Today's Agenda

Administrivia

More HTML

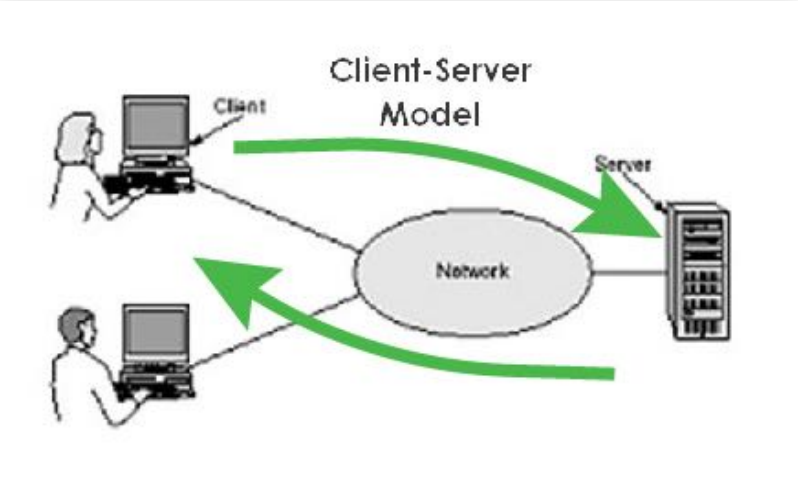
- You should not feel like you will know everything yet
- and we continue learning more as we get into CSS and JS

Discuss Accessible Design

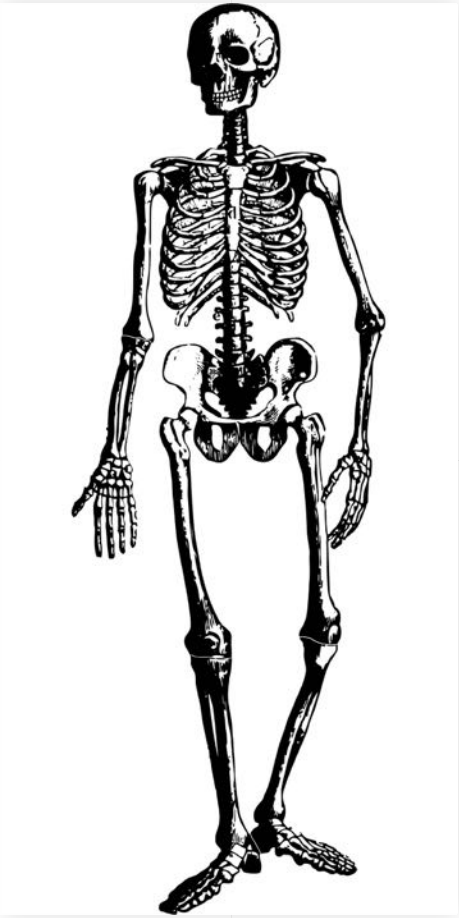
Start CSS

Review: Internet

- There are layers
- IP (Internet Protocol) addresses: like 192.168.0.1
- No centralized control but...
    - DNS maps the numbers to names like Google.com
    - **W3C Validates web pages**
- Websites use a client-server model over the Internet



From Wikipedia



HTