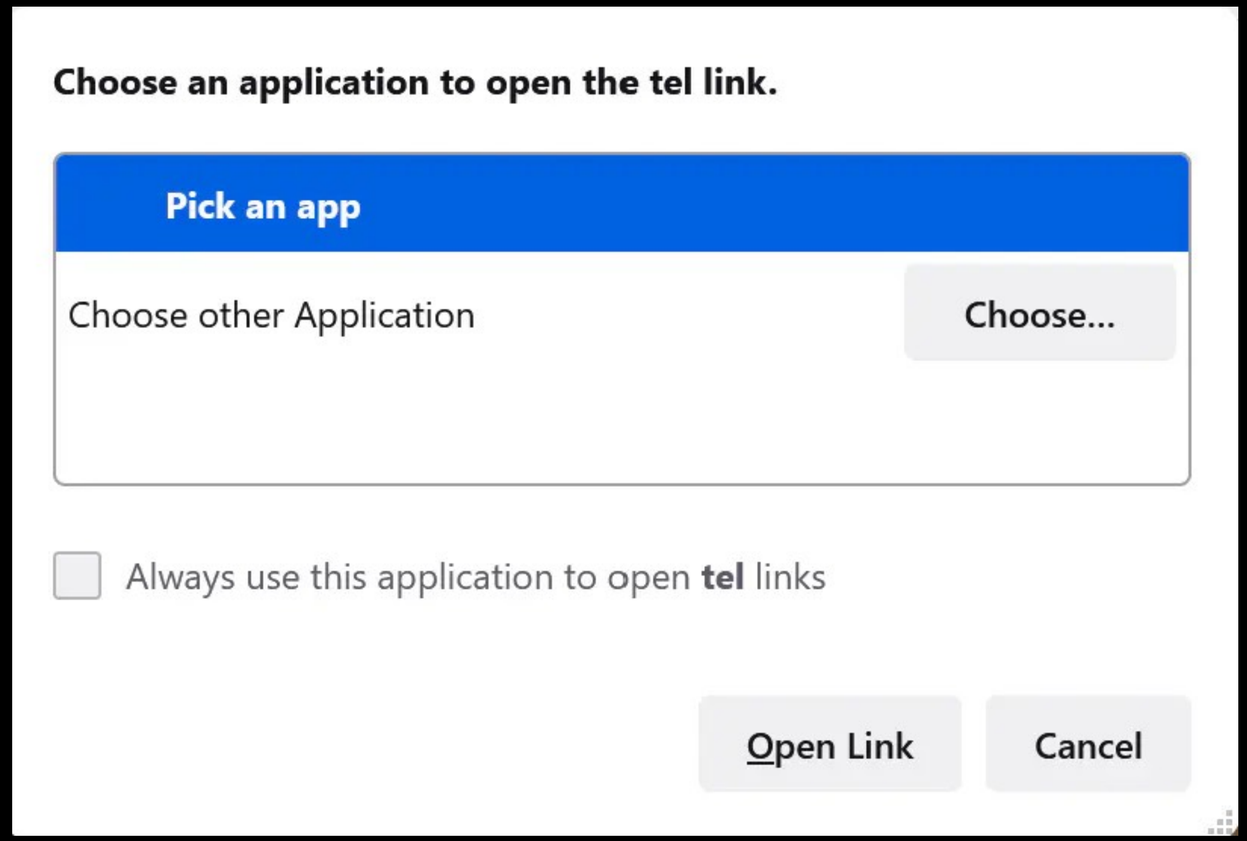
On tablets & desktops, it opens a helper app, like FaceTime on iPadOS & macOS

© 2016–2021 WebSanity

Privacy Policy

tel:+13146444900





Using Firefox on Windows 11, you are 1st asked if the site can open a `tel` link...

& then asked to select an app to open the `tel` link

What about phone extensions (x 1234)?

`,` adds a *pause* (about 1 second)

`;` adds a *wait* (a long pause; actually, a *wait for dial tone*)

```
<a href="tel:+18005551212;123">Call us!</a>
```

FaceTime calls

To start a FaceTime video call on Apple devices, use `href="facetime:+18005551212"` or `href="facetime:hpl@lovecraft.com"`

For FaceTime audio calls on Apple devices, use `href="facetime-audio:+18005551212"` or `href="facetime-audio:hpl@lovecraft.com"`

Maps Apps
(not websites!)

Linking to a specific location in a maps *app* is a little weird

You've always been able to link to a maps *website* — it's just:

```
<a href="https://mapquest.com/">MapQuest</a>
```

MapQuest was the first maps service on the Web when it launched in 1996

Since at least 2009 you have been able to link to a specific location in the Google Maps *website*

But what if you wanted to link to a specific location in a maps *app*?

In 2012, Apple rolled out Apple Maps, an app, along with iOS 6

There is no website for Apple Maps (still!)

Instead of a website, Apple registered `maps.apple.com` as a URL that opens by default in the Apple Maps *app*

In other words, when you click on a link that starts with `maps.apple.com`, it never tries to open a webpage — the operating system intercepts it & opens an *app* instead

Because Apple was the first to enable linking to a specific location in an app, lots of websites used `maps.apple.com`

When Google realized that it should make it easy to link to specific locations in the Google Maps *app*, it was too late — millions of webpages were already using `maps.apple.com`

So Google, & then Microsoft, made it so that `maps.apple.com` would open *their* maps apps on their operating systems!

When you click a link that starts with `maps.apple.com` (e.g., `<a href="http://maps.apple.com/?q=…>`)…

: Apple Maps *app* will open

: Google Maps *app* will open

⊞: Windows Maps *app* will open if it is installed; if it is not, the Google Maps *website* will open

Link to a specific address:

```
<a href="http://maps.apple.com/?q=454+Angell
+St+Providence+RI+02906">address</a>
```

Note the format: `http://maps.apple.com/?q=`, followed by the address, with

- `+` replacing ␣
- any other punctuation (e.g., commas or apostrophes) removed

Link to a ZIP code:

```
<a href="http://maps.apple.com/?q=02906">
address</a>
```

Link to a city & state:

```
<a href="http://maps.apple.com/?q=Providence
+RI">address</a>
```

Use `maps.apple.com` — it works on every browser & on every OS!

`<nav> … </nav>`

A section of a page with *navigation links* to…

- Other pages, either internal or external, or
- Parts within the page (URL fragments), like a table of contents

Only “major navigation blocks”

HTML

```html
<h2><code>&lt;nav&gt;</code> without CSS</h2>

<nav>
  <ul>
    <li><a href="#_">Life</a></li>
    <li><a href="#_">Writings</a></li>
    <li><a href="#_">Characters</a></li>
    <li><a href="#_">Influence</a></li>
    <li><a href="#_">Contact</a></li>
  </ul>
</nav>
```

CSS

JS

<nav> without CSS

- Life
- Writings
- Characters
- Influence
- Contact

Notice that `<nav>` has not changed how the list looks, because `<nav>` doesn't change appearance, just *meaning* (it's semantic!)

HTML

```html
<h2><code>&lt;nav&gt;</code> with CSS</h2>

<nav class="styled">
  <ul>
    <li><a href="#_">Life</a></li>
    <li><a href="#_">Writings</a></li>
    <li><a href="#_">Characters</a></li>
    <li><a href="#_">Influence</a></li>
    <li><a href="#_">Contact</a></li>
  </ul>
</nav>
```

CSS

```css
nav.styled ul {
  margin: 0;
  padding: 0;
  list-style: none;
}

nav.styled ul li {
  float: left;
  display: block;
  background: #4B4B4B;
```

JS

<nav> without CSS

- Life
- Writings
- Characters
- Influence
- Contact

<nav> with CSS

Life Writings Characters Influence Contact

With CSS, we can easily alter how the `<nav>` appears, making it prettier & more usable

More than one `<nav>` section is OK on a page

However, for accessibility, you need to uniquely label each `<nav>` using the `aria-label` attribute

HTML

```html
<!-- Main nav -->
<nav aria-label="primary">
  <ul>
    <li><a href="#foo">Services</a></li>
    <li><a href="#bar">Projects</a></li>
    <li><a href="#baz">Products</a></li>
    <li><a href="#qux">Tips</a></li>
    <li><a href="#corge">Contact</a></li>
  </ul>
</nav>

<!-- Breadcrumb -->
<nav aligned="breadcrumb">
  <ol>
    <li><a href="#grault">Home</a></li>
    <li><a href="#garply">Services</a></li>
    <li>Seasonal Services</li>
  </ol>
</nav>
```

CSS (SCSS)

JS

- Services
- Projects
- Products
- Tips
- Contact

1. Home
2. Services
3. Seasonal Services

You can use whatever values you want for `aria-label`

Here, `primary` & `breadcrumb` are very descriptive for both the developer & the user

If headings (e.g., `<h3>`) are used to label each `<nav>`, then you have use an `id` attribute on the `<h3>` & `aria-labelledby` on the `<nav>`

The values for `id` & `aria-labelledby` must match

HTML

```html
<!-- Main nav -->
<nav aria-labelledby="primary">
  <h3 id="primary">Main Navigation</h3>
  <ul>
    <li><a href="#foo">Services</a></li>
    <li><a href="#bar">Projects</a></li>
    <li><a href="#baz">Products</a></li>
    <li><a href="#qux">Tips</a></li>
    <li><a href="#corge">Contact</a></li>
  </ul>
</nav>

<!-- Breadcrumb -->
<nav aligned-labelledby="breadcrumb">
  <h3 id="breadcrumb">Breadcrumb Navigation</h3>
  <ol>
    <li><a href="#grault">Home</a></li>
    <li><a href="#garply">Services</a></li>
    <li>Seasonal Services</li>
  </ol>
</nav>
```

CSS (SCSS)

JS

Main Navigation

- Services
- Projects
- Products
- Tips
- Contact

Breadcrumb Navigation

1. Home
2. Services
3. Seasonal Services

✏️ SIDE NOTE

There are many different kinds of navigation on a website

Let's look at 5 common kinds of navigation:

1. Branding/Home
2. Core Content/Primary
3. Breadcrumb
4. Utility
5. Subpage

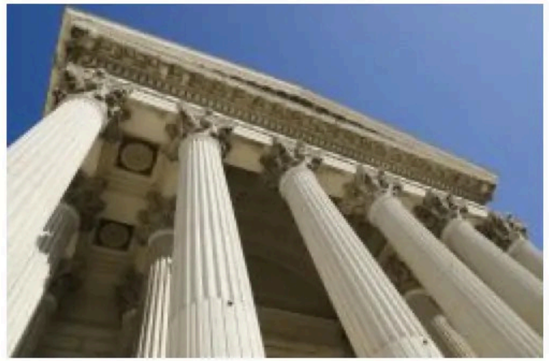
Branding/Home Navigation

ACLU
AMERICAN CIVIL LIBERTIES UNION of PENNSYLVANIA

Defending liberty where it began

In the

Branding/Home navigation



The ACLU of Pennsylvania undertakes litigation when doing so is the most effective way to advance a civil liberties concern. We file lawsuits that will have an impact on people's rights by setting a legal precedent or affecting the policies and actions of public officials. We both provide direct legal representation to people and file amicus (friend-of-the-court) briefs addressing civil liberties issues in cases initiated by others. All of the ACLU-PA's legal work is on a pro bono basis; we never charge for our legal services.

At any given time, the ACLU-PA has over 50 cases on its docket. The program is supported in large part by a network of volunteer attorneys who, last year, donated over $1.5 million in pro bono services.

Legal Docket

A list of the legal cases involving the ACLU of Pennsylvania, indexed by topic. Current and most closed cases from the past decade are included.

JOIN NOW
BECOME A CARD-CARRYING MEMBER

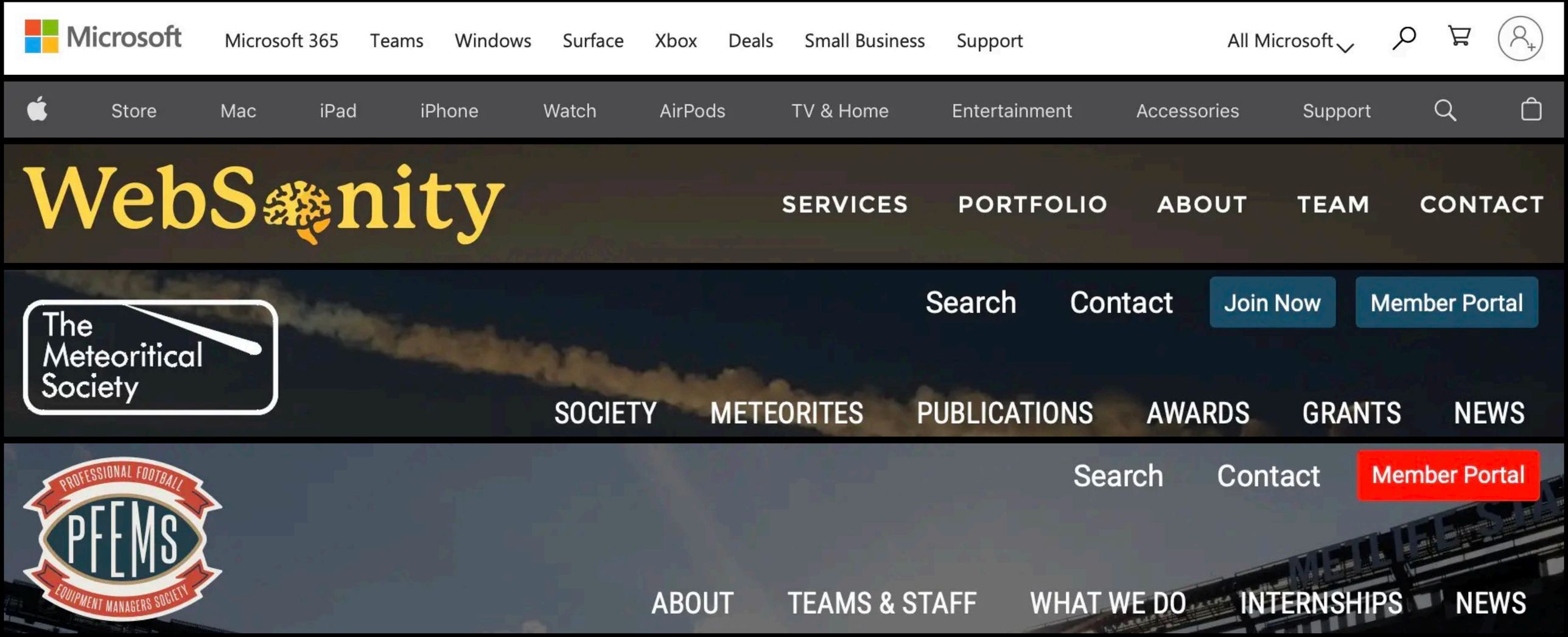
DONATE
SUPPORT THE WORK OF THE ACLU

GET HELP
SUBMIT A LEGAL COMPLAINT

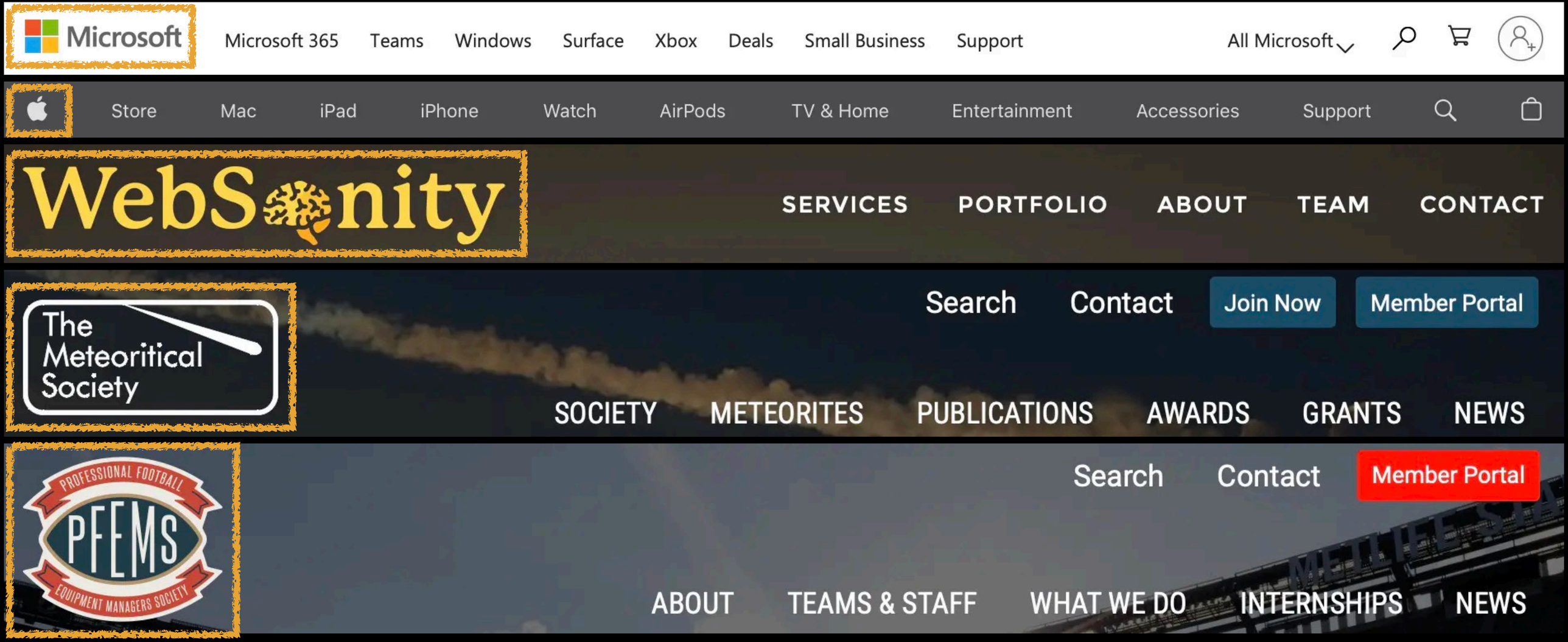
E-MAIL ALERTS
BREAKING NEWS, EVENTS, AND MORE

KNOW YOUR RIGHTS
ESSENTIAL RESOURCES

You Tube



Identifies site to user + acts as Home button
Branding through logo &/or wordmark &/or tagline



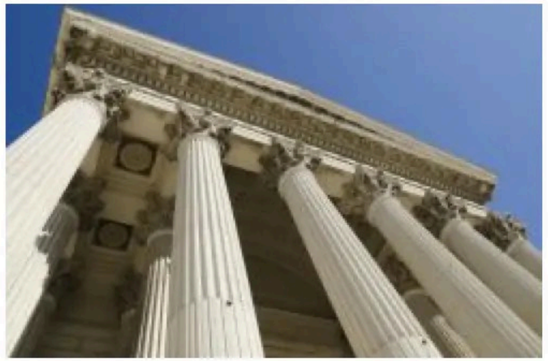
Identifies site to user + acts as Home button
Branding through logo &/or wordmark &/or tagline

Core Content
or
Primary Navigation

Primary navigation

In the Courts

Legal Docket File a Complaint



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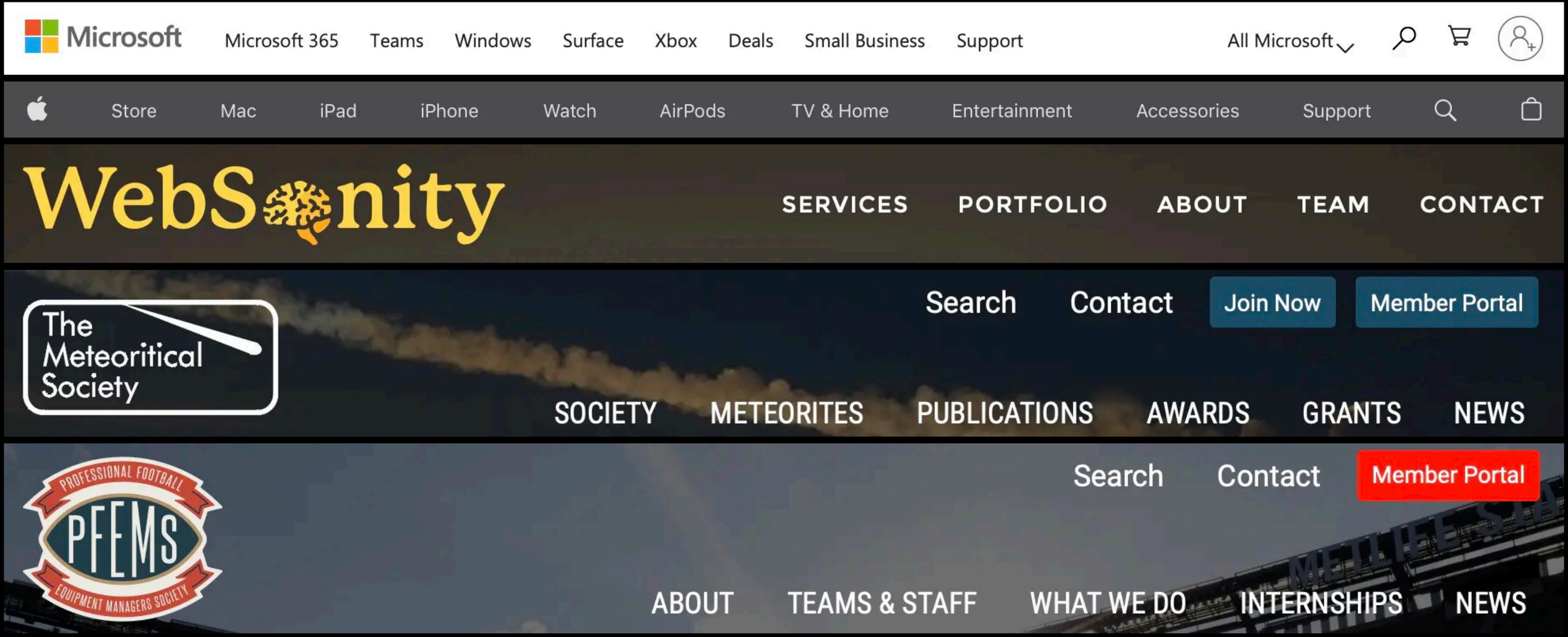
Goals of core content nav is to make it easy for users to…

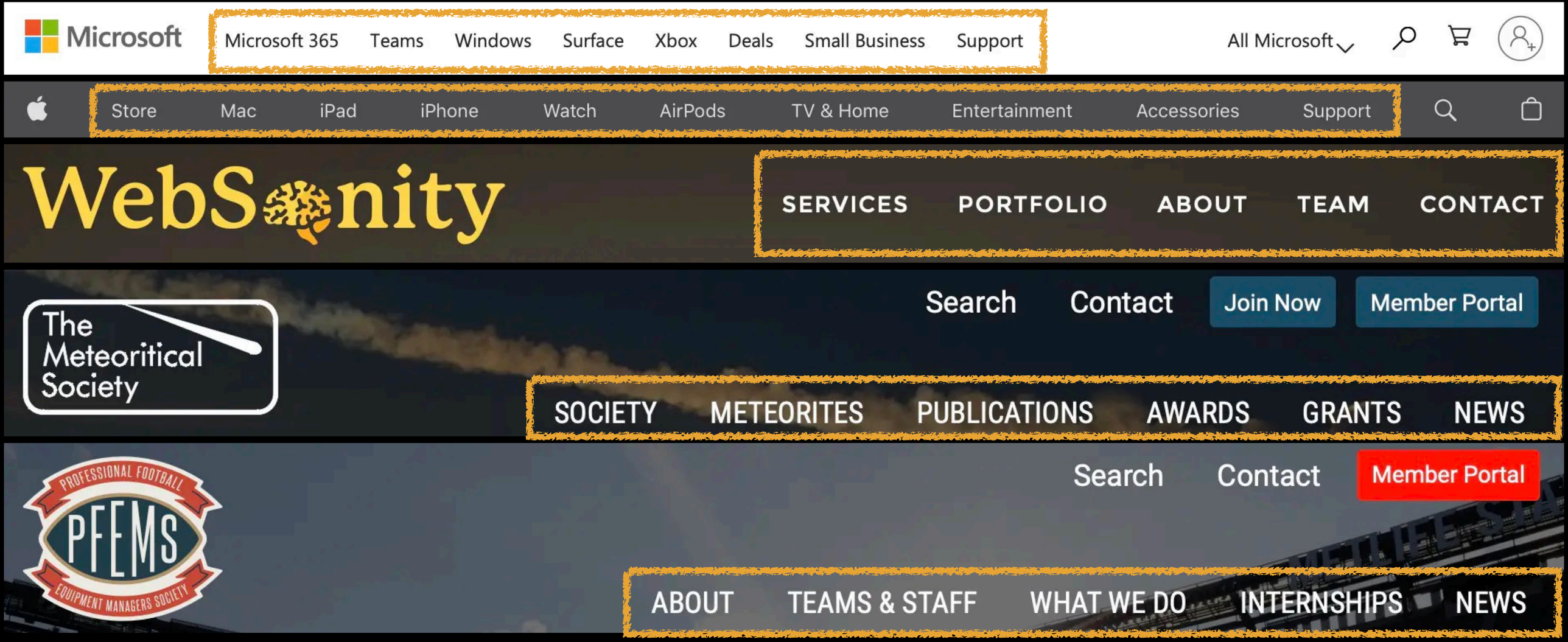
» understand the broad categorizations of content,
» & then get where they want to go

Use clear language

Think externally, not internally



Most common layout today is horizontal, which turns into a hamburger ≡ on mobile



Most common layout today is horizontal, which turns into a hamburger ≡ on mobile

Advantages to horizontal core content nav

- Readability
- Efficient usage of space
- Usability
- Can have 2nd-tier menus

St. John's
Tower Grove

- 10:30 am Ministry Schedule
- 5:00 pm Ministry Schedule
- Peace Meal Evening Prayer
- Prayer Requests
- Weddings at St. John's, Tower Grove
- Worship Related Ministries
- Morning Prayer
- Common Loaf

ving
port St. John's

rving
Neighbors, the World

Community
Gathering in Unity

Worshiping
God in Christ

Weekly Announcements

- PEACE MEAL VOLUNTEERS ARE ALWAYS WELCOME
- ALTAR GUILD MINISTERS NEEDED-ARE YOU CALLED?

New to St. John's

Directions
3664 Arsenal Street, a half block west of S. Grand across from Tower Grove Park.

Sunday Service Times

10:30 am Modern
A come-as-you-are morning service in modern English in the Main Church (in the Parish Hall in July & August)

Open "http://www.towergrovechurch.org/worshiping/" in a new tab or window

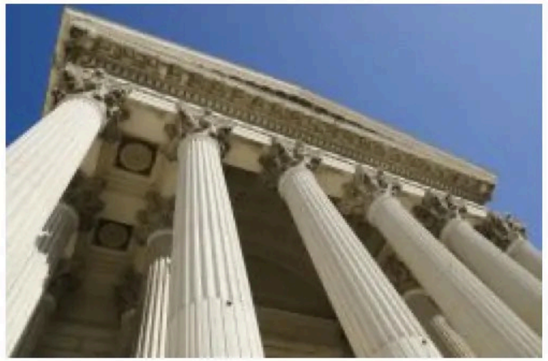
Breadcrumb Navigation

ACLU
AMERICAN CIVIL LIBERTIES UNION of PENNSYLVANIA

Defending liberty where it began

In the Courts

Legal Docket File a Complaint



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GET HELP
SUBMIT A LEGAL COMPLAINT

E-MAIL ALERTS
BREAKING NEWS, EVENTS, AND MORE

KNOW YOUR RIGHTS
ESSENTIAL RESOURCES

You Tube

Breadcrumbs, aka, *wayfinding* or *path navigation*

Communicates hierarchical location of page to user

Based on story of Hansel & Gretel (but not really!)

Pets / Dogs / Dog Grooming / Dog Pools

Walmart

Travel Stories › Egypt › Cairo

Lonely Planet

Home / Men / Shoes / Boots

Nordstrom

Guides › CSS › CSS layout › Flexbox

MDN

Running / Shoes

Womens Road Running Shoes (34)

Nike

Explore Shop Support

HOME / ACCESSORIES / OMEN 34C WQHD 165HZ CURVED GAMING MONITOR

Very familiar & usable

Better to use connectors (> or ➢) instead of separators (:, |, or /)

Home ➢ Animals ➢ About the Animals ➢ Mammals ➢ Pouched Mammals ➢ Red Kangaroo

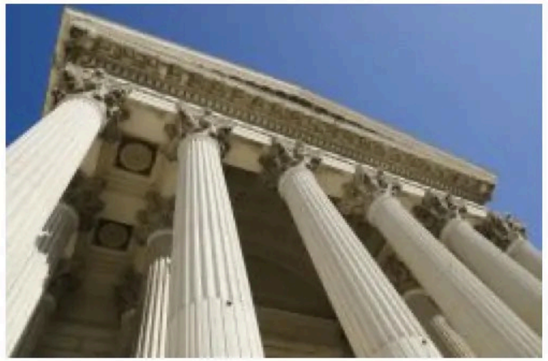
Connectors communicate the hierarchical relationships between webpages much better than separators

Utility Navigation

Utility navigation

In the Courts

Legal Docket File a Complaint



The ACLU of Pennsylvania undertakes litigation when doing so is the most effective way to advance a civil liberties concern. We file lawsuits that will have an impact on people's rights by setting a legal precedent or affecting the policies and actions of public officials. We both provide direct legal representation to people and file amicus (friend-of-the-court) briefs addressing civil liberties issues in cases initiated by others. All of the ACLU-PA's legal work is on a pro bono basis; we never charge for our legal services.

At any given time, the ACLU-PA has over 50 cases on its docket. The program is supported in large part by a network of volunteer attorneys who, last year, donated over $1.5 million in pro bono services.

Legal Docket

A list of the legal cases involving the ACLU of Pennsylvania, indexed by topic. Current and most closed cases from the past decade are included.

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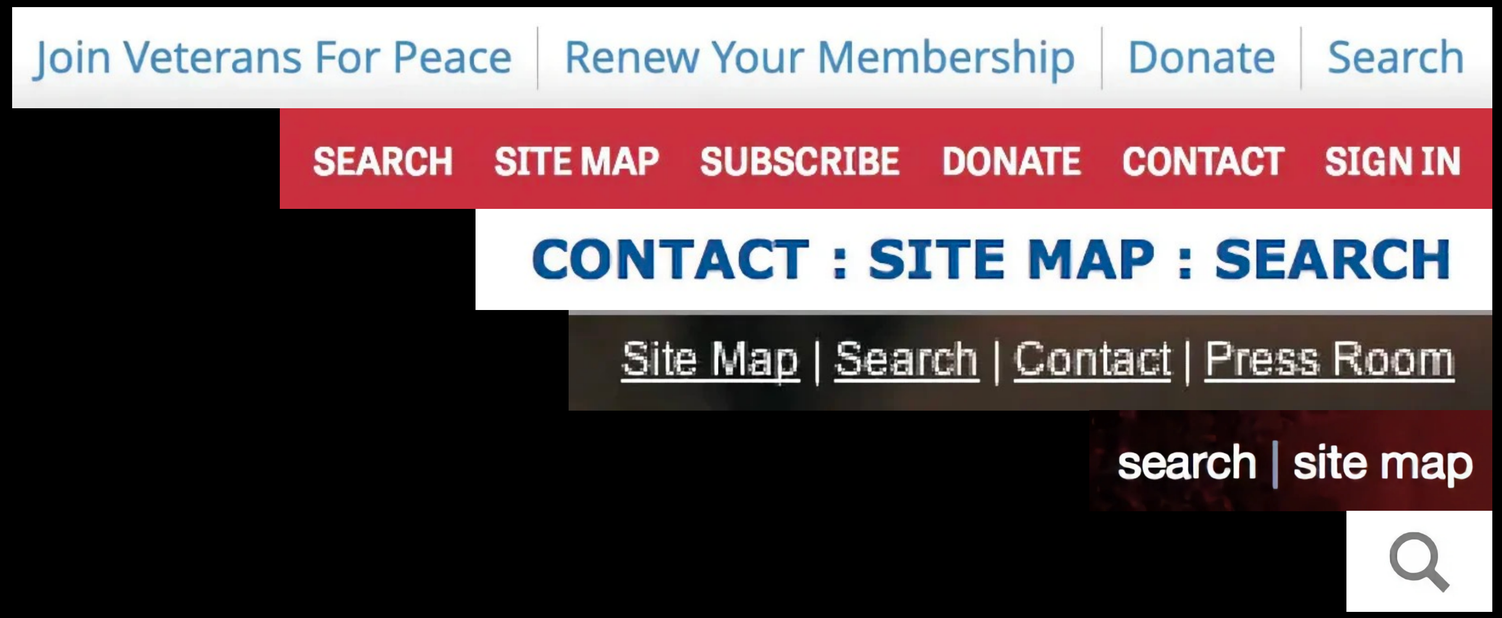
You Tube

Meta tasks for using the site, such as:

- » Search
- » Site Map
- » Sign In
- » Press
- » Shopping Cart



People have learned to look in the top right for this

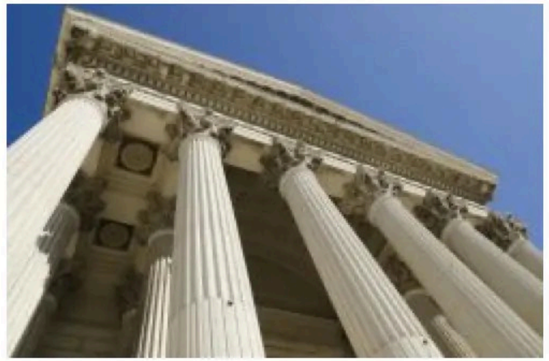
Subpage Navigation

ACLU
AMERICAN CIVIL LIBERTIES UNION of PENNSYLVANIA

Defending liberty where it began

Subpage navigation

In the Courts



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ESSENTIAL RESOURCES

You Tube

Lists pages that are subpages of the current one

Content of the current webpage often repeats links to subpages while also giving details about them

Teaching

Current Courses

Courses I'm teaching this term.

Web Development The Granneman Way

A complete course on Web Development, by Scott Granneman & Jans Carton.

Washington University

Courses taught at Washington University in St. Louis.

Webster University

Courses taught at Webster University.

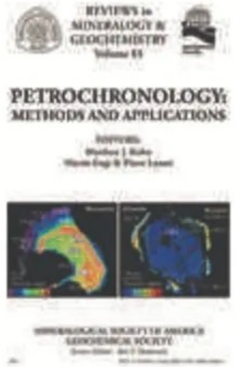
SIUE: Southern Illinois University Edwardsville

Courses taught SIUE

Geochemical Society Publications

Geochemical News | GCA Journal | Special Publications
Elements Magazine | Social Media | RIMG

Home ➤ Publications



Geochemical News

Geochemical News is a weekly e-newsletter featuring society news and current news articles of interest to geochemists.

Elements Magazine

Elements Magazine is a bi-monthly (6 issues/yr) magazine co-sponsored and published by the Geochemical Society and more than 15 other societies. Members receive a calendar year subscription as

Normally placed directly under webpage title (proximity makes purpose clearer)

Can be organized in columns if there are many links

Optional, so appears as needed

Uses horizontal space efficiently

Saint Louis Zoo
Animals Always®

ABOUT | VISIT | ANIMALS | CONSERVATION | EDUCATION | EVENTS | MEMBERSHIP | GIVE

Home ➤ Membership

Benefits & Membership Levels | Join or Renew | Young Zoo Friends
Gift Memberships | Frequently Asked Questions | Marlin Perkins Society

Zoo Friends

MEMBERSHIP

A day at the Saint Louis Zoo is one of the most fun and affordable ways for families to spend time together. And when you join the Zoo Friends, a great

Placement above page title is a bit odd

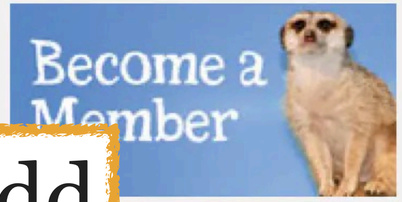
Becoming a Friend

Benefits & Membership Levels

membership levels and list of privileges reserved for Zoo Friends

Gift Memberships

The gift that keeps on giving all year long!



E-newsletter

Sign up for our e-newsletter to receive updates on events, animals, Zoo attractions and more.

search | site map

ACLU
AMERICAN CIVIL LIBERTIES UNION of NEW JERSEY

BECAUSE FREEDOM CAN'T PROTECT ITSELF

About Us | The Issues | Legal Docket | Legislation | Get Active | News | Your Rights

Home ➤ The Issues

The Issues

- Criminal Justice
- Cyber-Liberties
- Discrimination
- Economic Justice
- Elections & Voting
- Free Speech & Expression
- Immigrant Rights
- LGBT Rights
- National Security
- Open Government
- Police Practices
- Prisons
- Privacy
- Religious Freedom
- Reproductive Freedom
- Student & Youth Rights
- Additional Issues

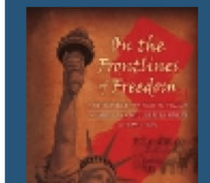
JOIN US »
GIVE NOW »
GET ACTIVE »
GET ALERTS »

Lots of subpages!

Criminal Justice

The Bill of Rights protects us against suspicionless searches and seizures. It guarantees due process to individuals who are accused of crimes and humane treatment to those who are incarcerated. The ACLU works to ensure that our criminal justice system indeed is just.

ON THE FRONTLINES OF FREEDOM



Get your copy of the book chronicling the history of the ACLU-NJ. Author Mary Jo Patterson provides an exclusive front row seat to clashes waged in defense

search | site map

ACLU
AMERICAN CIVIL LIBERTIES UNION of NEW JERSEY

BECAUSE FREEDOM CAN'T PROTECT ITSELF

About Us | The Issues | Legal Docket | Legislation | Get Active | News | Your Rights

Home ➤ Legal Docket

Legal Docket

This docket describes the numerous and varied civil liberties issues which the American Civil Liberties Union of New Jersey is currently involved in (open cases) or has been involved in (closed cases). Use the drop down menus below to sort the cases by issue and case status (open/closed).

Showing

Issue	Case Status
All	Open

- ACLU-NJ v. Hendricks
  Challenge to New Jersey tax dollars used to support religious schools.
- ACLU-NJ vs. NJ Division of Criminal Justice
  State unlawfully redacted information from public records
- Bornstein v. County of Monmouth
  County jail requests to seal court record of video footage of the last hours of an inmat
  life.

JOIN US >>
GIVE NOW >>
GET ACTIVE >>
GET ALERTS >>

So many subpages that *filtering* is necessary

http://t.co/IfUkdcbBwA @WNYC

Sectioning

Creates section

<body>

<nav>

<article>

<aside>

<section>

<h1>–<h6>*

Section info

<h1>–<h6>

<header>

<footer>

<address>

* Can create *implicit*, not explicit, section

Sectioning elements divide the webpage up into areas called *landmarks*, e.g., main content, navigation, asides, sections, headers, & footers

All content on a page should go into landmarks

HTML landmarks:

- `<main>`
- `<aside>`
- `<section>`*
- `<nav>`
- `<header>` & `<footer>` (only if a child of `<body>`)
- `<form>`*
- `<search>`

Note: `<article>` is not a landmark

* Must use `aria-labelledby`, `aria-label`, or `title` attributes

HTML

```
1  <header>↔</header>
10
11 <nav>↔</nav>
18
19 <main>↔</main>
39
40 <footer>↔</footer>
```

CSS (SCSS)

JS

H. P. Lovecraft's Characters

The complete pantheon

Cthulhu Mythos Protagonists Cultists

Cthulhu Mythos

The Cthulhu Mythos is a shared fictional universe, based on the work of American horror writer H. P. Lovecraft.

Yog-Sothoth

"Imagination called up the shocking form of fabulous Yog-Sothoth—only a congeries of iridescent globes, yet stupendous in its malign suggestiveness."

Nyarlathotep

"And it was then that Nyarlathotep came out of Egypt. Who he was, none could tell, but he was of the old native blood and looked like a Pharaoh."

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10 Barnes Street
Providence, RI 02906

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<header>

Cthulhu Mythos Protagonists Cultists

<nav>

Cthulhu Mythos

The Cthulhu Mythos is a shared fictional universe, based on the work of American horror writer H. P. Lovecraft.

<main>

Yog-Sothoth

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Nyarlathotep

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<footer>

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Why use landmarks?

- Easier for developers to read code if everything is grouped together (collapsing code! 🥰)
- Makes styling sections of the page easier (instead of `h2.sidebar` you can use `aside > h2`)
- Convey structure of your page to services & software
- Assistive technologies look for landmarks to help users

Landmarks are really important for accessibility

Landmarks identify important areas of webpages, making it easy for users of assistive technologies to skip over or jump to those areas

WAI-ARIA* is a W3C specification that defines a group of HTML global attributes that can be used to provide additional semantics & improve accessibility

Examples include `role`, `aria-required`, `aria-labelledby`, `aria-modal`, & `aria-disabled`

* Web Accessibility Initiative - Accessible Rich Internet Applications, usually just called ARIA

Prior to HTML5, it was necessary to use the `role` attribute to define landmarks

```
<div class="sidebar" role="complementary">
<div class="main-content" role="main">
```

HTML5 replaces those landmark `role` attributes with elements

ARIA Landmark Role	HTML5 equivalent
complementary	<aside>
contentinfo	<footer>
form	<form title="Sign up form">
banner	<header>
main	<main>
navigation	<nav>
region	<section title="Part 1">
search	<search>

Skip To Content

ARIA Landmarks Example

Visually outline the landmarks and/or headings on the page using the following buttons.

Show Landmarks | Show Headings

- Principles
- HTML
- Banner
- Complementary
- Contentinfo
- Form
- Main
- Navigation
- Region
- Search
- Asst. Tech.

HTML Sectioning Elements

It is important to understand that many HTML sectioning (e.g. `main`, `nav`, `aside` ...) elements by default define ARIA landmarks. If HTML sectioning elements are used without understanding the associated landmark structure, assistive technology users will most likely be confused and less efficient in accessing content and interacting with web pages.

HTML Element	Default Landmark Role
`aside`	`complementary`
`footer`	`contentinfo` when in context of the `body` element. The `footer` element is **not** a `contentinfo` landmark when it is a descendant of the following HTML sectioning elements: • `article` • `aside` • `section`

Excellent info — but currently missing <search>!

Landmarks

The following landmarks are defined on this page:

- Banner
- Complementary
- Contentinfo
- Main
- Navigation

Related Documents

- WAI-ARIA Authoring Practices 1.2
- WAI-ARIA 1.2 Specification
- Accessible Name and [illegible]mputation
- [illegible]lity API Mappings 1.2

“Using the `<aside>` element will automatically communicate a section has a role of `complementary`. *Developers should always prefer using the correct semantic HTML element over using ARIA*.” —MDN (emphasis added)

Jon Gunderson created a browser extension that can test & use landmarks

- Chromium-based browsers: SkipTo.js for Chrome
- Firefox: SkipTo.js for Firefox

(Safari users can use Apple’s excellent VoiceOver feature for macOS, iOS, iPadOS, tvOS, & watchOS)

H. P. Lovecraft's Characters

The complete pantheon

Click this button or press ⌥0/Alt+0 (zero)

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"And it was then that Nyarlathotep came out of Egypt. Who he was, none could tell, but he was of the old native blood and looked like a Pharaoh."

Legal

Contact

Connect

CodePen - HTML: Landmarks
https://cdpn.io/pen/debug/GRxojVq
S-Foc Ent RSG WS Best G Soc Apps lets News All Bookmarks

H. P. Lovecraft's Chara

The complete pantheon

Skip To Content (Option+0)

Landmark Regions

- Banner
- Navigation
- Main
- Contentinfo

Headings

- 2) Cthulhu Mythos
  - 3) Yog-Sothoth
  - 3) Nyarlathotep
- 2) Legal
- 2) Contact
- 2) Connect

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Navigation
Main
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H. P. Lovecraft's Characters

The complete pantheon

When you first install SkipTo.js, this gray box appears at the top of every page

Click on it...

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CodePen - HTML: Landmarks

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H. P. Lovecraft's Characters

The complete pantheon

Skip To Content (Option+0)

Cthulhu Mythos Protagonists Cultists

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...& this appears

I do not want to see that gray box on the top of every page

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- Facebook

Button Menu Style Internationalization

Button Visibility

☐ Bottom border of button always visible

Making the bottom border visible at the top of the page allows user to use the pointer to easily expose the button.

Button Focus

◉ None
○ Button
○ Menu

When a new page loads some users may not want the button visible since it obscures some content or may be distracting visually. Others may want the menu to be open when the page loads to eliminate the extra keystrokes needed to open the menu.

Reset Button Defaults

Uncheck this to hide the button unless you click on the extension button or use the key command

Change this to None to hide the button until you ask for it

Button | Menu | Style | Internationalization

Before...

Highlight Content

- [ ] Disable highlighting content when navigating menu options

Landmark Regions

- [x] Navigation
- [x] Search
- [x] Complementary
- [ ] Contentinfo
- [ ] Banner
- [ ] Region

Check all

- [ ] Show landmarks in document order

Check — otherwise it's confusing
(He added this because I requested it)

Headings

- ( ) h1
- (•) h1, h2
- ( ) h1, h2, h3
- ( ) h1, h2, h3, h4
- ( ) h1, h2, h3, h4, h5
- ( ) h1, h2, h3, h4, h5, h6

Check down to h4

- [x] Only show headings in main landmark region

Button **Menu** Style Internationalization

After!

Highlight Content

- [ ] Disable highlighting content when navigating menu options

Landmark Regions

- [x] Navigation
- [x] Search
- [x] Complementary
- [x] Contentinfo
- [x] Banner
- [x] Region

- [x] Show landmarks in document order

Headings

- ( ) h1
- ( ) h1, h2
- ( ) h1, h2, h3
- (•) h1, h2, h3, h4
- ( ) h1, h2, h3, h4, h5
- ( ) h1, h2, h3, h4, h5, h6

- [x] Only show headings in main landmark region

✏️ SIDE NOTE

Other ways to test landmarks & accessibility

- JAWS ⊞
- NVDA ⊞
- Orca 🐋
- Microsoft's Accessibility Insights ⊞
- VoiceOver

✏️ SIDE NOTE

ARIA is a huge spec, with many roles, states, & properties

We have only focused here on the landmark roles

More discussion about ARIA in the *For Developers Only* presentation

`<article>` … `</article>`

A section of content that can *stand on its own as a complete & self-contained composition* that could be independently distributed or reused

`<article>` does not mean “long” — a short post could be in an `<article>`

(Remember — `<article>` is *not* a landmark!)

Services & software use `<article>` (& landmark elements) to gather important content from a webpage, e.g.:

- *Scrapers* like Diffbot & Mercury Web Parser
- *Read-it-later services* like Instapaper & Pocket
- *Browser add-ons* like Mercury Reader & Reader Mode
- *Built-in browser tools* like Safari Reader, Firefox Reader View, & Edge's Immersive Reader

FOOTSTEPS

How to Find the Spirit of H.P. Lovecraft in Providence

Give this article

FOOTSTEPS

How to Find the Spirit of H.P. Lovecraft in Providence

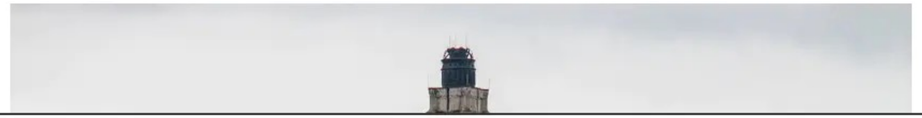
This isn't actually what this page 1st looked like...

www.nytimes.com/2016/08/14/travel/hp-lovecr
S-Foc Old Ent RSG WS Best G Soc Apps lets News

FOOTSTEPS

How to Find the Spirit of H.P. Lovecraft in Providence

Give this article



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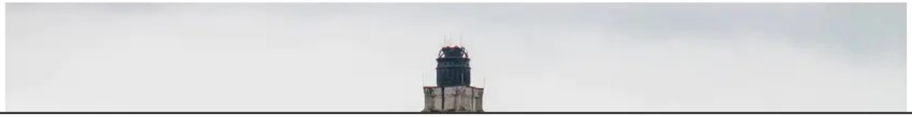
www.nytimes.com/2016/08/14/travel/hp-lovecr

S-Foc Old Ent RSG WS Best G Soc Apps lets News

FOOTSTEPS

How to Find the Spirit of H.P. Lovecraft in Providence

Large subscription ad ... OK, I need to log in ...



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Account

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The New York Times

Story Portrait

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FOOTSTEPS

How to Find the Spirit of H.P. Lovecraft in Providence

Give this article

www.nytimes.com/2016/08/14/travel/hp-lovecr AA
S-Foc Old Ent RSG WS Best Soc Apps lets News

How to Find the Spirit of H.P. Lovecraft in Providence

Aug. 10, 2016

The former Industrial Trust Tower, a.k.a. the Superman Building, plays a role in H.P. Lovecraft stories.Tony Cenicola/The New York Times NYTCREDIT: Tony Cenicola/The New York Times

To walk through the streets of Providence, particularly those of the city's

Ahhhh...

Hide Reader View
AA
Use Reader Automatically on “nytimes.com”
Reader Websites Preferences...
S-Foc Old Ent RSG WS Best G

How to Find the Spirit of H.P. Lovecraft in Providence

Aug. 10, 2016

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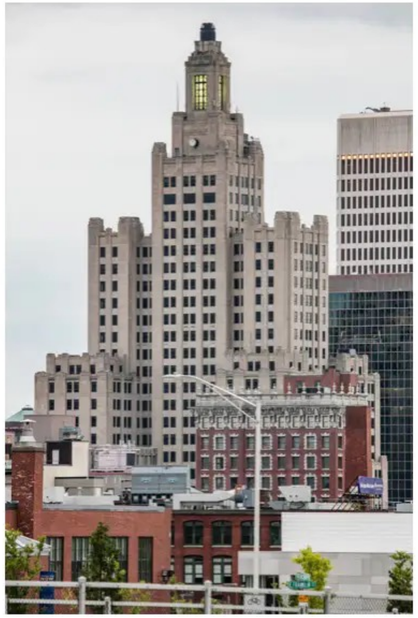
To walk through the streets of Providence, particularly those of the city’s

www.nytimes.com/2016/08/14/travel/hp-lovecr AA
S-Foc Old Ent RSG WS Best G Soc Apps lets News

How to Find the Spirit of H.P. Lovecraft in Providence

Aug. 10, 2016



The former Industrial Trust Tower, a.k.a. the Superman Building, plays a role in H.P. Lovecraft stories.Tony Cenicola/The New York Times NYTCREDIT: Tony Cenicola/The New York Times

To walk through the streets of Providence, particularly those of the city's

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Athelas
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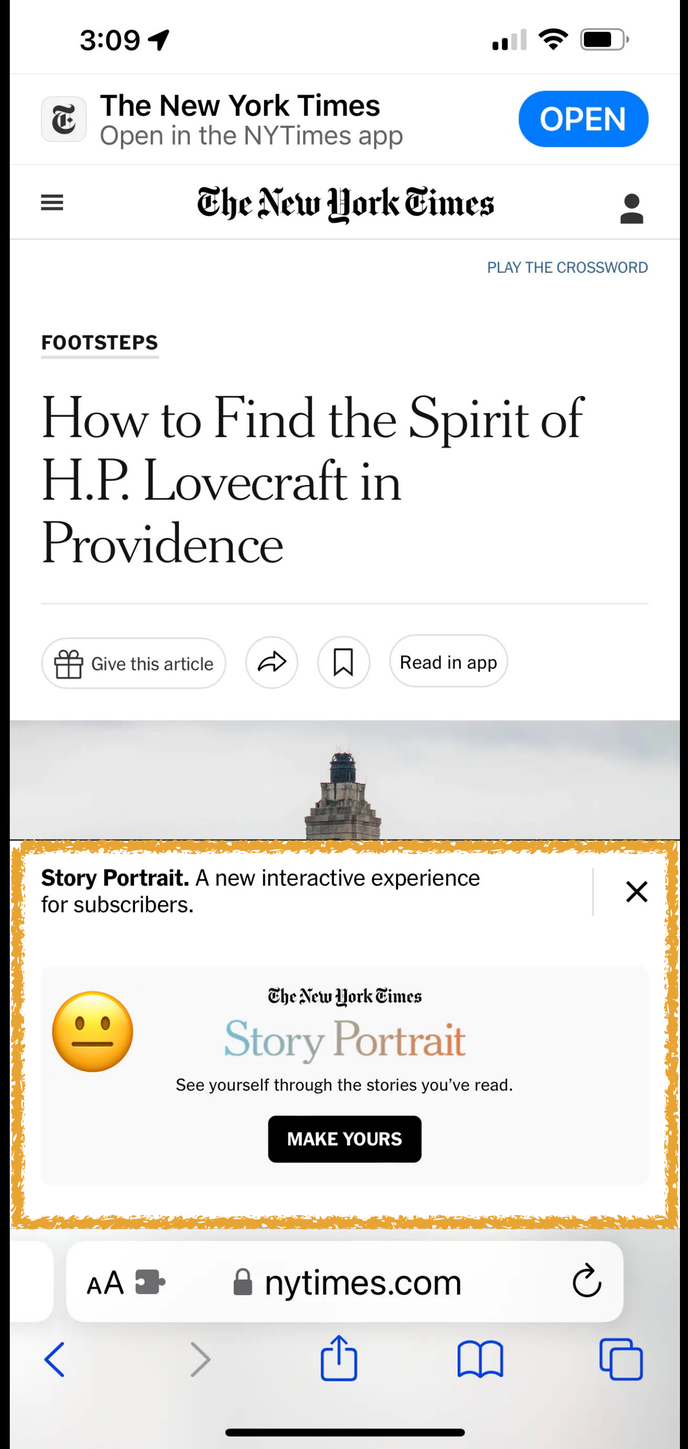
New York
Palatino
✓ San Francisco
Seravek
Times New Roman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The New York Times
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The New York Times
PLAY THE CROSSWORD
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How to Find the Spirit of H.P. Lovecraft in Providence
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How to Find the Spirit of H.P. Lovecraft in Providence
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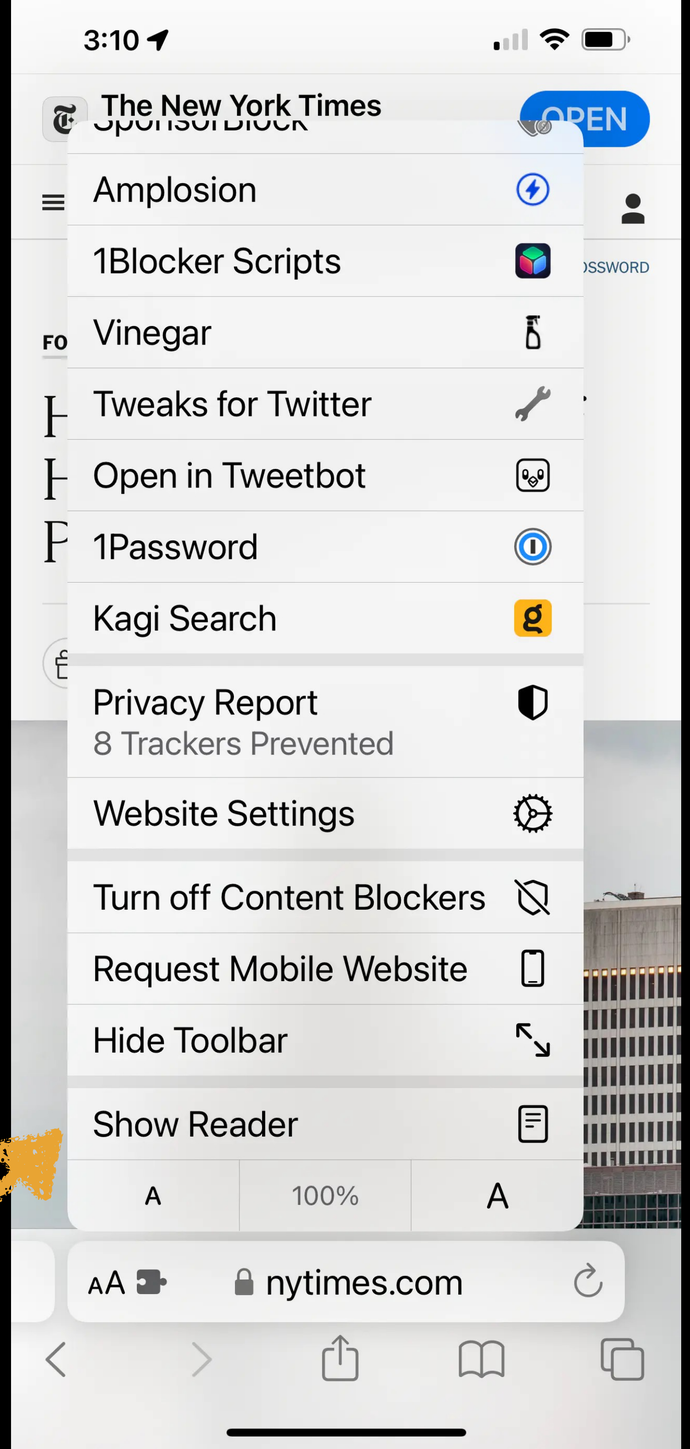
3:10
The New York Times
OPEN
Amplosion
1Blocker Scripts
Vinegar
Tweaks for Twitter
Open in Tweetbot
1Password
Kagi Search
Privacy Report
8 Trackers Prevented
Website Settings
Turn off Content Blockers
Request Mobile Website
Hide Toolbar
Show Reader
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nytimes.com

3:24

The New York Times
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How to Find the Spirit of H.P. Lovecraft in Providence

Aug. 10, 2016

The former Industrial Trust Tower, a.k.a. the Superman Building, plays a role in H.P. Lovecraft stories.Tony Cenicola/The New York Times
NYTCREDIT: Tony Cenicola/The New York Times

AA nytimes.com

3:25

The New York Times
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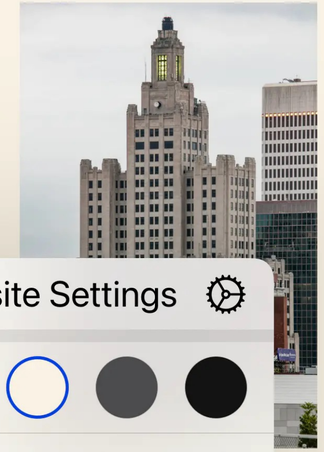
How to Find the Spirit of H.P. Lovecraft in Providence

Aug. 10, 2016



Website Settings

Font Iowan

Hide Reader

A A

AA nytimes.com

3:25

The New York Times
Open in the NYTimes app
OPEN

How to Find the Spirit of H.P. Lovecraft in Providence

Aug. 10, 2016

Settings for nytimes.com Done

WHILE VIEWING NYTIMES.COM

Request Desktop Website

Use Reader Automatically

Use Content Blockers

ALLOW NYTIMES.COM TO ACCESS

Camera Ask

Microphone Ask

All browsers have built-in tools for “reader mode”

(Google took *forever* to add reader mode to Chrome, & it works in a weird way — gosh, I wonder why?!?)

Reader	👩‍💻: chnsa.ws/reader-safari-mac 📱: chnsa.ws/reader-safari-ios
Reader View	chnsa.ws/reader-firefox
Speedreader	chnsa.ws/reader-brave
Reader Mode	chnsa.ws/reader-edge
Reading Mode	👩‍💻: chnsa.ws/reader-chrome 🤖: chnsa.ws/reader-android

`<aside>` … `</aside>`

Tangentially related content

» Sidebars
» Pull quotes
» Glossary
» Related links

HTML

```html
<article>
  <h1>
    Cthulhu Mythos
  </h1>
  <p>
    The Cthulhu Mythos is a shared fictional universe, based on the work of American horror writer H. P. Lovecraft.
  </p>
  <h2>
    Yog-Sothoth
  </h2>
  <p>
    “Imagination called up the shocking form of fabulous Yog-Sothoth—only a congeries of iridescent globes, yet stupendous in its malign suggestiveness.”
  </p>
</article>
```

CSS

JS

Cthulhu Mythos

The Cthulhu Mythos is a shared fictional universe, based on the work of American horror writer H. P. Lovecraft.

Yog-Sothoth

“Imagination called up the shocking form of fabulous Yog-Sothoth—only a congeries of iridescent globes, yet stupendous in its malign suggestiveness.”

August Derleth

Best remembered as the first publisher of the writings of H. P. Lovecraft, and for his own contributions to the Cthulhu Mythos genre of horror, as well as his founding of the publisher Arkham House.

HTML

```
iridescent globes, yet
stupendous in its malign
suggestiveness.”
  </p>
</article>

<aside>
  <h2>
    August Derleth
  </h2>
  <p>
    Best remembered as the
first publisher of the writings
of H. P. Lovecraft, and for his
own contributions to the
Cthulhu Mythos genre of horror,
as well as his founding of the
publisher Arkham House.
  </p>
</aside>
```

CSS

JS

Cthulhu Mythos

The Cthulhu Mythos is a shared fictional universe, based on the work of American horror writer H. P. Lovecraft.

Yog-Sothoth

“Imagination called up the shocking form of fabulous Yog-Sothoth—only a congeries of iridescent globes, yet stupendous in its malign suggestiveness.”

August Derleth

Best remembered as the first publisher of the writings of H. P. Lovecraft, and for his own contributions to the Cthulhu Mythos genre of horror, as well as his founding of the publisher Arkham House.

`<aside>` used as sidebar

HTML

```
course the town's real business
was the refinery, whose
commercial office was on the
square only a few doors east of
where we stood. Old Man Marsh was
never seen, but sometimes went to
the works in a closed, curtained
car.
  </p>
  <aside>
    There were all sorts of
rumours about how Marsh had come
to look.
  </aside>
  <p>
    There were all sorts of
rumours about how Marsh had come
to look. He had once been a great
dandy, and people said he still
wore the frock-coated finery of
the Edwardian age, curiously
adapted to certain deformities.
```

CSS

JS

As for business—the abundance of fish was certainly almost uncanny, but the natives were taking less and less advantage of it. Moreover, prices were falling and competition was growing. Of course the town's real business was the refinery, whose commercial office was on the square only a few doors east of where we stood. Old Man Marsh was never seen, but sometimes went to the works in a closed, curtained car.

There were all sorts of rumours about how Marsh had come to look.

There were all sorts of rumours about how Marsh had come to look. He had once been a great dandy, and people said he still wore the frock-coated finery of the Edwardian age, curiously adapted to certain deformities. His sons had formerly conducted the office in the square, but latterly they had been keeping out of sight a good deal and leaving the brunt of affairs to the younger generation. The sons and their sisters had come to look very queer, especially the elder ones; and it was said that their health was failing.

`<aside>` used as pull quote

`<section>` … `</section>`

A *generic section* containing a *thematic grouping* of content

Often starts with a heading (`<h1>`–`<h6>`)

Not a generic container element! For that, use `<div>`

HTML

```html
<footer>
  <section>
    <h2>Legal</h2>
    <p>
      All content, unless under a Creative Commons license, is © 1937 Willett Medical
    </p>
  </section>
  <section>
    <h2>Contact</h2>
    <address>
      Dr. Marinus Bicknell Willett<br />
      10 Barnes Street<br />
      Providence, RI 02906
    </address>
  </section>
  <section>
    <h2>Connect</h2>
    <ul>
      <li><a href="#">Facebook</a></li>
      <li><a href="#">Twitter</a></li>
      <li><a href="#">YouTube</a></li>
    </ul>
  </section>
  <p>
```

CSS

JS

Legal

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Dr. Marinus Bicknell Willett
10 Barnes Street
Providence, RI 02906

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Don’t get `<section>`-itis! 🤧

Only use `<section>` there’s a layout or other presentational purpose

Remember, if a `<section>` is acting as a landmark, you must also use the `title`, `aria-labelledby`, or `aria-label` attributes

`<body>` is the *root section container*

It's common to put a `<header>` or `<footer>` directly inside `<body>` as a landmark

You can—& should if you need to!—still use `<header>` or `<footer>` inside other sectioning elements like `<aside>`

`<header>` … `</header>`

Introductory or navigational aids for an area

Does not create a new area; it labels an area (remember, the equivalent ARIA role is `banner`)

Multiple `<header>`s are fine in a webpage, up to one per section

- One at the top of the webpage (in `<body>`) as a landmark
- One at the top of other sectioning elements (as appropriate)

But every section does not need a `<header>`

Use `<header>` when you need something more complex than just a heading like `<h2>`

A typical `<header>` may contain any of these & more:

» A section's heading (`<h1>`–`<h6>`)
» Table of contents
» Logos
» Navigation (likely in `<nav>`)
» Search form

HTML

```html
<header>
  <img src="https://s3-us-west-2.amazonaws.com/s.cdpn.io/122116/lovecraft-shadowed.jpg" width="97" height="125">
  <h1>H. P. Lovecraft’s Characters</h1>
  <p>
    The complete pantheon
  </p>
</header>
<main>
  <article>
    <h2>
      Cthulhu Mythos
    </h2>
    <p>
      The Cthulhu Mythos is a shared fictional universe, based on the work of American horror writer H. P. Lovecraft.
    </p>
```

CSS

JS

H. P. Lovecraft’s Characters

The complete pantheon

Cthulhu Mythos

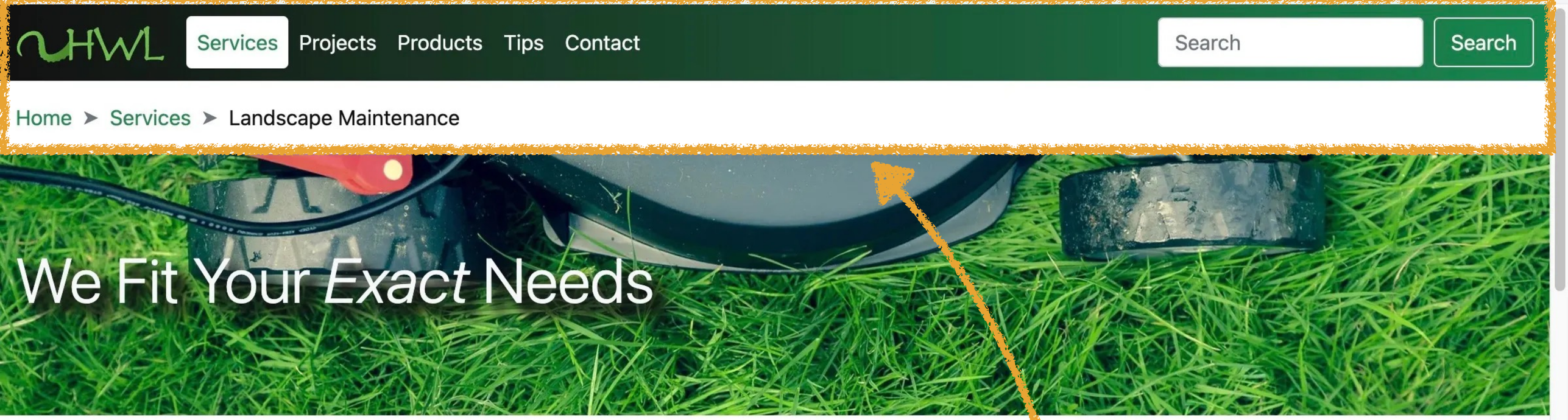
The Cthulhu Mythos is a shared fictional universe, based on the work of American horror writer H. P. Lovecraft.

Yog-Sothoth

“Imagination called up the shocking form of fabulous Yog-Sothoth—only a congeries of iridescent globes, yet stupendous in its malign suggestiveness.”

Nyarlathotep

“And it was then that Nyarlathotep came out of Egypt. Who he was, none could tell, but he was of the old native blood and looked like a Pharaoh.”



<header> contains logo, primary navigation, search box, & breadcrumb navigation

We are *sup*

Beautiful quality is o d quality. We understand the impo ese beautiful areas, so you can spend m all of our beautiful jobs, and are proud to say that we've never had a warranty claimed. We believe this is a result of our superior attention to beautiful detail, our commitment to doing the beautiful job right the first beautiful time, and the fact that people that have said they were going to claim a warranty have all disappeared mysteriously. Beautiful!

Weekly Lawn Service

Did you know that grass can grow anywhere from 2-6 inches a week (depending on temperature, humidity, time of year, and chicken sacrifices) which is why we provide weekly lawn service. We come out and cut your lawn once a week, on the day of your choice, as long as it is Tuesday. And we bring the chickens!

`<footer>` … `</footer>`

Footer for an area that may contain…

- Author
- Copyright
- Links to related content
- Contact info (in `<address>`)
- Social media links or icons

Multiple `<footer>`s are fine in a webpage, up to one per area

- One at the bottom of the webpage (in `<body>`) as a landmark
- One at the end of areas (as appropriate)

But every area does not need a `<footer>`

HTML

```html
<footer>
  <p>
    All content, unless under a Creative Commons license, is © 1937 Willett Medical
  </p>
  <address>
    Dr. Marinus Bicknell Willett • 10 Barnes Street • Providence, RI 02906
  </address>
  <p>
    <a href="http://miskatonic-expedition.com/privacy">Privacy Policy</a> | <a href="http://miskatonic-expedition.com/about-this-site">About This Site</a> | <a href="https://en.wikipedia.org/wiki/H._P._Lovecraft">HPL Accredited</a> | <a href="http://www.cthulhulives.org">Member of HPLHS</a>
  </p>
</footer>
```

CSS

JS

A `<footer>` can itself contains sectioning elements (`<section>` or `<nav>` for instance)

If it does, those usually contain…

» Appendices
» Indexes
» Long colophons
» License agreements
» *Fat footer* content

HTML

```html
<footer>
  <section>
    <h2>Legal</h2>
    <p>
      All content, unless under a Creative Commons license, is © 1937 Willett Medical
    </p>
  </section>
  <section>
    <h2>Contact</h2>
    <address>
      Dr. Marinus Bicknell Willett<br />
      10 Barnes Street<br />
      Providence, RI 02906
    </address>
  </section>
  <section>
    <h2>Connect</h2>
    <ul>
      <li><a href="#">Facebook</a></li>  <li><a href="#">Twitter</a></li>
      <li><a href="#">YouTube</a></li>
    </ul>
```

CSS

JS

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Providence, RI 02906

Connect

- Facebook
- Twitter
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				iOS		
<nav>	9	4	4.1	4.2	5	Y
<article>	9	4	4.1	4.2	5	Y
<aside>	9	4	4.1	4.2	5	Y
<section>	9	4	4.1	4.2	5	Y
<header>	9	4	4.1	4.2	5	Y
<footer>	9	4	4.1	4.2	5	Y

Scripting

```
<script>

<noscript>
```

`<script>` … `</script>`

Embeds or references *executable script* (99.999% of the time, JavaScript) in the document

HTML

```html
<h3>Embedded JavaScript</h3>

<p>
  Let's hope Cthulhu doesn't wake up in
  <script
  type="text/javascript">document.write
  (new Date().getFullYear());</script>
  & doom us all.
</p>
```

CSS

JS

Embedded JavaScript

Let's hope Cthulhu doesn't wake up in 2014 & doom us all.

Embedding places the actual JavaScript in the HTML

HTML

```html
<h3>Referenced JavaScript</h3>

<p>
  Let’s hope Cthulhu doesn’t wake up in
  <script
  src="http://codepen.websanity.com/js/
  year.js"></script> & doom us all.
</p>
```

CSS

JS

Referenced JavaScript

Let’s hope Cthulhu doesn’t wake up in 2014 & doom us all.

Referencing imports a external JavaScript using `src` attribute

✏️ SIDE NOTE

HTML 4 required the `type` attribute:

```
<script src="foo.js" type="text/javascript"></
script>
```

HTML5 removes that requirement 🥳:

```
<script src="foo.js"></script>
```

`<noscript>` … `</noscript>`

Alternate content when `<script>` is not executed (because, for instance, scripting is turned off in the browser)

If `<noscript>` is in `<head>`, can only contain `<link>`, `<style>`, or `<meta>`

If `<noscript>` is in `<body>`, can contain content

HTML

```html
<noscript>
  <p>
    <strong>Please turn on JavaScript,
    or Cthulhu will be angry.</strong>
  </p>
</noscript>

<p>
  Let's hope Cthulhu doesn't wake up in
  <script
  type="text/javascript">document.write
  (new Date().getFullYear());</script>
  & doom us all.
</p>
```

CSS

JS

Please turn on JavaScript, or Cthulhu will be angry.

Let's hope Cthulhu doesn't wake up in & doom us all.

?

The year doesn't appear because JavaScript is turned off

Other Elements

Following are all of the HTML elements we did not cover here, along with a very brief description of what they do

CSS (see *CSS Overview Condensed*)

`<div>`: content division
`<span>`: content span
`<style>`: CSS information for a document

Metadata

`<link>`: specifies relationships between resources (CSS)
`<base>`: base URL for all relative URLs

Languages for Embedding Content

`<math>`: insert content written in MathML

Embedded Multimedia

`<picture>`: offer alternative versions of an image
`<canvas>`: JavaScript-based graphics & animations
`<map>`: clickable image map
`<area>`: clickable area inside image map

Embedded Content

`<embed>`: embeds external content
`<object>`: external resource needing a plugin

Frames

`<iframe>`: inline, nested webpage

Grouping

`<pre>`: preformatted text

Edits

`<del>`: text deleted from document
`<ins>`: text added to document

Text Semantics

`<abbr>`: abbreviation
`<cite>`: citation
`<code>`: inline code
`<data>`: machine-readable translation of content
`<dfn>`: definition
`<kbd>`: textual user input from keyboard or voice
`<mark>`: marked or highlighted
`<pre>`: preformatted (monospaced) text

Text Semantics

`<q>`: inline quotation
`<samp>`: sample output from a computer program
`<sub>`: subscript
`<sup>`: superscript
`<time>`: specific period in time
`<var>`: name of variable in math or programming
`<wbr>`: line break opportunity

Tables (see *Tables & Lists: Organized Data*)

`<table>`: tabular data
`<tr>`: table row
`<th>`: table header cell
`<td>`: table data cell
`<thead>`: table head
`<tbody>`: table body
`<tfoot>`: table foot
`<col>`: table column
`<colgroup>`: table column group
`<caption>`: table caption

Forms (see *Forms*)

`<form>`: interactive controls for submitting information
`<fieldset>`: group controls & labels
`<legend>`: caption for `<fieldset>`
`<label>`: caption for form control
`<input>`: form input
`<textarea>`: multi-line editing for plain text
`<button>`: clickable button

Forms (see *Forms*)

`<option>`: selectable menu items
`<select>`: displays menu of `<option>`s
`<optgroup>`: group of `<option>`s within `<select>`
`<datalist>`: permissable or recommended `<option>`s
`<meter>`: scale of ranges or fractional values
`<progress>`: indicator showing completion progress
`<output>`: container for calculation or action results

Interaction

`<dialog>`: interactive component, e.g., dialog or alert
`<menu>`: list of interactive items
`<details>`: disclosure widget for information
`<summary>`: label for `<details>`

Web Components

`<slot>`: placeholder to create separate DOM tree
`<template>`: holds HTML rendered via JavaScript

Ruby

`<ruby>`: annotations to pronounce CJK characters
`<rp>`: fall-back parentheses for non-ruby browsers
`<rt>`: ruby text component

Text Direction

`<bdi>`: change text direction
`<bdo>`: override current directionality of text

Obsolete — do not use!

`<acronym>`: acronym or abbreviation for a word
`<applet>`: embed Java applet
`<basefont>`: default font face, size, & color
`<bgsound>`: background sound file
`<big>`: larger text
`<blink>`: causes text to slowly flash
`<center>`: centers content horizontally
`<content>`: used to insert code inside Shadow DOM

Obsolete — do not use!

`<dir>`: container for a directory of files &/or folders
`<font>`: defines font size, color, & face
`<frame>`: area to display another HTML document
`<frameset>`: contains frame elements
`<image>`: precursor to `<img>`
`<isindex>`: creates single-line text input form control
`<keygen>`: use public keys with `<form>`
`<listing>`: ignores HTML & uses monospaced font

Obsolete — do not use!

`<marquee>`: insert a scrolling area of text
`<menuitem>`: invoke command through a popup menu
`<multicol>`: create multiple columns of text
`<nextid>`: used by NeXT web design tool
`<nobr>`: prevent text from automatically wrapping
`<noembed>`: alternative fallback content
`<noframes>`: content for non-`<frame>` browsers
`<param>`: defines parameters for `<object>`

Obsolete — do not use!

`<plaintext>`: renders everything after as raw text
`<rb>`: base text component of ruby annotation
`<rtc>`: semantic annotations of characters in ruby
`<shadow>`: shadow DOM insertion point
`<spacer>`: inserts empty spaces
`<strike>`: strikethrough over text; same as `<s>`
`<tt>`: displays text with monospace font
`<xmp>`: ignores HTML & uses monospaced font

Thank you!

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granneman.com
@scottgranneman@mastodon.social

jans@websanity.com
websanity.com

Slides

granneman.com/downloads/web-dev/HTML-Overview-Condensed.pdf

chnsa.ws/html-condensed-slides

Notes

granneman.com/downloads/web-dev/HTML-Overview-Condensed.txt

chnsa.ws/html-condensed-notes

All of my presentations

granneman.com/presentations/all-presentations

chnsa.ws/all-presentations

HTML Overview Condensed

Elements, Attributes, Values, & References

R. Scott Granneman & Jans Carton

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Bonus

Lists

`<ol>` is often used to create navigation via CSS

Why? Because the order of navigation matters

HTML

```html
<nav>
  <ol class="crumbs">
    <li><a href="#">Home</a></li>
    <li><a href="#">Lovecraft</a></li>
    <li><a href="#">Great Old Ones</a></li>
    <li><a href="#">Cthulhu</a></li>
  </ol>
</nav>
```

CSS

```css
.crumbs li {
  display: inline-block;
}

.crumbs li::after {
    content: '➤';
    padding: 0 0.25em 0 0.5em;
    color: #999;
  }

.crumbs li a {
  display: inline;
  border: 0;
```

JS

Home ➤ Lovecraft ➤ Great Old Ones ➤ Cthulhu

```html
<ol>
  <li>Home</li>
  <li>Lovecraft</li>
  <li>Great Old Ones</li>
  <li>Cthulhu</li>
</ol>
```

It looks all fancy thanks to CSS!

`<dl>` … `</dl>`

HTML 4: *Definition list*

HTML5: Renamed *Description List*

Lists terms & descriptions of those terms, like…

» Glossary
» Metadata keys & values

`<dt> … </dt>`

Description term

The word or phrase being defined or described

`<dd> … </dd>`

Description data for a description term

HTML

```html
<h3>Glossary</h3>
<dl>
  <dt>Cthulhu</dt>
  <dd>"…a monster of vaguely anthropoid outline, but with an octopus-like head whose face was a mass of feelers, a scaly, rubbery-looking body, prodigious claws on hind and fore feet, and long, narrow wings behind."</dd>
  <dt>R'lyeh</dt>
  <dd>"The nightmare corpse-city of R'lyeh … was built in measureless eons behind history by the vast, loathsome shapes that seeped down from the dark stars."</dd>
</dl>

<h3>Metadata keys & values</h3>
<dl>
  <dt>Name</dt>
  <dd>Cthulhu</dd>
  <dt>Deity Type</dt>
  <dd>Great Old One</dd>
  <dt>Location</dt>
  <dd>R'lyeh</dd>
  <dt>Current status</dt>
  <dd>Sleeping</dd>
</dl>
```

CSS

JS

Glossary

Cthulhu
: "…a monster of vaguely anthropoid outline, but with an octopus-like head whose face was a mass of feelers, a scaly, rubbery-looking body, prodigious claws on hind and fore feet, and long, narrow wings behind."

R'lyeh
: "The nightmare corpse-city of R'lyeh … was built in measureless eons behind history by the vast, loathsome shapes that seeped down from the dark stars."

Metadata keys & values

Name
: Cthulhu

Deity Type
: Great Old One

Location
: R'lyeh

Current status
: Sleeping

May have more than 1 `<dt>` and/or 1 `<dd>`

HTML

```html
<dl>
  <dt>H. P. Lovecraft</dt>
    <dd>An American horror writer.</dd>
    <dd>A psychedelic band from the 1960s.</dd>
  <dt>Cthulhu</dt>
  <dt>Yog-Sothoth</dt>
    <dd>Malevolent creatures in the Cthulhu
    Mythos</dd>
</dl>
```

CSS

JS

H. P. Lovecraft
: An American horror writer.
: A psychedelic band from the 1960s.

Cthulhu

Yog-Sothoth
: Malevolent creatures in the Cthulhu Mythos

📦 FORMATTING GUIDE

Don’t do this — it makes your code harder to read

```
<dl>
  <dt>Cxaxukluth</dt><dd>Spawn of Azathoth;
father of Hziulquoigmnzhah & Ghisguth</dd>
  <dt>Hziulquoigmnzhah</dt><dd>Son of
Cxaxukluth; uncle of Tsathoggua</dd>
  <dt>Tsathoggua</dt><dd>Son of Ghisguth: the
Sleeper of N'kai</dd>
</dl>
```

Just put `<dt>` & `<dd>` on separate lines

FORMATTING GUIDE

Like this:

```
<dl>
  <dt>Cxaxukluth</dt>
  <dd>Spawn of Azathoth; father of
Hziulquoigmnzhah & Ghisguth</dd>
  <dt>Hziulquoigmnzhah</dt>
  <dd>Son of Cxaxukluth; uncle of Tsathoggua</
dd>
  <dt>Tsathoggua</dt>
  <dd>Son of Ghisguth: the Sleeper of N'kai</
dd>
</dl>
```

📦 FORMATTING GUIDE

```
<ul>
  <dl>
    <li><dt>Term</dt></li>
    <li><dd>Description</dd></li>
  </dl>
</ul>
```

No. Just no. 🤮

An unordered list inside `<dd>`? Maybe. But a `<dl>` inside a `<ul>` (or `<ol>`)? No. And it won't validate!

You can, however, use 1 or more `<p>`s inside an `<li>` or `<dd>`

HTML

```html
<h2>Best opening lines to Lovecraft stories</h2>

<ol>
  <li>
    <p>From <i>The Call of Cthulhu</i>:</p>
    <p>“The most merciful thing in the world, I think, is the inability of the human mind to correlate all its contents. We live on a placid island of ignorance in the midst of black seas of infinity, and it was not meant that we should voyage far.”</p>
  </li>
  <li>
    <p>From <i>The Shadow over Innsmouth</i>:</p>
    <p>“During the winter of 1927–28 officials of the Federal government made a strange and secret investigation of certain conditions in the ancient Massachusetts seaport of Innsmouth.”</p>
  </li>
  <li>
    <p>From <i>The Colour out of Space</i>:</p>
    <p>“West of Arkham the hills rise wild, and
```

CSS (SCSS)

JS

Best opening lines to Lovecraft stories

1. From *The Call of Cthulhu*:

   “The most merciful thing in the world, I think, is the inability of the human mind to correlate all its contents. We live on a placid island of ignorance in the midst of black seas of infinity, and it was not meant that we should voyage far.”

2. From *The Shadow over Innsmouth*:

   “During the winter of 1927–28 officials of the Federal government made a strange and secret investigation of certain conditions in the ancient Massachusetts seaport of Innsmouth.”

3. From *The Colour out of Space*:

Character References

What about an ampersand `&`, e.g.:

```
Carton & Granneman
https://duckduckgo.com/?q=van+halen&df=m
```

In HTML 4, you were *required* to encode it every time:

```
Carton &amp; Granneman
https://duckduckgo.com/?q=van+halen&amp;df=m
```

In HTML5, it depends whether it is an *ambiguous* (not valid) or *unambiguous* (valid) ampersand

An ambiguous ampersand looks like it could be a named character reference but is not

It starts with `&` & ends with `;` & has alphanumeric characters in the middle, but it isn't in the official list

These look right — but they are imposters!

`&2021;`
`&cthulhu;`

So they ~~must be destroyed~~ are not allowed

These look right — but they are imposters!

`&2021;`
`&cthulhu;`

So they ~~must be destroyed~~ are not allowed

These don’t look at all like a named character reference, so it’s perfectly OK to use them

`Carton & Granneman`

`https://duckduckgo.com/?q=van+halen&df=m`

Even `&cthulhu` would be OK (though weird) because there’s not a `;` at the end

` ` — the non-breaking space

Unfortunately, before CSS, developers figured out ways to mis-use ` ` to insert multiple spaces without the monospaced fonts of `<pre>`

HTML

```html
<h3>Mailing Address</h3>
<p>
      Dr. Marinus Bicknell Willett
  <br>    10 Barnes Street
  <br>    Providence, RI 02906
</p>

<h3>Indented Paragraph</h3>

<p>
       During the winter of 1927–28 officials of the Federal government made a strange and secret investigation of certain conditions in the ancient Massachusetts seaport of Innsmouth. The public first learned of it in February, when a vast series of raids and arrests occurred, followed by the deliberate burning and dynamiting—under suitable precautions—of an enormous number of crumbling, worm-eaten, and supposedly empty houses along the abandoned waterfront.
</p>
```

CSS

JS

Mailing Address

Dr. Marinus Bicknell Willett
10 Barnes Street
Providence, RI 02906

Indented Paragraph

During the winter of 1927–28 officials of the Federal government made a strange and secret investigation of certain conditions in the ancient Massachusetts seaport of Innsmouth. The public first learned of it in February, when a vast series of raids and arrests occurred, followed by the deliberate burning and dynamiting—under suitable precautions—of an enormous number of crumbling, worm-eaten, and supposedly empty houses along the abandoned waterfront.

Do not mis-use the ` ` character entity!

It’s a terrible hack

It’s not semantic

It complicates code

It breaks CSS

Use CSS instead!

✏️ SIDE NOTE

` `	Non-breaking space
`&#20;`	Standard space
` `	Em space; height of the font, not width of M!
` `	En space; 1/2 width of em space, not width of N!
` `	Thin space; 1/5 or 1/6 of an em space

5 different spaces specified with character references

Embedded Multimedia

<svg>

<figure> & <figcaption>

<video>, <audio>, <source>, <track>

<iframe>

📦 FORMATTING GUIDE

Unless you really know what you're doing & why you're doing it, don't put `<img>` inside headings (e.g, `<h1>` & `<h2>`)

```
<h1>The Call of Cthulhu <img src="cthulhu.webp"></h1> 👎
```

```
<h1>The Call of Cthulhu</h1>
<p><img src="cthulhu.webp"></p> 👍
```

December 2018: Nvidia researchers unveil StyleGAN, an AI that creates (usually) real-looking fake human faces

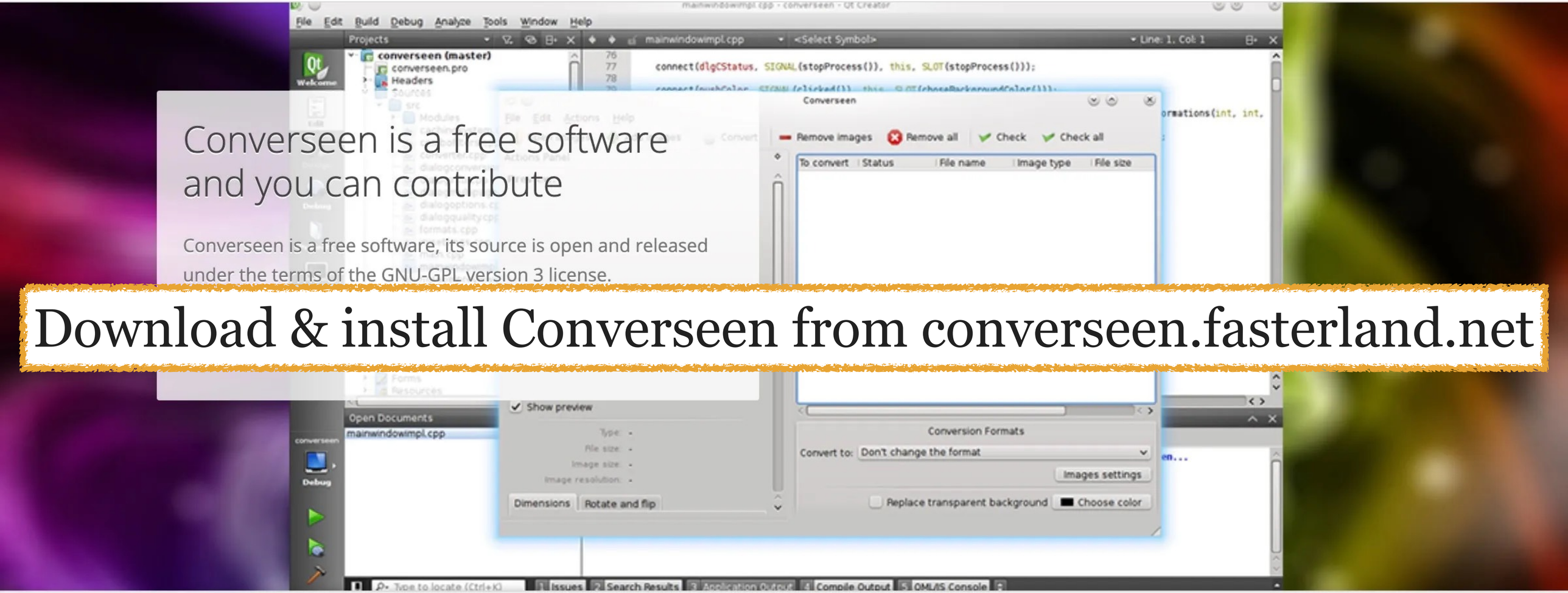
February 2019: Uber engineer Phillip Wang uses StyleGAN to create This Person Does Not Exist, which displays a new face on each webpage reload

					iOS		
decoding	–	79	63	11.1	11.3	96	96
loading	–	79	75	15.4	15.4	77	77
sizes	–	16	38	9	9	38	Y
srcset	–	16	38	9	9	34	34

Converseen

Converseen

Home Changelog Download Contact me Help

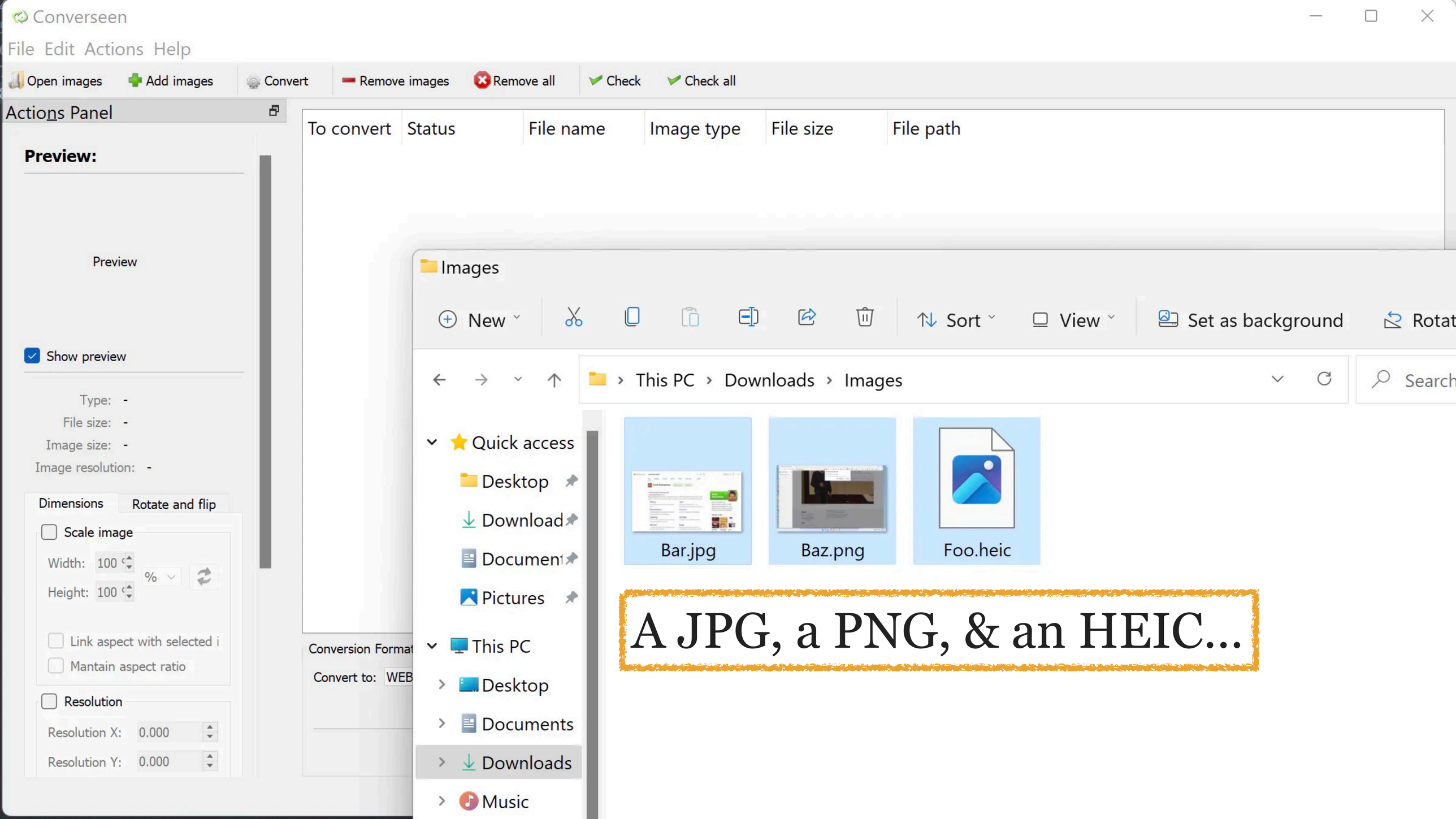


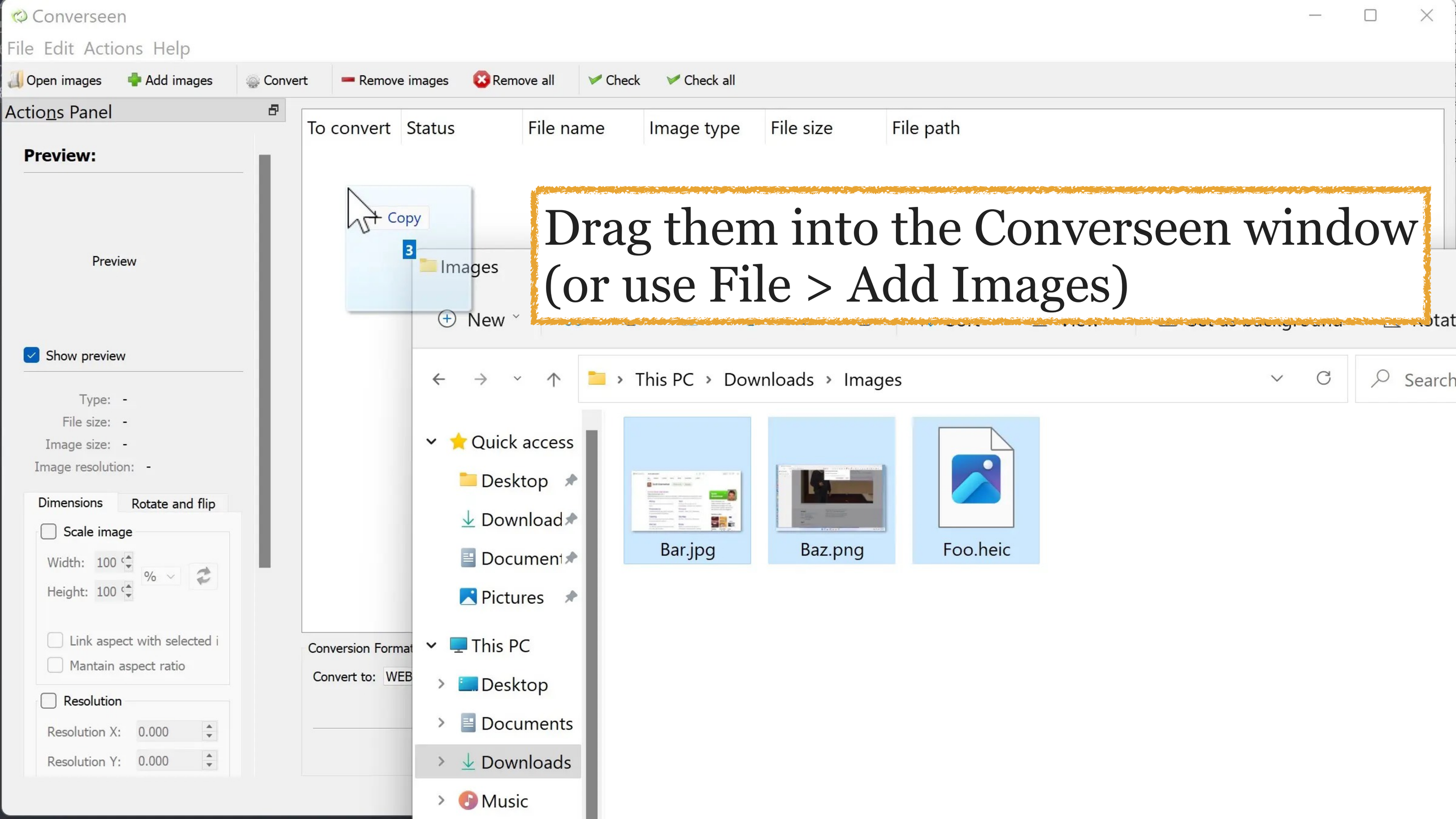
Converseen is a free software and you can contribute

Converseen is a free software, its source is open and released under the terms of the GNU-GPL version 3 license.

Download & install Converseen from converseen.fasterland.net

A Batch Image Conversion Tool for Windows & Linux


Converseen
File Edit Actions Help
Open images
Add images
Convert
Remove images
Remove all
Check
Check all
Actions Panel
Preview:
Preview
Show preview
Type: -
File size: -
Image size: -
Image resolution: -
Dimensions
Rotate and flip
Scale image
Width: 100
Height: 100
%
Link aspect with selected i
Mantain aspect ratio
Resolution
Resolution X: 0.000
Resolution Y: 0.000
To convert
Status
File name
Image type
File size
File path
Conversion Format
Convert to: WEB
Images
New
Sort
View
Set as background
Rotat
This PC › Downloads › Images
Search
Quick access
Desktop
Download
Documen
Pictures
This PC
Desktop
Documents
Downloads
Music
Bar.jpg
Baz.png
Foo.heic
A JPG, a PNG, & an HEIC...


Converseen
File Edit Actions Help
Open images
Add images
Convert
Remove images
Remove all
Check
Check all
Actions Panel
Preview:
Preview
Show preview
Type: -
File size: -
Image size: -
Image resolution: -
Dimensions
Rotate and flip
Scale image
Width: 100
Height: 100
%
Link aspect with selected i
Mantain aspect ratio
Resolution
Resolution X: 0.000
Resolution Y: 0.000
To convert
Status
File name
Image type
File size
File path
Copy
3
Images
New
Drag them into the Converseen window
(or use File > Add Images)
This PC › Downloads › Images
Search
Quick access
Desktop
Download
Document
Pictures
This PC
Desktop
Documents
Downloads
Music
Bar.jpg
Baz.png
Foo.heic
Conversion Format
Convert to: WEB

Converseen

File Edit Actions Help

Open images | Add images | Convert | Remove images | Remove all | Check | Check all

Actions Panel

Preview:

Preview

Show preview

Type: -
File size: -
Image size: -
Image resolution: -

Dimensions | Rotate and flip

Scale image

Width: 100 %
Height: 100

Link aspect with selected i
Mantain aspect ratio

Resolution

Resolution X: 0.000
Resolution Y: 0.000

To convert	Status	File name	Image type	File size	File path
		Bar.jpg	jpg	454.3 KiB	C:\Users\rsgranne\Downloads\Images
		Baz.png	png	2.4 MiB	C:\Users\rsgranne\Downloads\Images
		Foo.heic	heic	63.1 KiB	C:\Users\rsgranne\Downloads\Images

Check all items

Conversion Formats

Convert to: WEBP - (WebP Image Format)

Images settings

Replace transparent background | Choose color

Converseen

File Edit Actions Help

Open images | Add images | Convert | Remove images | Remove all | Check | Check all

Actions Panel

Preview:

Preview

Show preview

Type: -
File size: -
Image size: -
Image resolution: -

Dimensions | Rotate and flip

Scale image

Width: 100 %
Height: 100

Link aspect with selected i
Mantain aspect ratio

Resolution

Resolution X: 0.000
Resolution Y: 0.000

To convert	Status	File name	Image type	File size	File path
☑		Bar.jpg	jpg	454.3 KiB	C:\Users\rsgranne\Downloads\Images
☑		Baz.png	png	2.4 MiB	C:\Users\rsgranne\Downloads\Images
☑		Foo.heic	heic	63.1 KiB	C:\Users\rsgranne\Downloads\Images

Select WebP (or whatever other format you want)

Conversion Formats

Convert to: WEBP - (WebP Image Format)

WBMP - (Wireless Bitmap (level 0) image)
WEBM - (Open Web Media)
WEBP - (WebP Image Format)
WMV - (Windows Media Video)
XBM - (X Windows system bitmap (black and white))
XPM - (X Windows system pixmap (color))
XV - (Khoros Visualization image)
YCbCr - (Raw Y, Cb, and Cr samples)
YCbCrA - (Raw Y, Cb, Cr, and alpha samples)

Converseen

File Edit Actions Help

Open images | Add images | Convert | Remove images | Remove all | Check | Check all

Start the conversion process

Actions Panel

Preview:

Preview

Show preview

Type: -
File size: -
Image size: -
Image resolution: -

Dimensions | Rotate and flip

Scale image

Width: 100 %
Height: 100

Link aspect with selected i
Mantain aspect ratio

Resolution

Resolution X: 0.000
Resolution Y: 0.000

To convert	Status	File name	Image type	File size	File path
☑		Bar.jpg	jpg	454.3 KiB	C:\Users\rsgranne\Downloads\Images
☑		Baz.png	png	2.4 MiB	C:\Users\rsgranne\Downloads\Images
☑		Foo.heic	heic	63.1 KiB	C:\Users\rsgranne\Downloads\Images

Conversion Formats

Convert to: WEBP - (WebP Image Format)

Images settings

Replace transparent background | Choose color

Converseen

File Edit Actions Help

Open images | Add images | Convert | Remove images | Remove all | Check | Check all

Actions Panel

Preview:

Preview

Show preview

Type: -
File size: -
Image size: -
Image resolution: -

Dimensions | Rotate and flip

Scale image

Width: 100 %
Height: 100

Link aspect with selected i
Mantain aspect ratio

Resolution

Resolution X: 0.000
Resolution Y: 0.000

To convert	Status	File name	Image type	File size	File path
☑	Converted	Bar.jpg	jpg	454.3 KiB	C:\Users\rsgranne\Downloads\Images
☑	Converted	Baz.png	png	2.4 MiB	C:\Users\rsgranne\Downloads\Images
☑		Foo.heic	heic	63.1 KiB	C:\Users\rsgranne\Downloads\Images

Status...

Conversion Status

Image:	Status:
Bar.jpg	Converted
Baz.png	Converted

Total: 2
Converted: 2
Errors: 0

66%

Open destination | Stop | Close

Conversion in progress...

Conversion Formats

Convert to: WEBP - (WebP Image Format)

Images settings

Replace transparent background | Choose color

Foo.heic

Converseen

File Edit Actions Help

Open images | Add images | Convert | Remove images | Remove all | Check | Check all

Actions Panel

Preview:

Preview

Show preview

Type: -
File size: -
Image size: -
Image resolution: -

Dimensions | Rotate and flip

Scale image
Width: 100 %
Height: 100
Link aspect with selected i
Mantain aspect ratio

Resolution
Resolution X: 0.000
Resolution Y: 0.000

To convert	Status	File name	Image type	File size	File path
☑	Converted	Bar.jpg	jpg	454.3 KiB	C:\Users\rsgranne\Downloads\Images
☑	Converted	Baz.png	png	2.4 MiB	C:\Users\rsgranne\Downloads\Images
☑	Converted	Foo.heic	heic	63.1 KiB	C:\Users\rsgranne\Downloads\Images

Conversion Format
Convert to: WEB

Images

New | Sort | View

This PC › Downloads › Images

Search

Quick access
Desktop
Download
Document
Pictures
This PC
Desktop
Documents
Downloads
Music

Bar.jpg | Bar.webp | Baz.png | Baz.webp | Foo.heic | Foo.webp

Done!

`<audio> … </audio>`

Allows the browser to *play audio* without Flash or other plugins

Attributes

- `src="[URL]"`: if multiple, use `<source>` instead
- `controls`: Show play, stop, & other controls
- `autoplay`: No!
- `muted`: Not normally a good idea (default is `false`)
- `loop`: Repeat audio—only use if necessary!
- `preload="auto"`: Audio downloaded in background (Yes!)

On mobile browsers, the following `<audio>` attributes are not supported:

- `autoplay`
- `muted`
- `preload="auto"`

HTML

```html
<audio controls preload="auto" autobuffer
src="http://files.granneman.com/interviews/
2004-0630-Future-Tense.mp3">
</audio>
```

CSS

JS

0:00 -3:52

Sound on websites should really only used in 3 cases

- *Feedback* response to user actions for confirmation; keep it simple (e.g., a click or a beep) & instantaneous (use `preload` if possible)
- *User request*, like clicking on a song or video
- *Background noise* in an immersive application, e.g., a game or multimedia website

Don’t forget you can also use `<source>` & `<track>`

HTML

```html
<audio controls preload="auto" autobuffer>
  <source
  src="http://files.granneman.com/interviews/
  2004-0630-Future-Tense.mp3">
  <source
  src="http://files.granneman.com/interviews/
  2004-0630-Future-Tense.ogg">
</audio>
```

CSS

JS

Audio codec support test

PCM WAV (audio/wav;codecs=1)

HTML5 audio support: probably

Does it really play with HTML5 audio? Try below:

0:01 0:01

Web Audio API decodeAudioData() support: Yes, decoded to 51145 sample

Media Source Extensions support: no

FLAC (audio/flac)

HTML5 audio support: maybe

Does it really play with HTML5 audio? Try below:

0:01 0:01

Web Audio API decodeAudioData() support: Yes, decoded to 51145 sample

Media Source Extensions support: no

MPEG-4 AAC (audio/mp4;codecs=mp4a.40.5)

Test your browser's support for:
WAV
FLAC
AAC
Vorbis for Ogg & WebM
Opus for Ogg & WebM

Every browser supports MP3

					iOS		
Ogg	–	17	3.5	–	–	4	2.3
MP3	9	12	22	4	4	4	2.3
AAC	9	12	22*	4	4	12	3
WebM	–	79	28	12.1† 14.1‡	12.2† 15	25	2.3
WAV	–	12	3.5	4	3.2	8	3.2

* Only in MP4 container & only if OS has codecs installed † Only in WebRTC
‡ Safari on macOS 11.3 & up

Permute • $15

software.charliemonroe.net/permute/

Adapter • $0

www.macroplant.com/adapter/

Adapter • $0

www.macroplant.com/adapter/

Audio conversion software

`<iframe>` … `</iframe>`

Internal frame: embeds another webpage inside the current webpage

`src` attribute is required

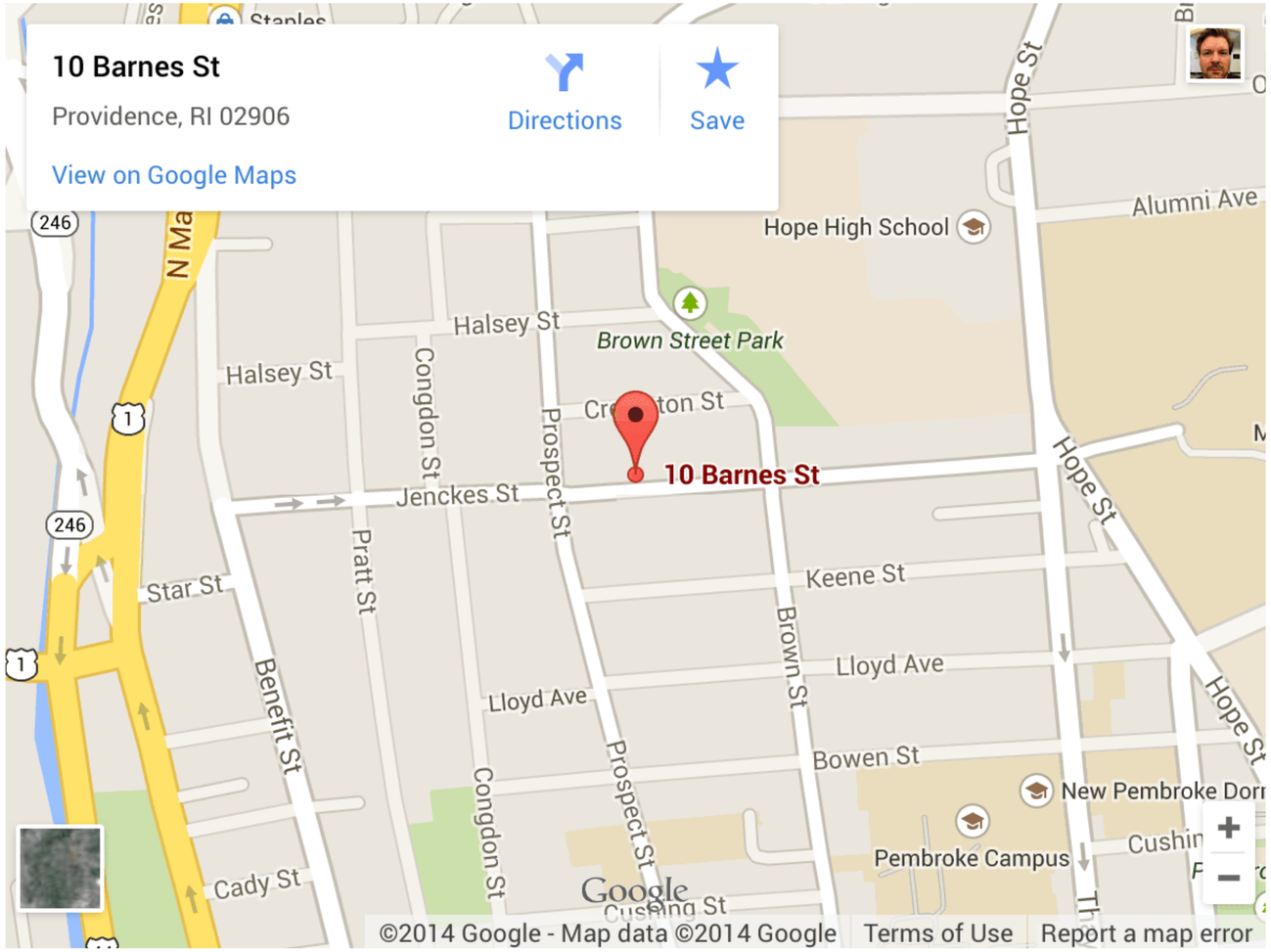
2 attributes should instead be handled using CSS: `width` (default is `300px`) & `height` (default is `150px`)

HTML

```
<iframe
src="https://www.google.com/maps/embed?
pb=!1m17!1m11!1m3!1d2972.7925037011373!2d
-
71.405474!3d41.832766000000014!2m2!1f0!2f
0!3m2!1i1024!2i768!4f13.1!3m3!1m2!1s0x89e
4452202b2d2ed%3A0x85a79d56cdc815c2!2s10+B
arnes+St!5e0!3m2!1sen!2sus!4v139887481779
4" width="600" height="450"
frameborder="0" style="border:0">
</iframe>
```

CSS

JS



A good thing: the embedded webpage in an `<iframe>` can be updated without reloading the container page

A caveat: the container webpage's CSS & JavaScript cannot affect the embedded webpage in an `<iframe>` (but this is good!)

`<iframe>` security is a big deal, so several attributes focus on that

- `allow`: Specifies a feature policy
- `sandbox`: Applies extra restrictions to the content in the frame
- `csp`: A Content Security Policy enforced for the embedded resource
- `referrerpolicy`: Indicates which referrer to send when fetching the frame's resource

`srcdoc`

Instead of a link to a document, *specifies inline HTML* to show

Overrides `src` attribute — if the browser doesn't support `srcdoc`, it falls back to the URL in `src`

Must encode any quotation marks inside `srcdoc`'s value using `"` (see *Character Entities* later)

HTML

```
<iframe src="https://www.google.com/maps/embed?
pb=!1m17!1m11!1m3!1d2972.7925037011373!2d-
71.405474!3d41.832766000000014!2m2!1f0!2f0!3m2!1i1024!2i768
!4f13.1!3m3!1m2!1s0x89e4452202b2d2ed%3A0x85a79d56cdc815c2!2
s10+Barnes+St!5e0!3m2!1sen!2sus!4v1398874817794"
width="600" height="450" frameborder="0" style="border:0"
srcdoc="<p><a href=&quot;https://maps.apple.com/?
address=10%20Barnes%20St,%20Providence,%20RI%20%2002906,%20
United%20States%26ll=41.832954,-71.405405%26q=10%20Barnes%2
0St%26_ext=EiYpWx/WDAvqREAxWhpL6lTaUcA52fT7aDHrREBBljj6YY/Z
UcBQBA%3D%3D%26t=m&quot;>Open in your device's Maps app</a>
</p>"</iframe>
```

CSS

JS

Open in your device's Maps app

					iOS		
srcdoc	–	79	25	6	6	20	25

✏️ SIDE NOTE

There is a much older feature called Frames which uses `<frameset>` & `<frame>`

MDN: “Avoid using it, and update existing code if possible; see the compatibility table at the bottom of this page to guide your decision. Be aware that this feature may cease to work at any time.”

Don’t use those elements!

And besides, Frames sucked anyway

Links

<a>

<nav>

<menu>

Before continuing, let’s go over *The Anatomy of a Web Address*

Easily our most-viewed & most-loved pen on CodePen!

The Anatomy of a Web Address

URL

`http://foo:bar@www.websanity.com:80/calendar/index.php?month=10&week=3#thurs`

Scheme

This is commonly referred to as the *protocol*.

`http://foo:bar@www.websanity.com:80/calendar/index.php?month=10&week=3#thurs`

Authority

http://foo:bar@www.websanity.com:80/calendar/index.php?month=10&week=3#thurs

User Information

http://foo:bar@www.websanity.com:80/calendar/index.php?month=10&week=3#thurs

User Name

http://foo:bar@www.websanity.com:80/calendar/index.php?month=10&week=3#thurs

Password

http://foo:bar@www.websanity.com:80/calendar/index.php?month=10&week=3#thurs

Host

http://foo:bar@www.websanity.com:80/calendar/index.php?month=10&week=3#thurs

Top-Level Domain

http://foo:bar@www.example.com:80/calendar/index.php?month=10&week=3#thurs

Second-Level Domain

http://foo:bar@www.example.com:80/calendar/index.php?month=10&week=3#thurs

Third-Level Domain

This is commonly referred to as the *subdomain*. Technically each level of the domain name is a subdomain.

http://foo:bar@www.websanity.com:80/calendar/index.php?month=10&week=3#thurs

Registered Domain Name

http://foo:bar@www.websanity.com:80/calendar/index.php?month=10&week=3#thurs

Port

http://foo:bar@www.websanity.com:80/calendar/index.php?month=10&week=3#thurs

Path

http://foo:bar@www.websanity.com:80/calendar/index.php?month=10&week=3#thurs

Path Segment

http://foo:bar@www.websanity.com:80/calendar/index.php?month=10&week=3#thurs

Path Segment

http://foo:bar@www.websanity.com:80/calendar/index.php?month=10&week=3#thurs

Query

http://foo:bar@www.websanity.com:80/calendar/index.php?month=10&week=3#thurs

Key-Value Pair

http://foo:bar@www.websanity.com:80/calendar/index.php?month=10&week=3#thurs

Key

http://foo:bar@www.websanity.com:80/calendar/index.php?month=10&week=3#thurs

Value

http://foo:bar@www.websanity.com:80/calendar/index.php?month=10&week=3#thurs

Fragment Identifier

http://foo:bar@www.websanity.com:80/calendar/index.php?month=10&week=3#thurs

from [RFC 3686 — *Uniform Resource Identifier (URI): Generic Syntax*]

<a>

`href` attribute must link to 1 of these:

» a URL; e.g., `https://cthulhu.com/hpl.html` or `/hpl.html`
» a path; e.g., `hastur.html` or `dagon/` or `dagon/hastur.html` or `../dagon/hastur.html`
» a query; e.g., `?monster=shoggoth`
» a fragment identifier; e.g., `#cthulhu`
» a combination of any of the above

Document-Relative URLs

To understand *document-relative URLs*, you need to understand the basics of how *paths* work

Computer paths specify where a file or folder is located

⊞: `C:\Users\scott\Pictures\yog-sothoth.jpg`

: `/Users/scott/Pictures/yog-sothoth.jpg`

Web servers use a specified folder as the *root folder* of a website

Everything in the root folder *is* the website

On Linux, website root folders go inside `/var/www`

All the files & assets for my website go inside `www.granneman.com`

All the files & assets for Finn's website go inside `www.finn.com`

And so on

```
www
  ↳
www.granneman.com
  ↳ www.finn.com
  ↳ www.cthulhu.com
```

When the web server is serving files from `www.cthulhu.com`, it acts as though `www.cthulhu.com` is the only folder on the server

Every internal link is based on the fact that everything exists *solely inside* `www.cthulhu.com`

Start with standard folders & a default page

The 4 folders & the file are all *siblings*, in the same folder

The 4 folders & the file are also *children* of the `www.granneman.com` folder

- `www.granneman.com`
  - `css`
  - `fonts`
  - `images`
  - `index.html`
  - `js`

Add a `privacy.html` page

`index.html` & `privacy.html` are now siblings

`index.html` needs to link to `privacy.html`

Since they're in the same folder, linking is easy:

```
<a href="privacy.html">
```

This is true for sibling files in any folder

Add another folder with files in it: `web-dev/browsers`

`index.html` needs to link to its other 3 sibling webpages

```
<a href="chrome.html">
<a href="firefox.html">
<a href="safari.html">
```

```
www.granneman.com
↳ css
↳ ...
↳ index.html
↳ js
↳ privacy.html
↳ web-dev
  ↳ browsers
    ↳ chrome.html
    ↳ firefox.html
    ↳ index.html
    ↳ safari.html
```

Add more files & folders

Create a link on `web-dev/index.html` pointing to `sublime.html`:

```
<a href="editors/sublime.html">
```

`web-dev/index.html` is a sibling of `editors`, so go into it & find `sublime.html`

- 🗁 www.granneman.com
  - ↳ ...
  - ↳ 🗁 web-dev
    - ↳ 🗁 browsers
      - ↳ 🗎 chrome.html
      - ↳ 🗎 firefox.html
      - ↳ 🗎 index.html
      - ↳ 🗎 safari.html
    - ↳ 🗁 editors
      - ↳ 🗎 index.html
      - ↳ 🗎 sublime.html
      - ↳ 🗎 v-s-code.html
    - ↳ 🗎 index.html

💡 PRO TIP

Remember root-relative URLs that start with `/`?

You could do that here too:

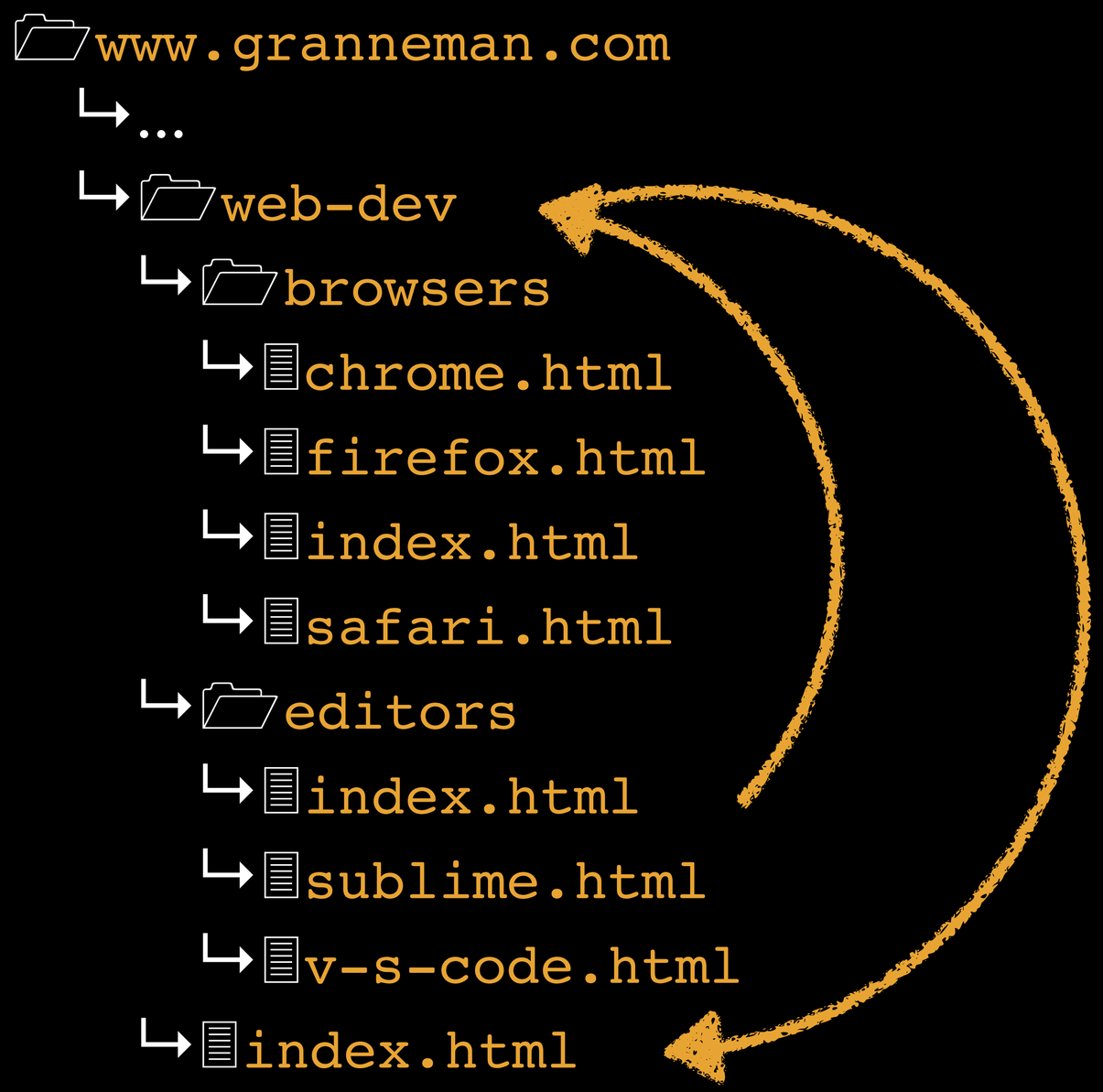
```
<a href="/web-dev/editors/sublime.html">
```

Start at `/`, go down into `web-dev`, then into `editors`, & then find `sublime.html`

What if I want to link from `editors/index.html` to `web-dev/index.html`?

```
<a href="../index.
html">
```

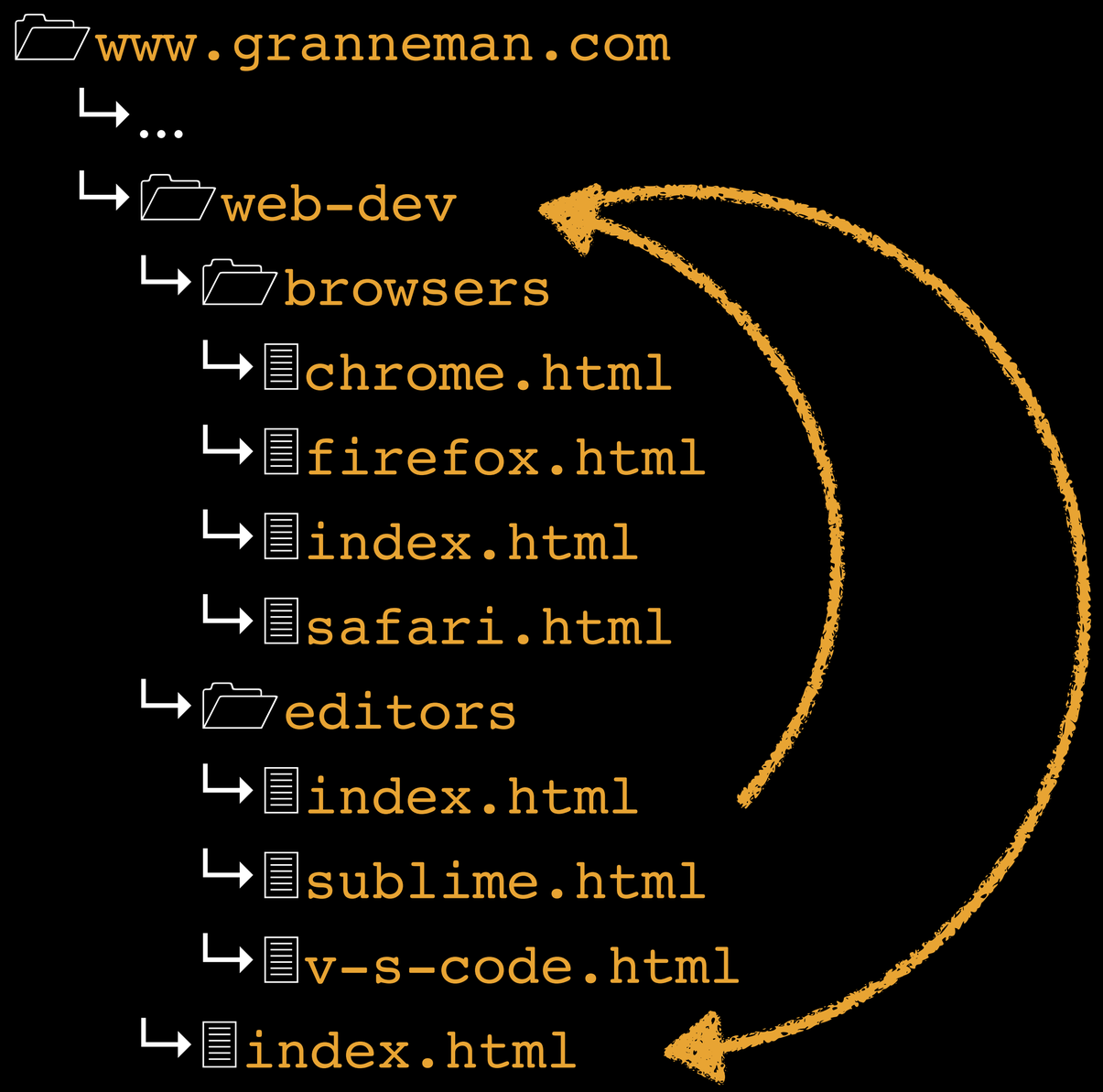
`..` means go *up* one directory, so go up from `editors` into `web-dev` & find `index.html`



`index.html` is a default page, however, so actually we could do this:

```
<a href="../">
```

`..` means go up from `editors` into `web-dev` & find the default page, which is `index.html`



Or we could use a root-relative URL along with the default page!

```
<a href="/web-dev/">
```

Start at `/`, go down into `web-dev`, & then find the default page, which is `index.html`

Add some sections that'll be on my website

```
www.granneman.com
↳ css
↳ fonts
↳ images
↳ index.html
↳ js
↳ presentations
↳ teaching
↳ web-dev
↳ writing
```

I need to link `index.html` to `main.css`

`index.html` & the `css` folder are siblings

`main.css` is the child of `css`

```
<a href="css/main.css">
```

To link to `main.css`, `index.html` has go into `css`, & then select `main.css`

💡 PRO TIP

Remember root-relative URLs that start with `/`?

You could do that here too:

```
<a href="/css/main.css">
```

👍★

Start at `/`, go down into `css`, & then find `main.css`

(Actually, this is what I always do when linking to CSS)

Fragments

Page fragments & fragment identifiers

Name preceded by `#`, specifying an internal location in a webpage that is targeted using the `id` attribute

Can be pointed to on the same page, from other pages on the same site, or from other sites

```
<h1>The Call of Cthulhu</h1>

<p id="toc">Table of Contents</p>
<ul>
  <li><a href="#horror-clay">I. The Horror in Clay</
a></li>
  <li>II. The Tale of Inspector Legrasse</li>
  <li>III. The Madness from the Sea</li>
</ul>

<h2 id="horror-clay">I. The Horror in Clay <a
href="#toc"><small>ToC</small></a></h2>
```

URL is `https://hpl.com/CoC.html`

```
<h1>The Call of Cthulhu</h1>

<p id="toc">Table of Contents</p>
<ul>
  <li><a href="#horror-clay">I. The Horror in Clay</
a></li>
  <li>II. The Tale of Inspector Legrasse</li>
  <li>III. The Madness from the Sea</li>
</ul>

<h2 id="horror-clay">I. The Horror in Clay <a
href="#toc"><small>ToC</small></a></h2>
```

URL will now be `https://hpl.com/CoC.html#horror-clay`

```
<h1>The Call of Cthulhu</h1>

<p id="toc">Table of Contents</p>
<ul>
  <li><a href="#horror-clay">I. The Horror in Clay</
a></li>
  <li>II. The Tale of Inspector Legrasse</li>
  <li>III. The Madness from the Sea</li>
</ul>

<h2 id="horror-clay">I. The Horror in Clay <a
href="#toc"><small>ToC</small></a></h2>
```

URL will now be `https://hpl/CoC.html#toc`

HTML

```html
<h3 id="toc">Table of Contents</h3>
<ul>
  <li><a href="#the-tomb">The Tomb</a></li>
  <li><a href="#dagon">Dagon</a></li>
  <li><a href="#beyond-the-walls">Beyond the Walls of Sleep</a></li>
</ul>

<hr>

<h3 id="the-tomb">The Tomb <a href="#toc">[TOC]</a></h3>
<p>In relating the circumstances which have led to my confinement…</p>

<h3 id="dagon">Dagon <a href="#toc">[TOC]</a></h3>
<p>I am writing this under an appreciable mental strain…</p>

<h3 id="beyond-the-walls">Beyond the Walls of Sleep <a href="#toc">[TOC]</a></h3>
<p>I have frequently wondered if the majority of mankind…</p>
```

CSS

JS

Table of Contents

- The Tomb
- Dagon
- Beyond the Walls of Sleep

The Tomb [TOC]

In relating the circumstances which have led to my confinement…

Dagon [TOC]

I am writing this under an appreciable mental strain…

Beyond the Walls of Sleep [TOC]

I have frequently wondered if the majority of mankind…

Lots more info about this in *CSS Overview Condensed*

Content Categories

It’s easy to hyperlink a few words in a paragraph:

```
<p>
  Lovecraft wrote <a href="https://
en.wikipedia.org/wiki/Dagon_(short_story)">
Dagon</a> in 1917.
</p>
```

But what if you wanted to hyperlink the entire paragraph?

```
<a>
  <p>
    Yog-Sothoth
  </p>
</a>
```

```
<p>
  <a>
    Yog-Sothoth
  </a>
</p>
```

HTML 4.01 categorized virtually all elements into 1 or 2 categories — *block-level* or *inline* — & the big rule was that block-level element could *not* go inside inline elements

```
<a>
  <p>
    Yog-Sothoth
  </p>
</a>
```

```
<p>
  <a>
    Yog-Sothoth
  </a>
</p>
```

HTML 4.01 categorized virtually all elements into 1 or 2 categories — *block-level* or *inline* — & the big rule was that block-level element could *not* go inside inline elements

HTML5 supersedes that simple categorization with a (much) more detailed set of *content categories* that determine what elements can correctly go inside other elements

```
<a>
  <p>
    Yog-Sothoth
  </p>
</a>
```

```
<p>
  <a>
    Yog-Sothoth
  </a>
</p>
```

Thanks to HTML5 you *can* put `<a>` around `<p>` (if you want the entire paragraph to be a link) — actually, you can put `<a>` around a lot of elements!

Content categories apply to *all* elements

For example, your code will not validate if you…

- » Put `<p>` inside `<i>`
- » Put `<header>` inside `<footer>`
- » Put `<figcaption>` anywhere *except* inside `<figure>`
- » Put `<li>` anywhere *except* inside `<ul>`, `<ol>`, or `<menu>`
- » Put `<h2>`, `<article>`, or `<header>` inside `<address>`

There are *many* other examples in which certain elements are not allowed inside other elements

Why?

Once again, because of HTML's *content categories*

4.3.10 The `address` element

WHATWG

Categories:

Flow content.

Palpable content.

Content categories

Parents:

Contexts in which this element can be used:

Where flow content s expected.

Children:

Content model:

Flow content but with no heading content descendants, no sectioning content descendants, and no `header`, `footer`, or `address` element descendants.

Tag omission in text/html:

Neither tag is omissible.

Content attributes:

Global attributes

DOM interface:

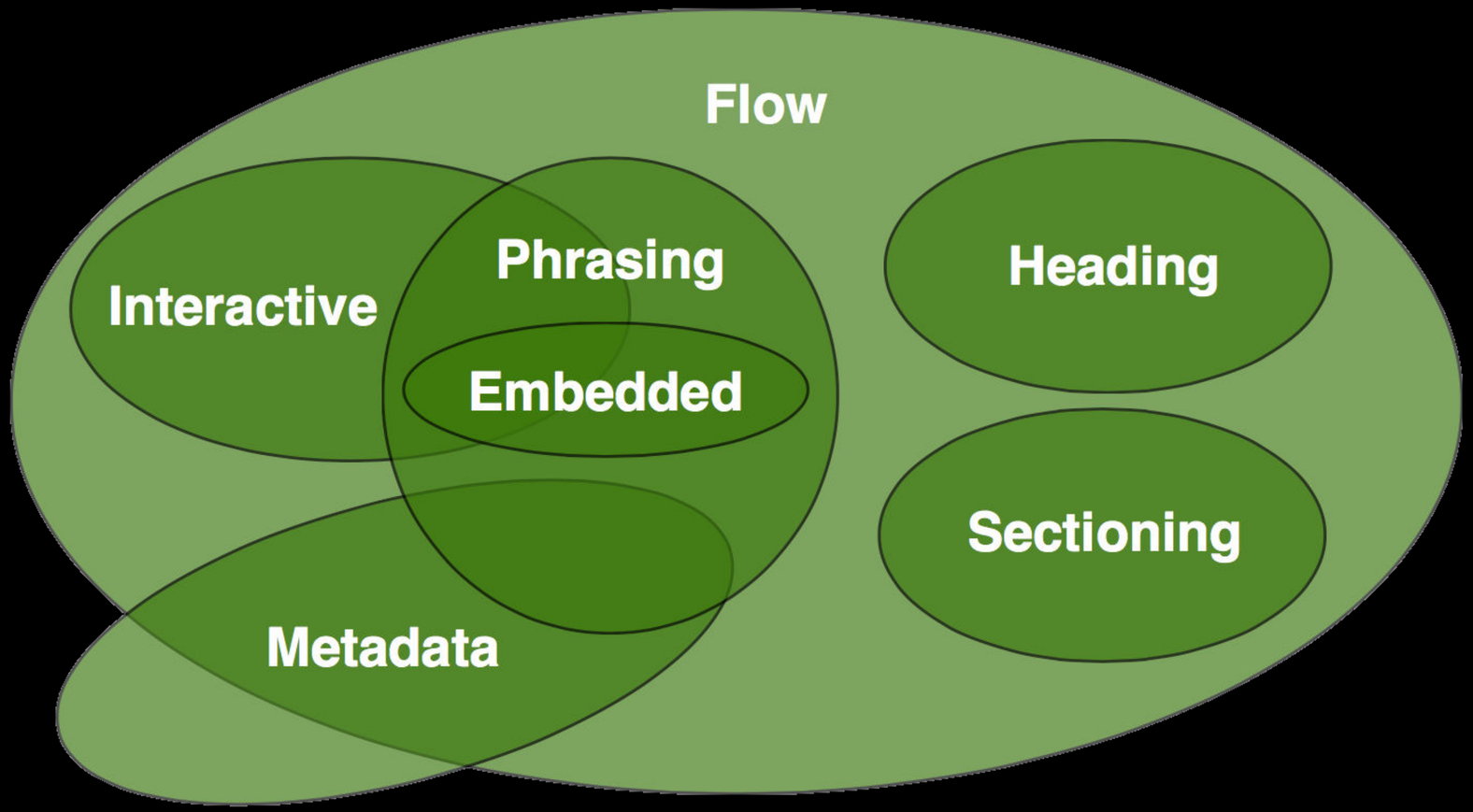
Uses `HTMLElement`.

The `address` element represents the contact information for its nearest `article` or `body`

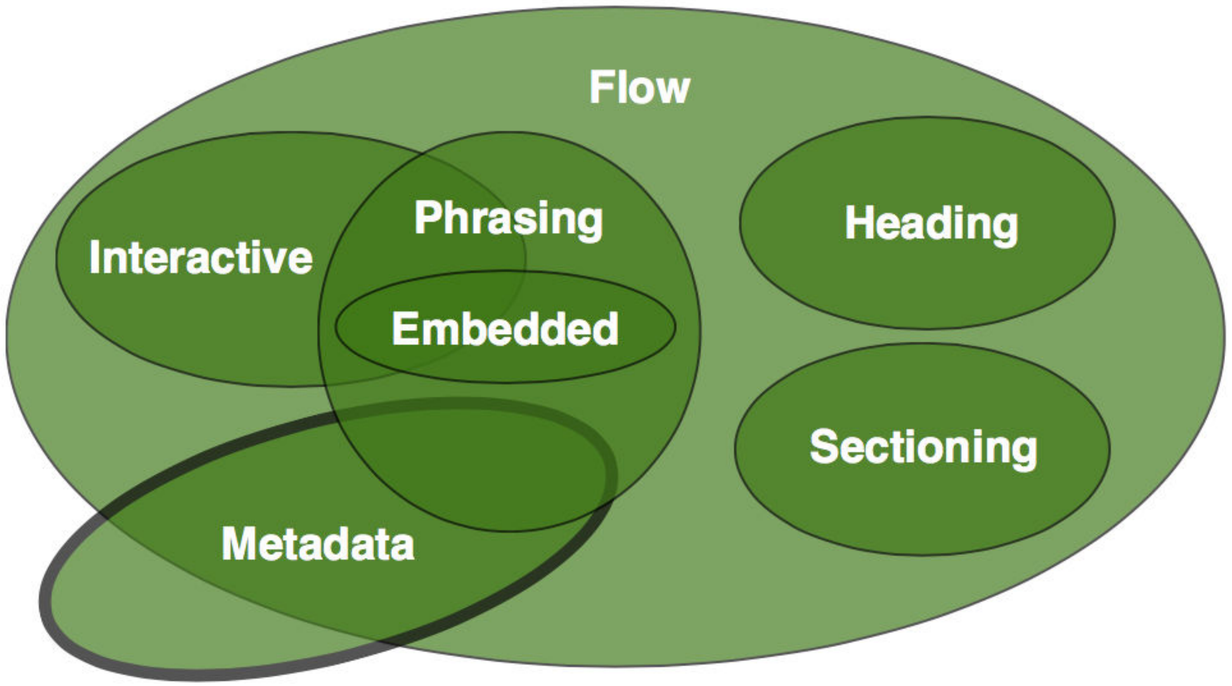
MDN

Content categories:	Flow content, palpable content.
Permitted content:	Flow content, but with no nested `<address>` element, no heading content (`<hgroup>`, `<h1>`, `<h2>`, `<h3>`, `<h4>`, `<h5>`, `<h6>`), no sectioning content (`<article>`, `<aside>`, `<section>`, `<nav>`), and no `<header>` or `<footer>` element.
Tag omission:	None, both the starting and ending tag are mandatory.
Permitted parent elements:	Any element that accepts flow content.
DOM interface:	`HTMLElement` Prior to Gecko 2.0 (Firefox 4), Gecko implemented this element using the `HTMLSpanElement` interface

Content categories

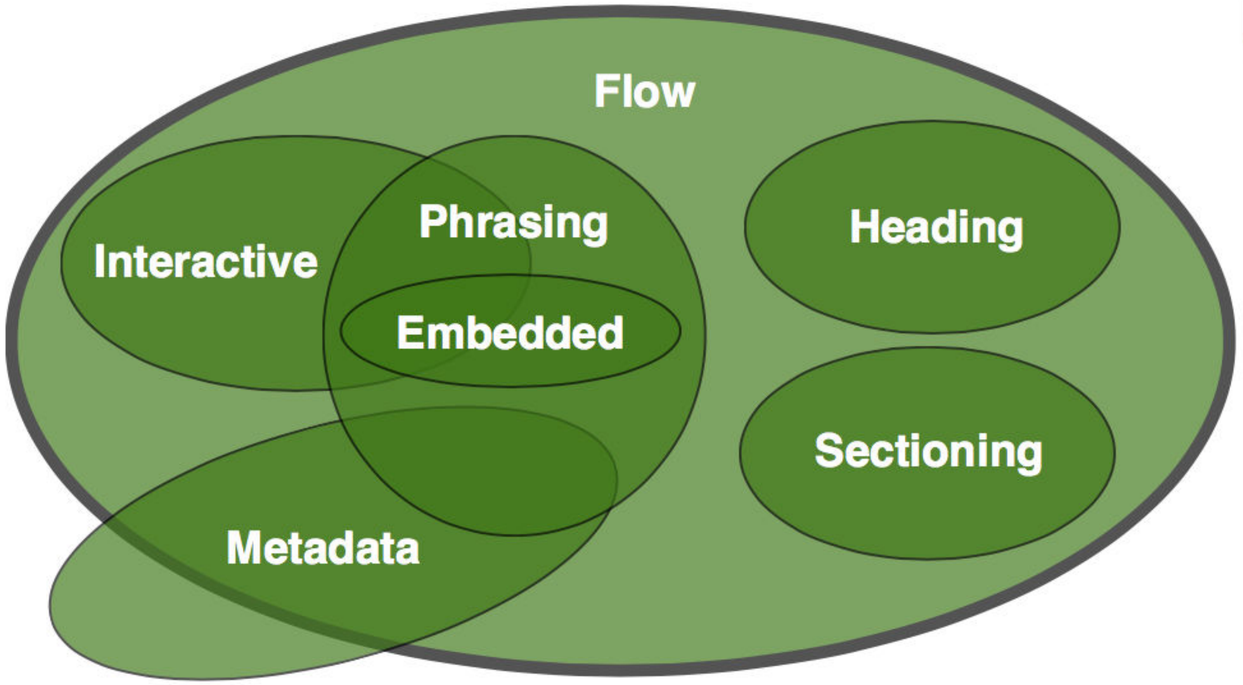


Every HTML element falls into zero or more content categories



Metadata content

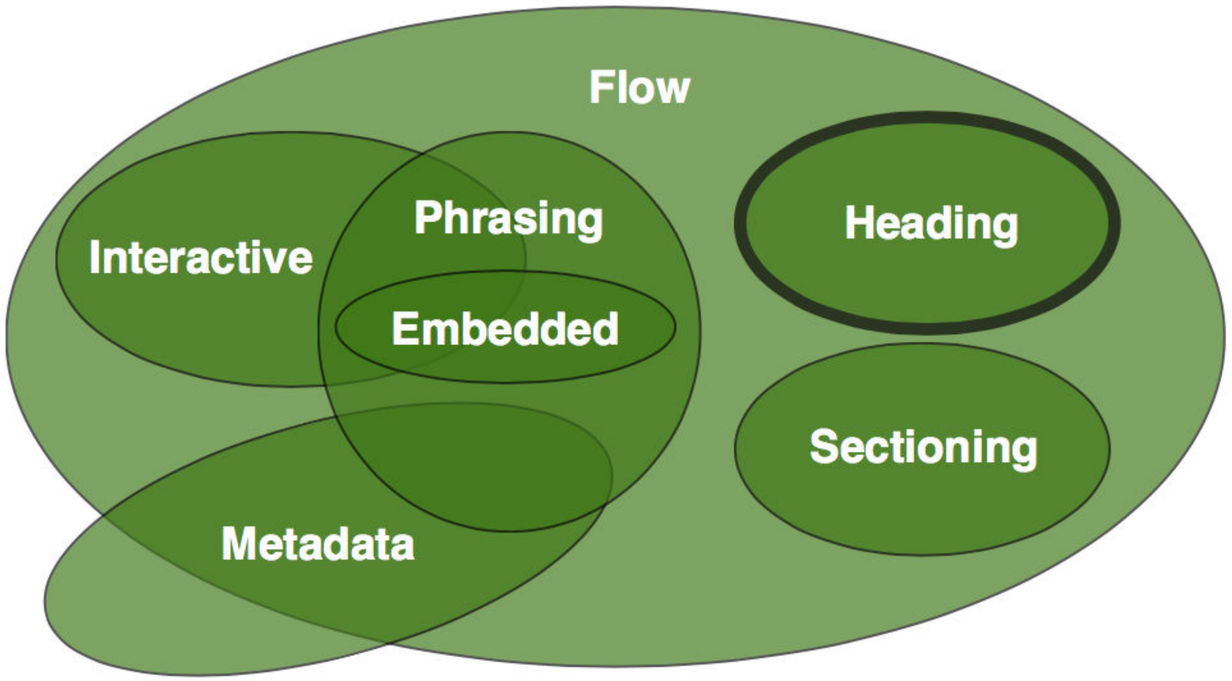
`base`, `link`, `meta`, `noscript`, `script`, `style`, `template`, `title`



Flow content

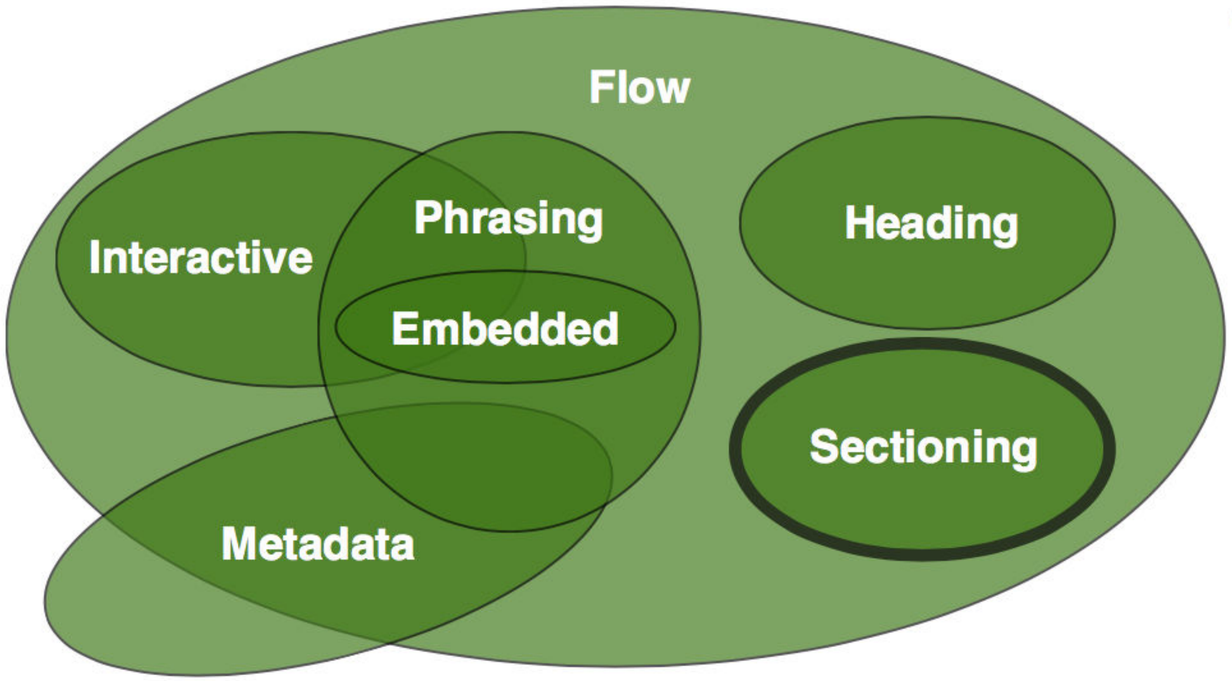
a, abbr, address, area*, article, aside, audio, b, bdi, bdo, blockquote, br, button, canvas, cite, code, data, date, datalist, del, details, dfn, dialog, div, dl, em, embed, fieldset, figure, footer, form, h1, h2, h3, h4, h5, h6, header, hgroup, hr, i, iframe, img, input, ins, kbd, keygen, label, link*, main, map, mark, math, menu, meta*, meter, nav, noscript, object, ol, output, p, pre, progress, q, ruby, s, samp, script, section, select, small, span, strong, style*, sub, sup, svg, table, template, textarea, time, u, ul, var, video, wbr, *Text**

** Under certain circumstances (see prose).*



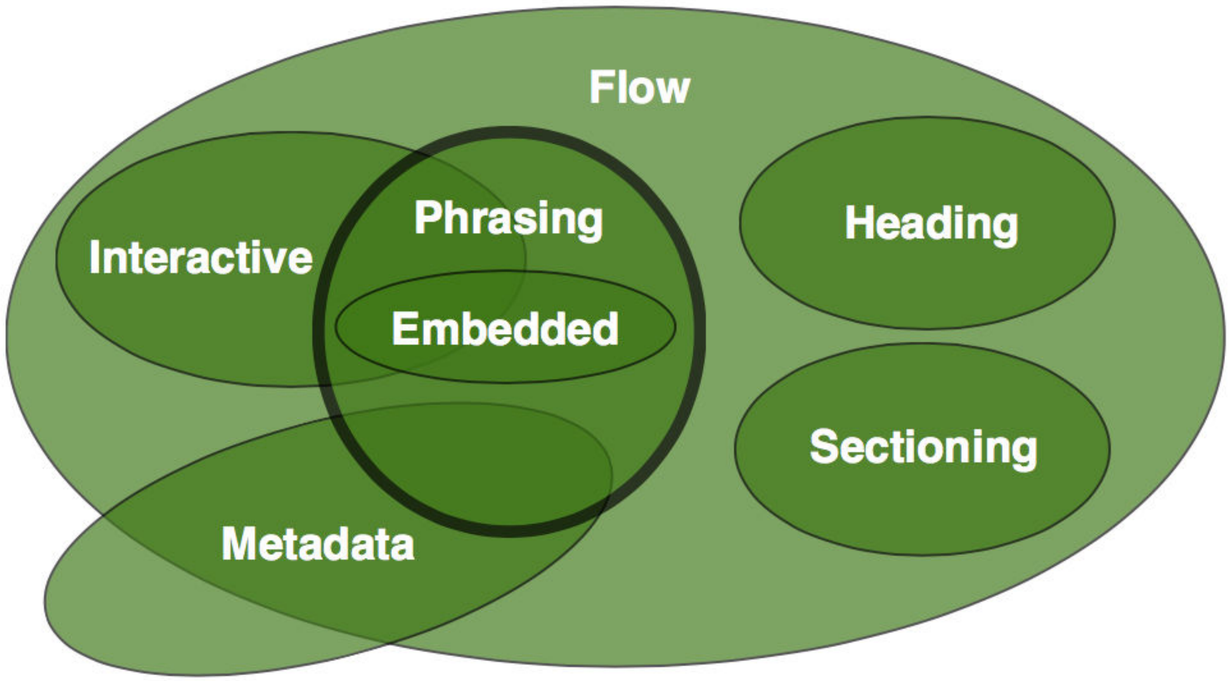
Heading content

`h1`, `h2`, `h3`, `h4`, `h5`, `h6`, `hgroup`



Sectioning content

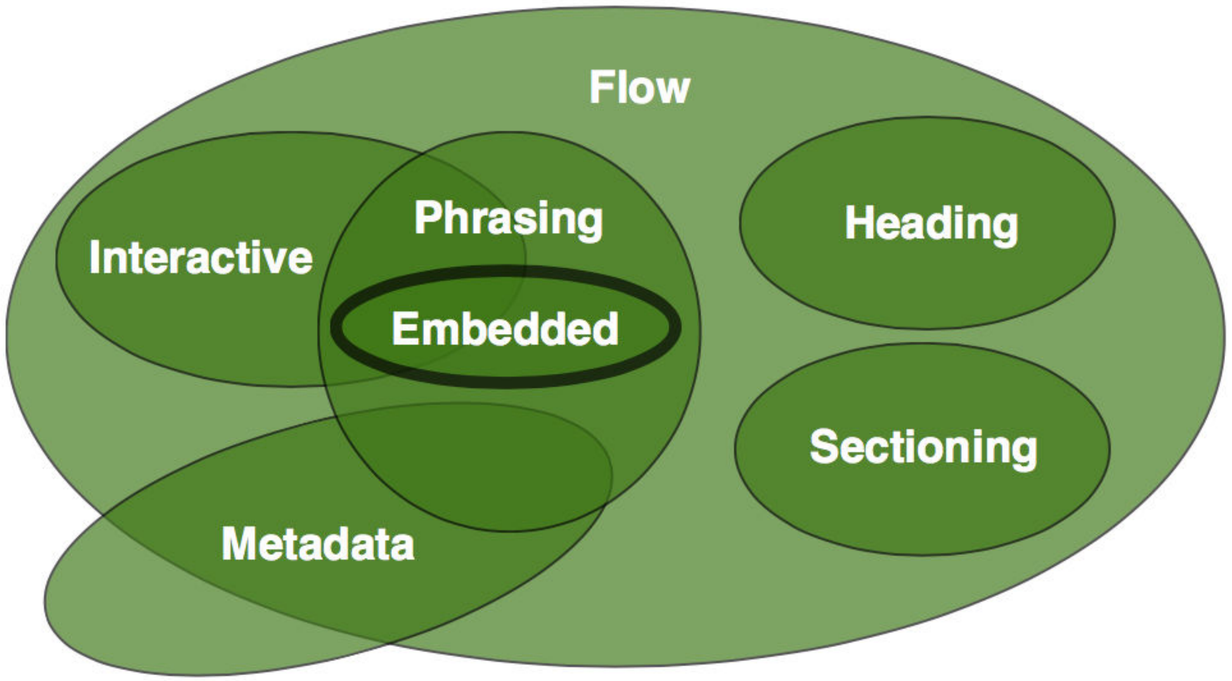
`article`, `aside`, `nav`, `section`



Phrasing content

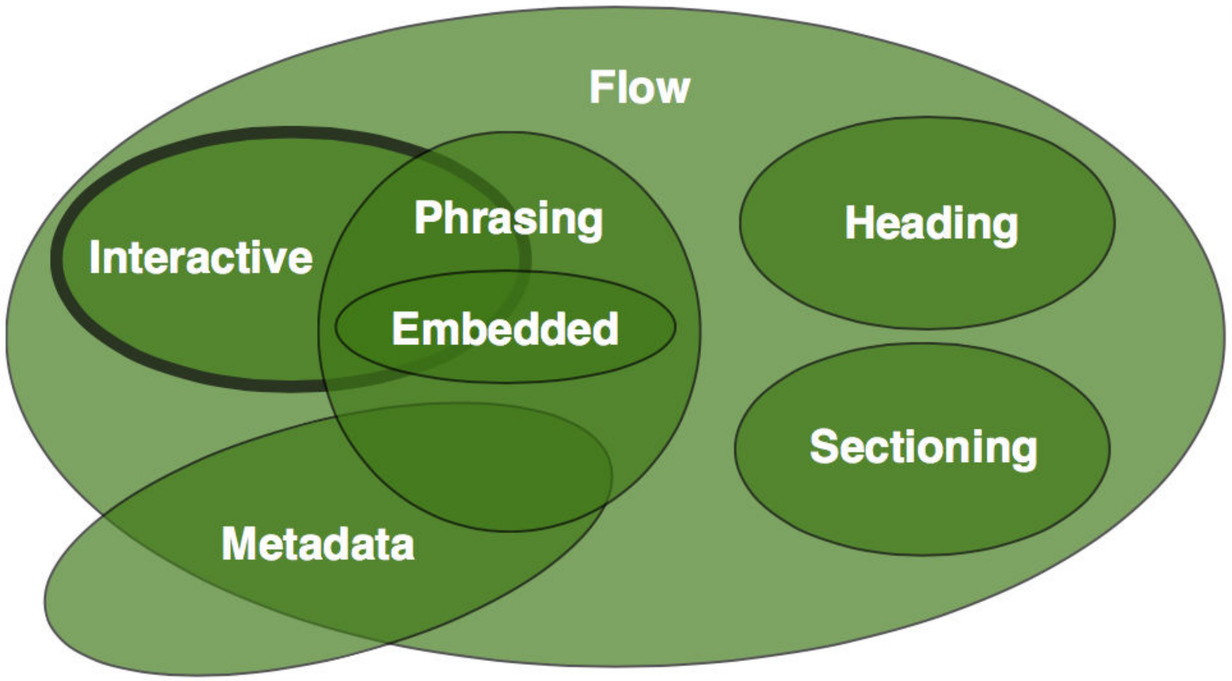
a*, abbr, area*, audio, b, bdi, bdo, br, button, canvas, cite, code, data, date, datalist, del*, dfn, em, embed, i, iframe, img, input, ins*, kbd, keygen, label, link*, map*, mark, math, meta*, meter, noscript, object, output, progress, q, ruby, s, samp, script, select, small, span, strong, sub, sup, svg, template, textarea, time, u, var, video, wbr, *Text**

** Under certain circumstances; see prose.*



Embedded content

`audio`, `canvas`, `embed`, `iframe`, `img`, `math`, `object`, `svg`, `video`



Interactive content

`a`, `audio`*, `button`, `details`, `embed`, `iframe`, `img`*, `input`*, `keygen`, `label`, `object`*, `select`, `textarea`, `video`*

** Under certain circumstances.*

`<menu>` … `</menu>`

Acts like `<ul>` in every way, except it is *semantically correct for building interactive menus*

HTML

```html
<h2><code>&lt;nav></code> &amp;amp;
<code>&lt;menu></code> without CSS</h2>

<nav>
  <menu>
    <li><a href="#">Life</a></li>
    <li><a href="#">Writings</a></li>
    <li><a href="#">Characters</a></li>
    <li><a href="#">Influence</a></li>
    <li><a href="#">Contact</a></li>
  </menu>
</nav>
```

CSS (SCSS)

JS

<nav> & <menu> without CSS

- Life
- Writings
- Characters
- Influence
- Contact

HTML

```html
<h2><code>&lt;nav></code> &amp;amp;
<code>&lt;menu></code> with CSS</h2>

<nav class="styled">
  <menu>
    <li><a href="#">Life</a></li>
    <li><a href="#">Writings</a></li>
    <li><a href="#">Characters</a></li>
    <li><a href="#">Influence</a></li>
    <li><a href="#">Contact</a></li>
  </menu>
</nav>
```

CSS (SCSS)

```scss
nav.styled menu {
  margin: 0;
  padding: 0;
  list-style: none;

  li {
    float: left;
    display: block;
    background: #4B4B4B;
```

JS

<nav> & <menu> without CSS

- Life
- Writings
- Characters
- Influence
- Contact

<nav> & <menu> with CSS

Life | Writings | Characters | Influence | Contact

					iOS		
`<menu>`	11	12	8	3.1	3.2	1	2.1

Note: the purpose of `<menu>` has changed. The old use with `<menuitem>` is not supported at all, but all browsers now support the new use with `<li>`, but compatibility charts have not been updated

Interactivity

<details> & <summary>

`<details>` … `</details>`

Represents a “disclosure widget” that *allows users to obtain additional info or controls*

First child must be `<summary>`, which the user sees, & then followed by text (if you leave out `<summary>`, most browsers will use `Details` as the label)

`<summary>` … `</summary>`

Specifies a summary, caption, or legend for a `<details>` disclosure box

Clicking `<summary>` toggles the parent `<details>` open & closed

Only use for `<summary>` is inside `<details>`

`<summary>` can only contain:

- `<h1>`–`<h6>`
- plain text
- HTML that can be used within a `<p>`

HTML

```html
<h2>Un-styled</h2>

<details>
  <summary>In what story did the cosmic entity <i>Yog-Sothoth</i> first appear?</summary>
  <i>The Case of Charles Dexter Ward</i>, written in 1927 but not published until 1941
</details>
```

CSS

JS

Un-styled

▶ In what story did the cosmic entity *Yog-Sothoth* first appear?

Brave

HTML

```html
<h2>Un-styled</h2>

<details>
  <summary>In what story did the cosmic entity <i>Yog-Sothoth</i> first appear?</summary>
  <i>The Case of Charles Dexter Ward</i>, written in 1927 but not published until 1941
</details>
```

CSS

JS

Un-styled

▼ In what story did the cosmic entity *Yog-Sothoth* first appear?

The Case of Charles Dexter Ward, written in 1927 but not published until 1941

Brave

HTML

```html
<h2>Styled</h2>

<details class="styled">
  <summary>Who was the author of <i>Al-Azif</i>, aka <i>The Necronomicon</i>?</summary>
  <p>Abdul Alhazred, first mentioned in “The Hound”, published in 1924</p>
</details>
```

CSS

```css
details.styled {
  padding-left: 1.7em;

  > summary {
    margin-left: -1.7em;
    background-color: hsl(0, 0%, 95%);
    padding: 0.25em 0.5em;
```

JS

Un-styled

▼ In what story did the cosmic entity *Yog-Sothoth* first appear?
The Case of Charles Dexter Ward, written in 1927 but not published until 1941

Styled

▶ Who was the author of *Al-Azif*, aka *The Necronomicon*?

▶ Who did *not* kill Harley Warren?

▶ Who self-immolates after discovering his ancestry?

Brave

HTML

```html
<h2>Styled</h2>

<details class="styled">
  <summary>Who was the author of <i>Al-Azif</i>, aka <i>The Necronomicon</i>?</summary>
  <p>Abdul Alhazred, first mentioned in “The Hound”, published in 1924</p>
</details>
```

CSS

```css
details.styled {
  padding-left: 1.7em;

  > summary {
    margin-left: -1.7em;
    background-color: hsl(0, 0%, 95%);
    padding: 0.25em 0.5em;
```

JS

Un-styled

▼ In what story did the cosmic entity *Yog-Sothoth* first appear?

The Case of Charles Dexter Ward, written in 1927 but not published until 1941

Styled

▼ Who was the author of *Al-Azif*, aka *The Necronomicon*?

Abdul Alhazred, first mentioned in “The Hound”, published in 1924

▶ Who did *not* kill Harley Warren?

▶ Who self-immolates after discovering his ancestry?

Brave

HTML

```html
<details>
  <summary>Name at least 3 professors found in works by H.P. Lovecraft who work at Miskatonic University.</summary>
  <ul>
    <li>Prof. Ferdinand C. Ashley</li>
    <li>Prof. Atwood</li>
    <li>Prof. William Dyer</li>
    <li>Prof. Lake</li>
    <li>Prof. Seneca Lapham</li>
    <li>Prof. Francis Morgan</li>
    <li>Prof. Nathaniel Wingate Peaslee</li>
    <li>Prof. Warren Rice</li>
  </ul>
</details>

<!-- Source: https://en.wikipedia.org/wiki/Characters_of_the_Cthulhu_My
```

CSS (SCSS)

JS

▶ Name at least 3 professors found in works by H.P. Lovecraft who work at Miskatonic University.

HTML

```html
<details>
  <summary>Name at least 3 professors found in works by H.P. Lovecraft who work at Miskatonic University.</summary>
  <ul>
    <li>Prof. Ferdinand C. Ashley</li>
    <li>Prof. Atwood</li>
    <li>Prof. William Dyer</li>
    <li>Prof. Lake</li>
    <li>Prof. Seneca Lapham</li>
    <li>Prof. Francis Morgan</li>
    <li>Prof. Nathaniel Wingate Peaslee</li>
    <li>Prof. Warren Rice</li>
  </ul>
</details>

<!-- Source: https://en.wikipedia.org/wiki/Characters of the Cthulhu My
```

CSS (SCSS)

JS

▼ Name at least 3 professors found in works by H.P. Lovecraft who work at Miskatonic University.

- Prof. Ferdinand C. Ashley
- Prof. Atwood
- Prof. William Dyer
- Prof. Lake
- Prof. Seneca Lapham
- Prof. Francis Morgan
- Prof. Nathaniel Wingate Peaslee
- Prof. Warren Rice

💡 PRO TIP

Default styles for `<summary>` includes `display: list-item`, which allows you to change or remove the disclosure triangle icon that indicates closed or open

You can also remove the disclosure triangle if you change the style to `display: block`

Scripting

```
<script>

<noscript>

<canvas>
```

`<canvas>` … `</canvas>`

A resolution-dependent *bitmap canvas* that is used for drawing graphics on the fly using JavaScript

`<canvas>` is *raster-based*, while SVG is *vector-based*

Used for:

» graphs
» game graphics
» art
» visual images
» photo compositions
» animations
» & much more!

Sizing via CSS can cause distortion, so better to use the `width` & `height` attributes

Unless you're creating a responsive webpage...

💡 PRO TIP

What about `height` & `width` on a responsive webpage?

1. Don't use `width` & `height` attributes on `<canvas>`
2. In CSS, set `width: 100%` for the `<canvas>`
3. Using JavaScript, set the `height` to some ratio of the `width`

```
var canvas =
 document.getElementById('responsive-canvas');
var heightRatio = 1.5;
canvas.height = canvas.width * heightRatio;
```

Can provide alternate content inside `<canvas>` for older rendering engines & those with JavaScript disabled

```
<canvas width="640" height="480">
  Time to get a real browser!
</canvas>
```

Advantages of `<canvas>`

» Interactivity via keyboard, mouse, or touch
» Animation of all objects
» Flexibility in what can be created
» Supported by all major desktop & mobile rendering engines
» Programmable!

Software you can use to create `<canvas>`

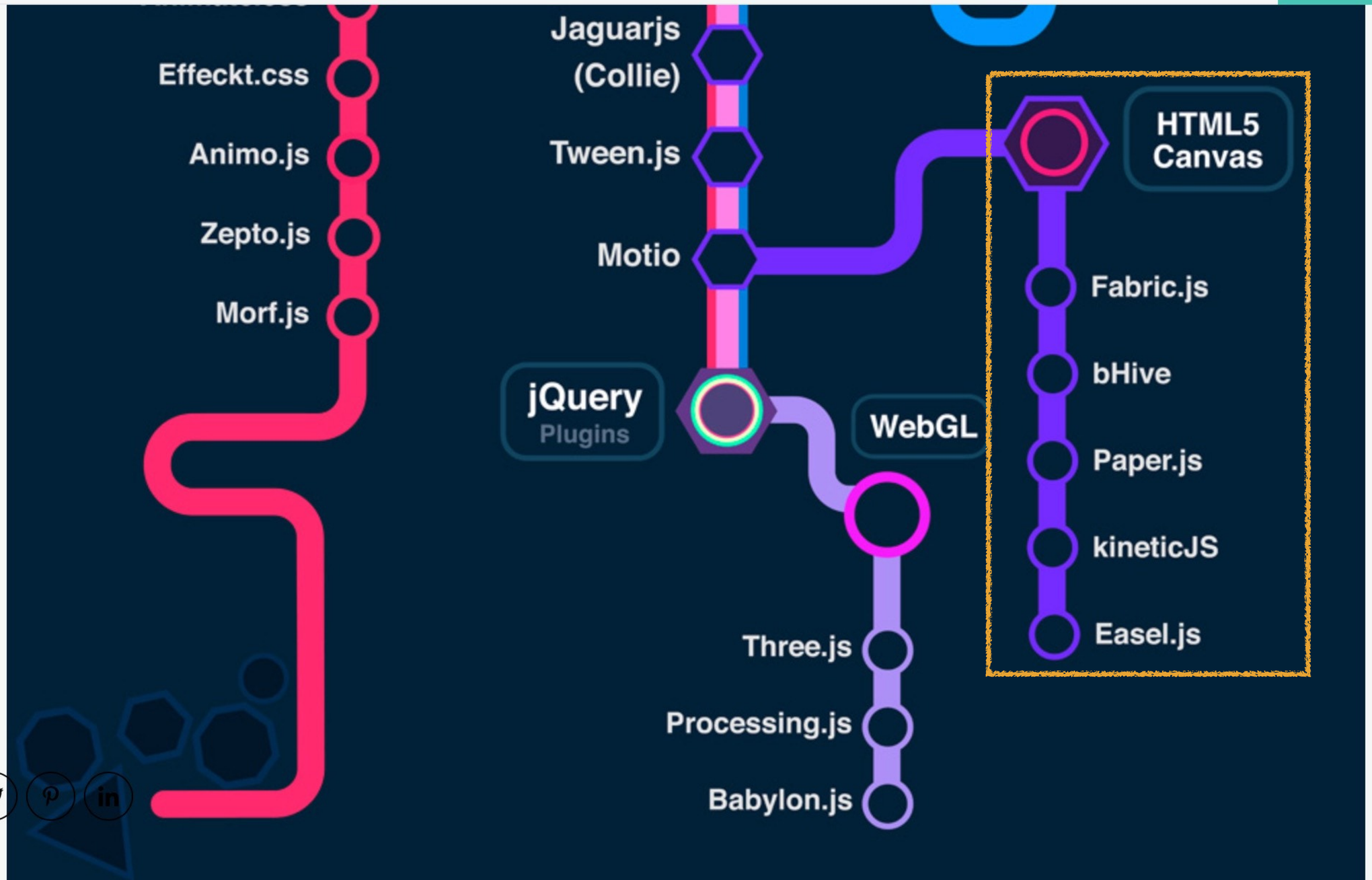
» Adobe ~~Flash~~ Animate
» Adobe Illustrator
» Adobe After Effects + bodymovin extension
» Tumult Hype
» Google Web Designer
» Construct 2 (games)

Web Animation Infographics: A Map of the Best Animation Libraries for JavaScript and CSS3 plus Performance Tips

ARTICLE BY **AWWWARDS TEAM** IN **WEB DESIGN** - APRIL 30

This website uses cookies to ensure you get the best experience on our website. Learn More. GOT IT!

Today we have decided to showcase a **map** of the **current state of web animation** by compiling highly regarded


Effeckt.css
Animo.js
Zepto.js
Morf.js
Jaguarjs
(Collie)
Tween.js
Motio
jQuery
Plugins
WebGL
HTML5
Canvas
Fabric.js
bHive
Paper.js
kineticJS
Easel.js
Three.js
Processing.js
Babylon.js

HTML

```html
<canvas id="example" width="200" height="200">
  This text is displayed if your browser does
  not support the canvas element.
</canvas>
```

CSS

JS

```javascript
var example = document.getElementById('example');
var context = example.getContext('2d');
context.fillStyle = 'red';
context.fillRect(30, 30, 50, 50);
```

HTML

```html
<canvas id="canvas" width="400"
height="400"></canvas>
```

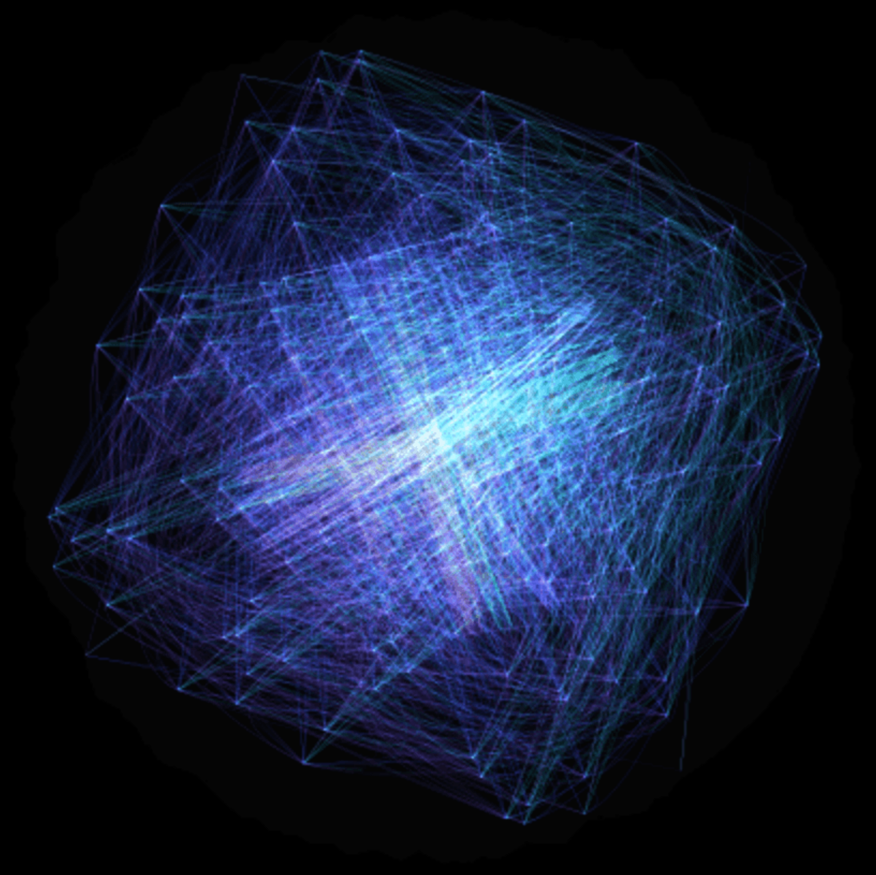
CSS

JS

```js
  /* Update Trail
/*=====================================
=====================================
===*/
  this.updateTrail = function(){

    if(this.trail.length <
    this.maxTrail){
      this.createPoint(this.arcx,
      this.arcy);
    }

```



HTML

```html
    </span>

  <canvas id="smoke"></canvas>
</section>
</div>
<!-- /Breaking Bad Logo -->



<!-- Breaking Bad theme -->
<audio></audio>
```

CSS (SCSS)

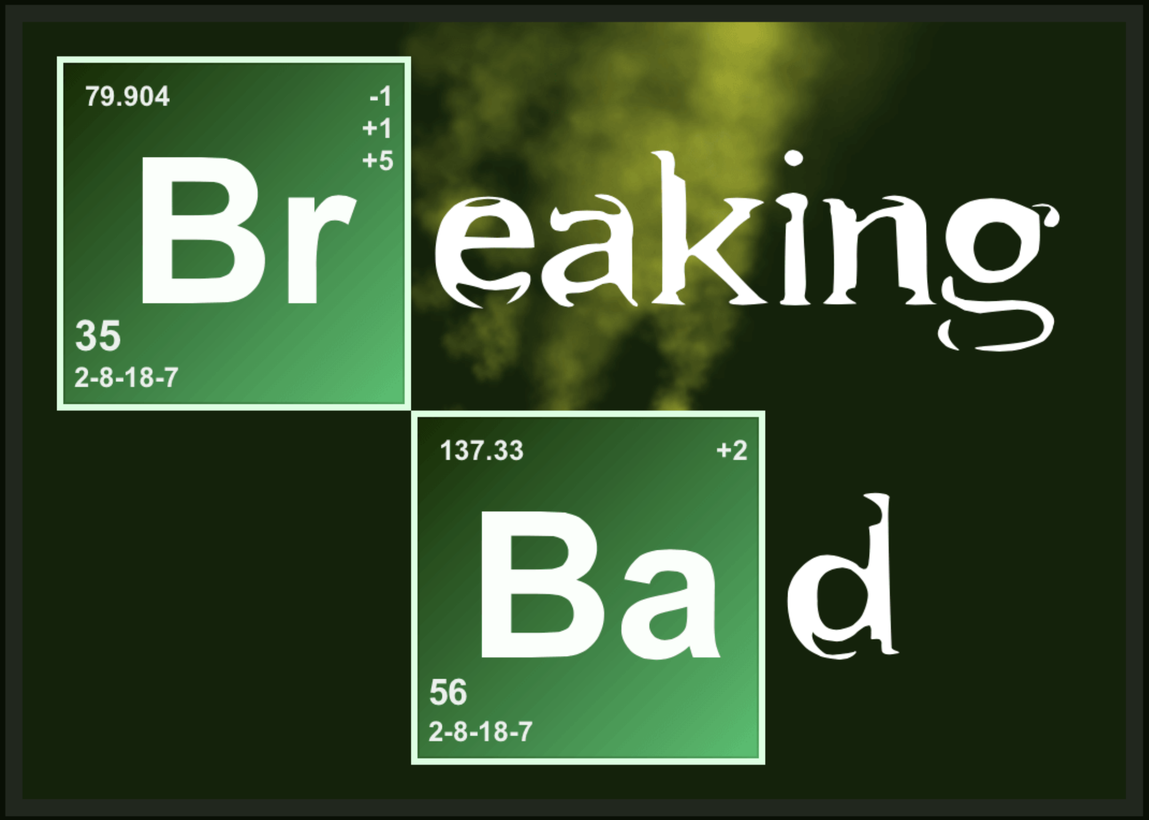
JS

```js
    smoke_1.update(timeElapsed);
    smoke_1.render(context);

    smoke_2.update(timeElapsed);
    smoke_2.render(context);

    smoke_3.update(timeElapsed);
    smoke_3.render(context);

    windVelocity += (Math.random() - 0.5) * 0.002;
    if (windVelocity > 0.015) {
        windVelocity = 0.015;
```



HTML

```html
<canvas class="canvas"></canvas>

<div class="help">?</div>

<div class="ui">
  <input class="ui-input" type="text"
  />
  <span class="ui-return">↵</span>
</div>

<div class="overlay">
  <div class="tabs">
```

CSS

JS

```js
*/


var S = {
  init: function () {
    var action = window.location.href,
        i = action.indexOf('?a=');

    S.Drawing.init('.canvas');
    document.body.classList.add('body-
    -ready');

    if (i !== -1) {
```

HTML

```html
<canvas class="canvas"></canvas>

<div class="help">?</div>

<div class="ui">
  <input class="ui-input" type="text"
  />
  <span class="ui-return">↵</span>
</div>

<div class="overlay">
  <div class="tabs">
```

CSS

JS

```js
*/


var S = {
  init: function () {
    var action = window.location.href,
        i = action.indexOf('?a=');

    S.Drawing.init('.canvas');
    document.body.classList.add('body-
    -ready');

    if (i !== -1) {
```

				iOS		
<canvas>	9	1.5	2	3.2	1	3

SEO

SEO (*Search Engine Optimization*)

is all about getting higher rankings on

SERPs (*Search Engine Results Pages*),

which should result in higher

CTRs (*Click-Through Rates*)

```
<meta name="robots" content="noindex">
```

Tells search engines *not to index* the webpage & show it on SERPs (*Search Engine Results Pages*)

💡 PRO TIP

Google points out that in order for it to even see `noindex`, you cannot block the page using `robots.txt`

If you block Googlebot using `robots.txt`, it won't see `noindex`, & your webpage can still appear in SERPs if other pages link to it!

```
<meta name="robots" content="nofollow">
```

Tells search engines *not to follow links* on the webpage & index them

Prevents search engines from associating your page (which may have a good ranking) with external pages you link to (which may not have a good ranking)

More useful on discussion sites where anyone can comment & add links

```
<meta name="robots" content="noindex,
nofollow">
```

Combine both if you need to

Tools

Books

Jon Duckett's *HTML & CSS: Design & Build Websites* is overall good but now very outdated in many places (© 2011!)

References

HTML elements reference

On this Page

Main root
Document metadata
Sectioning root
Content sectioning
Text content
Inline text semantics
Image and multimedia
Embedded content

https://developer.mozilla.org/en-US/docs/Web/HTML/Element

This page lists all the HTML elements, which are created using tags. They are grouped by function to help you find what you have in mind easily. An alphabetical list of all elements is provided in the sidebar on every element's page as well as this one.

> For more information about the basics of HTML elements and attributes, see the section on elements in the Introduction to HTML article.

Sectioning root

Element	Description
`<body>`	The **HTML `<body>` Element** represents the content of an HTML document. There can be only one `<body>` element in a document.

Content sectioning

Content sectioning elements allow you to organize the document content into logical pieces. Use the sectioning elements to create a broad outline for your page content, including header and footer navigation, and heading elements to identify sections of content.

Element	Description
`<address>`	The **HTML `<address>` element** indicates that the enclosed HTML provides contact information for a person or people, or for an organization.
`<article>`	The **HTML `<article>` element** represents a self-contained composition in a document, page, application, or site, which is intended to be independently distributable or reusable (e.g., in syndication).

HTML attribute reference

On this Page

Attribute list
Content versus IDL attributes
Boolean Attributes
See also

Related Topics

HTML

Tutorials:

HTML basics

▸ Introduction to HTML

https://developer.mozilla.org/en-US/docs/Web/HTML/Attributes

Elements in HTML have **attributes**; these are additional values that configure the elements or adjust their behavior in various ways to meet the criteria the users want.

Attribute list

Attribute Name	Elements	Description
`accept`	`<form>`, `<input>`	List of types the server accepts, typically a file type.
`accept-charset`	`<form>`	List of supported charsets.
`accesskey`	Global attribute	Keyboard shortcut to activate or add focus to the element.
`action`	`<form>`	The URI of a program that processes the information

Can I use _____ ? Settings

CSS

- ::placeholder CSS pseudo-element
- ::selection CSS pseudo-element
- :placeholder-shown CSS pseudo-class
- @font-face Web fonts
- Blending of HTML/SVG elements
- calc() as CSS unit value
- 2.1 selectors
- background-attachment
- background-blend-mode
- background-position edge offsets
- box-decoration-break
- clip-path property
- Counter Styles
- Counters
- currentColor value
- Device Adaptation
- Exclusions Level 1
- Feature Queries
- Filter Effects

HTML5

- Audio element
- Audio Tracks
- Autofocus attribute
- Canvas (basic support)
- Canvas blend modes
- classList (DOMTokenList)
- Color input type
- contenteditable attribute (basic support)
- Custom Elements
- Custom protocol handling
- Datalist element
- dataset & data-* attributes
- Date and time input types
- Details & Summary elements
- Dialog element
- disabled attribute of the fieldset element
- Download attribute
- Drag and Drop
- Email, telephone & URL input types

SVG

- Inline SVG in HTML5
- SVG (basic support)
- SVG effects for HTML
- SVG favicons
- SVG filters
- SVG fonts
- SVG fragment identifiers
- SVG in CSS backgrounds
- SVG in HTML img element
- SVG SMIL animation
- **All SVG features**

JS API

- Ambient Light API
- Base64 encoding and decoding
- Battery Status API
- Blob constructing
- Blob URLs

Can I use meter ? Settings

2 results found

Detected your country as "U.S.A.". Would you like to import usage data for that country?

Import No thanks

meter element - LS

Global 92.04%

Method of indicating the current level of a gauge.

Current aligned Usage relative Date relative Show all

IE	Edge *	Firefox	Chrome	Safari	Opera	iOS Safari *	Opera Mini *	Android Browser *	Chrome for Android
			49						
			60			10.2			
	15	55	61	10.1	47	10.3		4.4	
11	16	56	62	11	48	11	all	56	61
		57	63	TP	49				
		58	64		50				
		59	65						

```html
<!DOCTYPE html>
<html>
  <head>
    <title>
      HTML Vocabulary Example
    </title>
    <link rel="stylesheet" href="style.css">
  </head>
  <body>
    <!--Mumbo jumbo-->
    <p>
      Lorem ipsum dolor sit amet.
    </p>
    <div class="special" contenteditable>
      Etiam turpis &amp; felis, porttitor vitae dapibus.
    </div>
    <p>
      <span>
        In vulputate, tellus turpis euismod diam.
      </span>
    </p>
  </body>
</html>
```

HTML VOCABULARY

?

SYNTAX

- Doctype
- Element
- Tag
- Tag name
- Start tag
- End tag
- Attribute
- Attribute name
- Attribute value
- Comment
- Text
- Character reference

STRUCTURE

- Root
- Parent
- Children
- Child
- Siblings

```html
<!DOCTYPE html>
<html>
  <head>
    <title>
      HTML Vocabulary Example
    </title>
    <link rel="stylesheet" href="style.css">
  </head>
  <body>
    <!--Mumbo jumbo-->
    <p>
      Lorem ipsum dolor sit amet.
    </p>
    <div class="special" contenteditable>
      Etiam turpis &amp; felis, porttitor vitae dapibus.
    </div>
    <p>
      <span>
        In vulputate, tellus turpis euismod diam.
      </span>
    </p>
  </body>
</html>
```

HTML VOCABULARY

SYNTAX

- Doctype
- Element
- Tag
- Tag name
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- End tag
- Attribute
- Attribute name
- Attribute value
- Comment
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STRUCTURE

- Root
- Parent
- Children
- Child
- Siblings

Browser Tools

Built-in developer tools are excellent

Chrome DevTools

Chrome DevTools is a set of web developer tools built directly into the Google Chrome browser.

Overview	Get started with Google Chrome's built-in web developer tools.
Open Chrome DevTools	All of the ways that you can open Chrome DevTools.
What's new in DevTools	Stay up to date with the latest DevTools changes

p 1140 × 114.26

Scott Granneman is an author, educator, & partner in a Web development company in St. Louis, Missouri. Scott has written seven books, contributed to two, and penned monthly columns for SecurityFocus and *Linux Magazine*. He is an Adjunct Professor at Washington University in St. Louis & Webster University, teaching courses on technology, security, web development, & the Internet. As a Principal of WebSanity, he plans, develops, and hosts websites for clients in 12 states using an open source, UNIX-based content management system. He has given presentations all over the United States, and loves speaking to people.

Key Site Links

Pages you're probably looking for.

Teaching

Chromium DevTools

Elements | Console | Sources | Network | Performance | Memory | Application | Security | Lighthouse | CSS Overview

```
<main class="container body page-full-width">
  ::before
  <div>
    <p>…</p> == $0
  </div>
  <h2>Key Site Links</h2>
  <p>Pages you're probably looking for.</p>
  <h3>Teaching</h3>
  <ul>…</ul>
  <h3>Personal</h3>
  <ul>…</ul>
  <img border="0" class="ccm-image-block" alt="Scott Granneman teaching at Webster
  <p>…</p>
  ::after
</main>
```

html..cID-1.c5-editor.js.no-touch | body.cID-1 | div#wrap | main.container.body.page-full-width | div | p

Styles | Computed | Layout | Event Listeners

Filter :hov .cls

```
p {                                   bootstrap.css:1102
  margin: 0 0 10px;
}

* {                                   bootstrap.css:881
  -webkit-box-sizing: border-box;
  -moz-box-sizing: border-box;
  box-sizing: border-box;
}

p {                                   user agent stylesheet
  display: block;
  margin-block-start: 1em;
  margin-block-end: 1em;
  margin-inline-start: 0px;
  margin-inline-end: 0px;
}
```

GETTING STARTED

Getting Set Up To Work On The Firefox Codebase

WORKING ON FIREFOX

Working on Firefox

Bug Handling

FIREFOX USER GUIDE

Firefox DevTools User Docs

The Core Tools

More Tools

Connecting the Developer Tools

Debugging the browser

Extending DevTools

Migrating from Firebug

Contribute

Firefox DevTools User Docs

Firefox Developer Tools is a set of web developer tools built into Firefox. You can use them to examine, edit, and debug HTML, CSS, and JavaScript.

This section contains detailed guides to all of the tools as well as information on how to debug Firefox for Android, how to extend DevTools, and how to debug the browser as a whole.

If you have any feedback on DevTools or want to contribute to the project, you can join the DevTools community.

Note

If you are just getting started with web development and using developer tools, our learning docs will help you — see Getting started with the Web and What are browser developer tools? for good starting points.

The Core Tools

You can open the Firefox Developer Tools from the menu by selecting **Tools > Web Developer > Web Developer Tools** or use the keyboard shortcut `Ctrl` + `Shift` +

Writing Presentations Teaching Web Dev Tech Personal Site Map Search

Home

p 1140 × 114.25

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Key Site Links

Pages you're probably looking for.

Firefox DevTools

Inspector | Console | Debugger | Network | Style Editor | Performance | Memory | Storage | Accessibility | Application | axe DevTools

Search HTML

```
<!DOCTYPE html>
<html class=" cID-1 js no-touch" stopthemadness-user-drag="true" style="" lang="en">  event scroll overflow
  ▶ <head> ··· </head>
  ▼ <body class="cID-1">
    ▼ <div id="wrap">
      ▶ <header class="site-header">···</header>
      ▶ <nav class="navbar navbar-inverse ">···</nav>
      ▶ <header class="ws-header">···</header>
      ▶ <nav class="ws-pathnav">···</nav>
      ▼ <main class="container body page-full-width">
        ::before
        ▼ <div>
          ▶ <p> ··· </p>
        </div>
        <h2>Key Site Links</h2>
        <p>Pages you're probably looking for.</p>
```

D-1 › div#wrap › main.container.body.page-full-width › div › p

Filter Styles :hov .cls

```
p {                                          bootstrap.css:1102
  margin: ▶ 0 0 10px;
}

* {                                          bootstrap.css:881
  ~~-webkit-box-sizing: ▶ border-box;~~
  ~~-moz-box-sizing: ▶ border-box;~~
  box-sizing: border-box;
}
```

Inherited from body

```
body {                                       main.css:47
  font-family: -apple-system, system-ui,
    BlinkMacSystemFont, "Segoe UI", Roboto, "Helvetica
    Neue", Arial, sans-serif, "Apple Color Emoji",
    "Segoe UI Emoji", "Segoe UI Symbol";
  font-size: 1rem;
}

body {                                       bootstrap.css:897
```

Layout | Computed | Changes | Compatibility | Fonts

Fonts Used .SF NS
System Font

Instance Custom

Size 16 px

Line Height 22.85 px

Spacing normal

Italic

Width 100
wdth

Optical Size 28
opsz

Safari Developer Help

Table of Contents

Helpful? Yes No

Copyright © 2022 Apple Inc. All rights reserved.

Home

p 940px × 110px
Role: paragraph

Scott Granneman is an author, educator, & partner in a Web development company in St. Louis, Missouri. Scott has written seven books, contributed to two, and penned monthly columns for SecurityFocus and *Linux Magazine*. He is an Adjunct Professor at Washington University in St. Louis & Webster University, teaching courses on technology, security, web development, & the Internet. As a Principal of WebSanity, he plans, develops, and hosts websites for clients in 12 states using an open source, UNIX-based content management system. He has given presentations all over the United States, and loves speaking to people.

Safari Web Inspector

Key Site Links

Pages you're probably looking for.

Teaching

Elements | Console | Sources | Network | Timelines | Storage | Graphics | Layers | Audit

main.container.body.page-full-width 〉 div 〉 p

```
▼ <html lang="en" class=" cID-1 js no-touch" stopthemadness-user-drag="true"
stopthemadness-user-select="true" style>
  ▶ <head>…</head>
  ▼ <body class="cID-1">
    ▼ <div id="wrap">
      ▶ <header class="site-header">…</header>
      ▶ <nav class="navbar navbar-inverse ">…</nav>
      ▶ <header class="ws-header">…</header>
      ▶ <nav class="ws-pathnav">…</nav>
      ▼ <main class="container body page-full-width">
        ::before
        ▼ <div>
          ▶ <p>…</p> = $0
        </div>
        <h2>Key Site Links</h2>
        <p>Pages you're probably looking for.</p>
        <h3>Teaching</h3>
        ▶ <ul>…</ul>
        <h3>Personal</h3>
        ▶ <ul>…</ul>
        <img border="0" class="ccm-image-block" alt="Scott Granneman teaching at
        Webster University, 2015" src="/files/8915/3488/8727/2015-12-
```

```
p {                                   bootstrap.css:1102
  margin: 0 0 10px;
}

* {                                   bootstrap.css:881
  -webkit-box-sizing: border-box;
  -moz-box-sizing: border-box;
  box-sizing: border-box;
}

html[stopthemadness-user-select] * {  style.css (line 10)
  -webkit-user-select: text !important;
  user-select: text !important;
}
```

:active | :hover
:focus | :target
:focus-visible | :visited
:focus-within

Filter | Classes | Pseudo

Computed | Layout | Font | Changes | Node | Layers

Box Model

position –
margin –
border –
padding –
940 × 110
10

Filter

Auto — granneman.com

Validation

Markup Validation Service

Check the markup (HTML, XHTML, ...) of Web documents

Validate by URI | Validate by File Upload | Validate by Direct Input

Validate by URI

Validate a document online:

Address:

More Options

Check

This validator checks the markup validity of Web documents in HTML, XHTML, SMIL, MathML, etc. If you wish to validate specific content such as RSS/Atom feeds or CSS stylesheets, MobileOK content, or to find broken links, there are other validators and tools available. As an alternative you can also try our non-DTD-based validator.

Try now the W3C Validator Suite™ premium service that checks your entire website and evaluates its conformance with W3C open standards to quickly identify those portions of your website that need your attention.

The W3C validators are hosted on server technology donated by HP, and supported by community donations.
Donate and help us build better tools for a better web.

Validator.nu (X)HTML5 Validator (Living Validator)

Validator Input

Address

Show Image Report

Show Source

Validate

About this Service • More options

Address, File Upload, or Text Field

Learn

Mastodon

- Rachel Andrew: `front-end.social/@rachelandrew`
- Deceptive Patterns: `masto.design/@deceptivepatterns`
- CSS-Tricks: `mastodon.social/@csstricks`
- Paul Irish: `toot.cafe/@paul_irish`
- WebKit: `front-end.social/@webkit`
- Jen Simmons: `front-end.social/@jensimmons`

Websites

- CSS-Tricks: `css-tricks.com`
- Web.Dev: `web.dev`
- CSS Weekly: `css-weekly.com`

Changelog

2025-06-03 4.11: Added slide re: accessibility to `<main>`; added more screenshots of `alt` text generated by Claude; re-took screenshot for `<hgroup>`; updated `title` attribute screenshot; re-did & updated *Permute*

2025-03-12 4.10: Completely re-did JPEG XL section, adding a lot of extra information, screenshots, & citations

Changelog

2025-02-25 4.9: (con’t from ↓): added why we need *Custom Attributes*; for `alt` generation, removed Bing & added Claude; added slide re: wrapping `<a>` around multiple nodes with cool animation; other void elements do not use `/>` either; noted in Formatting Guide that single line elements can be wrapped; added clarity to 3 methods for making fake links; added note on `<noscript>`; cleaned up wording in a few areas

Changelog

2025-02-25 4.9: Updated theme to Granneman 1.14; used lining numbers for dates & version numbers in Changelog; lots of minor fixes; updated example of `<head>`; updated *Browser Tools*; re-did screenshot of `<track>`; moved info re: `.ogv` around; hid WebPShop, the Photoshop plugin for WebP; more details on AVIF; added details re: `<img>` & `alt` attribute; added video showing *typebars* for `<u>`; changed `title` Side Note to Pro Tip; added details re: clipboard managers; re-did *Headings* to put details on screenshot; more details on *Limited Attributes*; (con't ↑)

Changelog

2025-01-07 4.8: Updated pre-semantic HTML example's notation; updated Gus example of desire lines; added note re: underlined text & links; better screenshots for `<small>`; better wording using YouTube for hosting videos; added wording explaining section overview pages; updated Containers diagram

Changelog

2024-10-28 4.8: Changed wording for raster & vector; added slide showing non-semantic & semantic code; added formatting note re: `<a>` that it should generally go inside other elements; better title slides for legacy & modern image formats; better explanation re: video codecs; re-took `<ol reversed>` screenshot; better screenshots for `<summary>` & `<details>`; added several examples of designed `<blockquote>`; added SkipTo.js & hid Landmark Navigation extensions

Changelog

2024-09-11 4.7: Updated theme to Granneman 1.13; re-themed all chapter slides; minor formatting fixes; defined SEO in footnote; changed linking to `index.html` into a Pro Tip; some links weren't formatted as `<code>`; added screenshot of `jpegxl.info`; Photoshop now supports JEPG XL

2024-04-23 4.6: Replaced (after 10 years!) `<title>` slide; rearranged slides in `<title>` section; added detail re: link colors to `<a>`

Changelog

2024-04-18 4.5: Added screenshot of “Audio codec support test” to `<audio>` in Bonus; added screenshot of “HTML5 audio/video tester” after `<video>` browser compatibility tables; replaced Separation of Concerns slide with better one; added that other punctuation must be removed with `mailto`; replaced non-semantic HTML screenshot with better one & made wording better in *Semantic HTML*; removed duplicate *Containers & Codecs* section

Changelog

2024-04-08 4.4: Reduced Converseen (moved most of it to *Bonus*) & added XL Converter; added *Containers & Codecs* to *Embedded Multimedia*; re-did `<video>` browser compatibility tables; re-did `<audio>` in *Bonus*; added heading slides in `<img>` for *Image Formats*; reorganized & improved slides in `<img>`

2024-04-03 4.3: Added another space image showing how small WebP is; added many details re: using AI to generate `alt` text

Changelog

2024-03-26 4.2 (con't from ↓): Tightened `<footer>`; re-did *Default Pages* intro screenshots; much improved content in *Email Addresses* in `<a>`; updated theme to Granneman 1.12; minor fixes; added video showing VS Code autocomplete root-relative paths; added percentages to headings demo; added that headings are bolded by default; added OGG to `type` in `<video>`; corrected code re: when to use `src` or `<source>`; added slide re: order of videos to use in `<source>`; re-did browser compatibility table for `<video>`

Changelog

2024-03-26 4.2: Added SEO joke in `<title>`; added slide pointing out `<title>` & `<h1>` usually don't match; reduced screenshots showing headings are like an outline; added *Formatting Guide* chapter; added number of named character references; better explanation & screenshots for using the Unicode Character Search page at FileFormat.info; added To Web as a conversion app; moved Letterboxd to the end of the `<title>` examples; added callouts to `<aside>`; added another `<header>` example (con't ↑)

Changelog

2024-03-06 4.15: Updated screenshot for `<header>`; rewrote section on `maps.apple.com`; added chapter slides in *Links to Email, Phone Numbers, FaceTime, & Maps*; greatly culled 5 kinds of navigation info & examples

2023-11-09 4.14: Added details re: `alt` for `<img>`; added IBM Selectric type ball to `<u>`; added lots of details showing how to use Character Map & why it's terrible in *Character References*

Changelog

2023-10-26 4.13: Upgraded theme to Granneman 1.11; minor formatting & text fixes; updated resources in *Learn*; removed Unicorn Validator & added citations in *Validation*; added note that Landmarks extension doesn't support `<search>`; added table showing how to turn on Reader Mode for various browsers; provided better explanation, including short video, in *Open Links in New Tabs*; added clarifying details in *Links*; used different templates in `<video>`; better wording throughout *Embedded Multimedia*; added `<search>` to *Semantic HTML*; added to & re-did *Decimal* & *Hexadecimal* in *Character References*

Changelog

2023-10-24 4.12: Added QR codes; added `<search>` + citations to landmarks section; added element list to *Headings*; added detail to `<hgroup>`; re-did obsolete elements in *Other Elements* & then removed elements that are covered earlier

2023-09-28 4.11: Added 2 formatting slides to `alt`; added slide re: formatting when using `srcset`; added how to link to default pages; changed Twitter link to Mastodon

Changelog

2023-09-26 4.10: Added Butterick's advice not to title-case headings; added details re: how to manually open links in background tabs, including demo video, in *Open Links in New Tabs*; updated screenshots & citations in `<nav>`

2023-06-12 4.9: Added year PNGs appeared; added `<br>` to `<address>` example (I'm an idiot!); added details re Hansel & Gretel to *Breadcrumb Navigation*; added that WHATWG defines 2 kinds of links; added details about the term "anchor"; added image of 1st website; added examples to *Breadcrumbs*

Changelog

2023-03-12 4.8: Added section in `<nav>` about 5 kinds of navigation; added example of using `alt=""` to `<img>`; added citation to *The Anatomy of a Web Address*; added citation for metadata; added `<hgroup>` back in … for good this time!; updated numbers & citations in *Global Attributes*; further explanation of metadata in HTML; moved browser compatibility chart for new image formats

Changelog

2023-03-09 4.7: Added note about `<video>` vs YouTube; moved `<figure>` & `<figcaption>` from *Bonus* back into *Embedded Multimedia*

2023-03-02 4.6: Added accessibility attributes for multiple `<nav>` on a page; removed Error 403 & added granneman.com to *Default Pages*; explained why you might want to create *Fake Links*; better example of `tel:` plus map of country calling codes

Changelog

2023-02-26 4.5: Added Boxy SVG; minor edits; added `kind="description"` example back to `<track>`; rearranged slides re `<track>`; better wording for when to use `<ul>` & `<ol>`; added table for `<em>` & `<i>`, `<strong>` & `<b>`; added new slides to `<address>` to make it clearer; fixed M4A typo in *Permute*; updated compatibility tables for new image formats; added more to `<svg>` & improved content; added citations & number of photos taken per day to *Raster*

Changelog

2022-12-06 4.4: Switched theme to Granneman 1.8; added instructions for showing Text Input menu in Ventura; added screenshot of what I enable in macOS Character Viewer; added Mastodon account in *Learn*; replaced Inspector screenshots; added citations in several places; added new section, *Links That Will Not Work*; removed mention of WebP 2; fixed minor formatting issues; Chrome killed JPEG XL; mentioned that `<audio>` is in *Bonus*; added 3 image converters: Converseen, Permute, & Squash

Changelog

2022-11-17 4.3: Moved nesting sublists from Bonus back into *Lists*; explained aria is for accessibility in *Global Attributes*; added a few new entries in *Boolean Attribute Values*; added `<main>` & labeled photos of desire lines in *Semantic HTML*; moved `<s>` & `<small>` back into *Marking Up Text*; updated screenshot for `<i>` to emphasize use with terms; added book images for metadata in *Inside* `<head>`

Changelog

2022-11-11 4.2: Added several screenshots for `<head>`, `<h1>`, & other headings; added org chart for *Your First Webpage*; better example for `<br><br>`; added pre-HTML5 code with several ex's of `<div id="">`; added big section on Windows 11 Emoji Picker & why it's garbage

2022-07-08 4.1: Added `srcset` back in to `<img>` & expanded it; added Windows 11 screenshots for `<a href="tel:">`

Changelog

2022-07-08 4.0: Massive overhaul to almost everything, removing a lot of material we wouldn't have time to cover & rewriting many slides; included citations for every appropriate slide

2022-03-17 3.3: Added screenshot to *Root-Relative URLs*; new terrible screenshots of This Person Does Not Exist; updated &/or corrected all citations for *Your First Webpage*, *Headings*, *Lists*, *Character References*, *Grouping*, *Marking Up Text*, & most of *Embedded Media*; added detail re: `<svg>` `xmlns` attribute; added 5 spaces with character references

Changelog

2022-02-14 3.2: Finished in *Other Elements*; re-organized & added better examples for `<hr>`; tiny clarification for `<blockquote>`; made `<main>` clearer

2022-02-12 3.1: Updated compatibility chart for WebM; added *Other Elements* section to summarize elements that were taken out here & can be found in *HTML - Overview for Professionals*; rearranged slides in *Character References*

Changelog

2021-12-19 3.0 (con't. from ↓): removed CORS & `crossorigin` , `preconnect`, `prefetch`, `preload`, `prerender`, `dns-prefetch`, `as` from `<link>`; added chapter slides to split up `<a>`; added examples to *Absolute URLs*; added examples to *Root-Relative URLs*; better screenshots & updated defaults table in *Default Pages*; updated Text Input & Character Viewer in Character References; re-did almost everything!

Changelog

2021-12-13 3.0: Removed most of *IE*; removed `<base>`, `<map>`, `<area>`, `<object>`, `<param>`, `<embed>`; removed *Bonus*, including: `<base>`, `<big>`, `<acronym>`, `<frameset>`, `<frame>`, `<noframes>`, `<dialog>`, `<blink>`, `<marquee>`, `<font>`, `<basefont>`, `<tt>`, `<center>`, `<applet>`, `<bgsound>`, `<nextid>`, `<nobr>`, `<plaintext>`, `<listing>`, `<xmp>`, `<spacer>`, & *Tools*; added slides explaining inter-relationships of sectioning, grouping, & text semantic elements at the beginning of each of those sections; moved `<meta>` to *Your First Webpage*; (con't. ↑)...

Changelog

2021-12-13 2.8: Updated theme to Granneman 1.7; fixed formatting issues; added slide explaining metadata; added info re: void elements; moved `<br>` re: poetry to *CSS - Typography*; split off *HTML - Overview* to *HTML - Overview for Students* & *HTML - Overview for Professionals*; started re-organizing; big changed so bumped to 3.0!

2021-07-20 2.7: Modified advice on `<figure>`; added slide of Mom's Egg Salad illustrating `ul`, `ol`, `li`, `dl`, `dt`, & `dd`; for `<track>`, added slide illustrating `descriptions`; added more compatibility charts for image formats; added details re: WebP & AVIF

Changelog

2021-07-18 2.6: Restored *Learn* under *Tools*; better org chart diagram for default pages; updated number of global attributes; fiddled around with `<hgroup>`; updated `<menu>`; added note re using JavaScript to generate ToC from headings; added more re MIME types; added slides in *Links* about links to external files causing webpages to load slower; more details on `tel:`, `facetime:`, & `facetime-audio:`; greatly improved entire *Character References* section

Changelog

2020-12-02 2.5: Added lots of presenter notes; added This Person Does Not Exist to list of stock image sites; clarified void elements & self-closing elements in *Type* under *Categorization*

2020-08-06 2.4: Added better examples of `<address>`; added note re specifying `width` & `height` for `<img>`; better screenshot showing headings create implied sections; Lovecraft-ized all `<a>` examples; renamed *Character Entities* to *Character References* & greatly expanded it

Changelog

2020-07-14 2.3: Minor fixes & word changes; added & fixed arrows in `<a>`; added another way to create fake link; added examples of what never to use with `href`; added fun quiz of abbreviations & acronyms

2020-07-13 2.2: (con't. from ↓) re-took Anatomy of a Web Address screenshots; fixed bad link explaining how links work

Changelog

2020-07-13 2.2: Changed “rendering engine” to “browsers” where appropriate; minor wording changes; Lovecraft-ized semantic HTML example; changed “small print” to “fine print” on `<small>`; (con’t. ↑)

2020-07-04 2.1: Added compatibility charts for `<img>`; added details about the `type` attribute for `<a>`, `<area>`, & `<link>`; moved `<font>`, `<basefont>`, `<tt>`, `<center>` into new section in *Bonus*: *Obsolete*; cleaned up *Bonus* section & moved some things

Changelog

2020-07-03 2.0 (con't. from ↓): meaning of `<cite>` has changed, with examples; added `<svg>` example to `<map>`; added more detail about values for `<link>`'s `rel` & `integrity` attributes; added `as` to `<link>` attributes; moved list counters from *Lists* to *Tables & Lists* presentation; added compatibility table for `<iframe>` `srcdoc`; updated `<video>` & `<audio>` compatibility tables; updated *Bonus*; so many changes it's now bumped to 2.0!

Changelog

2020-07-03 2.0 (con't. from ↓): added details re: `<canvas>` & moved into Scripting; streamlined *Tools*; updated screenshots of MDN Element Reference; added more info re: `<canvas>`, esp. re: responsiveness; removed ImgPlaceholder.com & added Unsplash & unsplash.it; changed *site root-relative* to *root-relative*; fixed `<a>` diagram missing arrows; added screenshot showing how headings become tables of contents via JS; added several examples for `<br>`; (con't. ↑)

Changelog

2020-07-03 2.0 (con't. from ↓): moved `<hgroup>` under *Sectioning* & expanded it; moved `<blockquote>` into *Grouping*; moved `<q>` & `<cite>` into *Text Semantics*; added detail re: `<q>` incl. Chris Farley video; updated browser compatibility tables for *Sectioning*; updated wording for elements in *Grouping*; added more info & illustrations to `<pre>`; re-did `<main>`; replaced screenshots in `<aside>`; added `<menu>` & `<menuitem>` to *Lists*; added `<summary>` & `<details>`; (con't. ↑)

Changelog

2020-07-03 2.0 (con't. from ↓): removed *Lines & Paragraphs* & moved `<p>`, `<br>`, `<wbr>`, & `<pre>` into *Grouping* & *Text Semantics*; re-ordered *Categorization* & added slide about sectioning, grouping, & text semantics; added `<body>` to *Sectioning*; added slide re: outlining to *Sectioning*; re-ordered elements in *Sectioning*; better explanation for `<article>`, & more on services & software that use it; moved details re: `<small>` out of sectioning & into *Sizes?*; added justification for `<header>`; (con't. ↑)

Changelog

2020-07-03 2.0 (con't. from ↓): added Function to *Categorization* with tables; moved basic outline of `<html>`, `<head>`, & `<body>` at end of *Document Structure*; changed *Global Attributes* to *Attributes & Values* & completely re-did it; moved `<ruby>`, `<rt>`, `<rp>`, `<bdo>`, & `<bdi>` out of *Bonus* & into *For Developers Only*; added screenshot to `hidden`; improved screenshot & details for `tabindex`; removed Kevin Spacey from `<aside>` & added in Shakespeare's *Othello*; (con't. ↑)

Changelog

2020-07-03 2.0: Updated number of elements; changed *Multimedia* to *Embedded Multimedia*; vastly improved semantic explanation & examples & moved from *Categorization* to *Semantic HTML*; re-did Categorization so it's now much better (con't. ↑)

2019-09-14 1.26: Removed Web Platform Daily from *Tools*; added compatibility chart for `<ol>` `reversed` attribute; added examples for `href` attribute; added screenshot in `<li>`; added `srcdoc` to `<iframe>`

Changelog

2019-08-25 1.24: Added detail re: `<noscript>`; Googlebot no longer looks at `rel="prev"` & `"next"`; added grouped examples for almost all elements in Text Semantics; added note that `---` is not an em dash; added that headings are important for SEO

2018-12-10 1.23: (con't. from ↓) ...better `data-*` screenshot; added slides re: `target="_blank"` & `rel="noopener"`; added detail re: headings

Changelog

2018-12-10 1.23: Added more detail re: customizing the Character Viewer; added CodePen example for placeholder.com; added `<pre>` example from my journals; added put page before site in `<title>`; replaced screenshots for `<aside>` & `<main>`; replaced `<figure>` screenshot & added screenshot for making caption without `<figure>`; replaced placeholder.com (because it sucks now) with ImgPlaceholder.com & added other placeholder sites; (con't. ↑)…

Changelog

2018-11-08 1.22: Updated `<time>` screenshot; changed `src` to `alt` in value quotation example; added `type` to `<source>` with info re: MIME types; more info on `<video>` attributes for mobile

2018-10-24 1.21: Updated compatibility tables with new Safari & iOS logos & reordered columns; deleted a few useless pages in *Bonus*

2018-10-01 1.20: Re-ordered slides in *Categorization* & made them clearer; updated & fixed list of Boolean attributes; small fixes

Changelog

2018-09-19 1.19: Added more formatting re: `<blockquote>`; fixed `<meter>`/`<progress>` table; added compatibility table for `<mark>`; better `<h1>` example for `<small>`; added links to slides for *Tables* & *Forms*; added links & details to Brackets & VSCode under *Tools*; added Matt's Rule for `<video>`/`<audio>`; added slide re: when to use `src` or `<source>`; added formatting rule in `<a>` for quotation marks inside values; switched out image for `<aside>` pull quote

Changelog

2018-09-17 1.18: Added formatting guides for `<pre>`, `<dl>`, `<p>`, `<a>`, `<br>`, `<li>`, `<blockquote>`, `<address>`, & headings; added Gerhyrah's Rule, Eddie's Rule, Chris's Rule, & Christian's Rule for formatting; un-hid using `<section>` inside `<article>`

2018-05-07 1.17: Massively changed `<a>`; fixed minor formatting errors introduced when switching themes; added Gmail screenshots to `accesskey`; added examples for video & audio (!); added pictures for Reader View that were stripped out when switching themes (?)

Changelog

2017-11-06 1.16: Added PRO TIP section for default/index/main pages; added FORMATTING GUIDE to `<p>` & `<hx>`; updated theme to updated Granneman 1.4 again; formatting fixes; added slides re: when to use `<figure>` with `<image>`; added page showing different quotation marks in different languages; added in Unicode; changed `accesskey` to mostly don't use it; better slide introducing list types; re-organized `<video>` & `<audio>` to explain `<source>`; added further explanation of proper heading levels

Changelog

2017-11-03 1.15: Clearer hyphens & dashes table; added Edge to Visualized Data compatibility chart; switched theme to Granneman 1.4; minor formatting fixes; added links to more info I've created on Brackets & Visual Studio Code; added slides on *boolean attributes*; placehold.it has become placeholder.com; added note re: holder.js; `<img>` goes inside `<p>` &tc; added note re: correct formatting of `<source>`; made placeholder images into a PRO TIP; for `<img>`, added slide re: creating `css`, `images`, `js`

Changelog

2017-11-02 1.14: Updated “HTML 4.01” & “HTML5” to use lining numbers; updated iOS logo & removed Edge if unnecessary in compatibility charts; added compatibility chart for *Sectioning*; better Lists table

2017-10-23 1.13: Hid examples in `<frame>`; moved Tools > Learning to *Bonus*; added Nu Validation Checker to *Validation*; updated `<small>` example to show CSS; better example for `<main>`; added JavaScript libraries for `<canvas>`; copied Separation of Concerns from *CSS Overview*; updated `<aside>` example

Changelog

2017-10-20 1.12 (con't ↓): Removed `<q>` details; moved `<cite>` to *Bonus*; warned against "named anchors"; removed Nice Nice JPG (peace out, Vanilla); better example of using `<small>` to create subtitles with `<h2>`; better example for `<data>`; added details about `<time>` & `datetime`; updated compatibility table for `<time>` & `<data>`; reformatted `<link>` `rel` slide; in *Video*, moved `<object>`, Video for Everybody Generator, & `<embed>` example to *Bonus*; re-did `<audio>` & `<video>` compatibility tables

Changelog

2017-10-20 1.12: Removed old Safari Reader examples & added new ones, including iOS; added `tel:` & `maps:` to `<a>`; improved `<meta>` examples & list; removed useless examples; better example of headings & implicit sections; better examples of `<nav>`; hid example in `<section>` (con't ↑)

2017-09-06 1.11: Added screenshots for websites of built-in browser dev tools; added websites under *Learning*; added new global attributes & compatibility table: `spellcheck`, `accesskey`, `contenteditable`, & `hidden`

Changelog

2016-09-23 1.10: Better notation for placeholder images; lots of little cleanups of formatting & text; note re: `<br>`

2016-09-07 1.9: Lots of little fixes; better compatibility tables for `<main>` & many other elements; added that `<span>` & `<div>` draw boxes; added slide explaining *polyfills*; fixed formatting on several slides

2016-03-02 1.8: Added slide comparing headings to outline; added attributes for `<ol>`

Changelog

2016-03-02 1.7: Switched theme to Georgia Pro; forgot to format `<canvas>` as code on support chart; added slide re: Microsoft ending support for pre-11 IE; added slide showing `<ol>` for navigation; fixed wording on `<p>` margins; reformatted `<hr>` pro tip; different recommendations for video & audio converters; tons of minor changes & fixes

2016-01-10 1.6: Added tiny detail to `<figure>`; added a lot more info re: `<meta>`; added tiny details re: URL fragments in `<a>`; added page about empty `mailto` links; added tiny detail to content models

Changelog

2015-09-14 1.5: Added HTML Vocabulary; edited a tiny bit in `<a>`; more info about `<small>`

2015-05-20 1.4: Added slides to beginning re: slides & videos; renamed *Outlines & Sections* to *Outlining*; moved HTML Doctor HTML5 Element Flowchart to *Bonus*; added pull quote examples to `<aside>`; added example of HTML 4 use of `<address>`; added loop attribute to `<video>`; listed attributes for `<video>` & `<audio>` not supported on mobile; added example from textbook of heading as section; added example from textbook of `<figure>`

Changelog

2015-03-06 1.3: Added note about built-in MP4 support in Firefox; added video of Kevin Spacey from *House of Cards* for `<aside>`; added rules & updated image for `data-*` global attribute; moved example of Microsoft Word's `<ins>` & `<del>`; added details about *resource inlining*

2015-01-12 1.2: Minor typos fixed; moved Safari Reader examples to `<article>` from `<main>`; fixed `<dl>` screenshot

2014-09-13 1.12: Changed "browser" to "rendering engine" almost everywhere; fixed text on fake link page; crossed out `<hgroup>`; minor typos fixed

Changelog

2014-09-11 1.11: Fixed images for `<em>` & `<small>`; for `<ins>` & `<del>`, changed “Microsoft Word” to “word processors”; added image of Word’s Track Changes; indicated `<strike>` & `<s>` was in past; added image of typed page for `<u>`; moved `<kbd>` & `<samp>` interactions to *Bonus*

2014-09-06 1.10: Added slide defining attributes to *Global Attributes*; added `data-*` to slide listing Global Attributes; added screenshots to `lang` attribute; added detail to `<pre>`; major re-org of *Outlines & Sections*

Changelog

2014-09-04 1.9: Removed `<style>` example; minor textual additions & fixes; moved multiple `<meta>` note; added screenshot after `data-*` global attribute

2014-09-02 1.8: Added semantic examples to table; removed animation for content categories

2014-08-15 1.7: Added quotes from IE devs re: conditional comments

Changelog

2014-08-11 1.6: Added Web Design Weekly in *Tools*; added additional slide for placehold.it & removed slide for fpoimg.com

2014-08-09 1.5: Added info re: placeholders in `<img>`

2014-08-05 1.4: Added *Tools* section; added screenshots of SVG image maps; added details about `alt` attribute; updated Modernizr, html5shiv, & html5media; added conditional comments info; added responsive image replacement with `<h1>`

Changelog

2014-08-03 1.3: Moved bonus stuff to *Extras* section at end

2014-07-28 1.2.3: Fixed `<blockquote>` & `<p>`; added slides for Reader

2014-07-28 1.2.2: Removed `<big>`

2014-07-27 1.2.1: Improved *Outlines & Sections*

Changelog

2014-07-21 1.2: Shortened to get rid of obsolete or confusing stuff

2014-05-15 1.1.2: Improved URL table in `<a>`

2014-05-12 1.1.1: Various fixes for errors

2014-05-11 1.1: Updated to new format

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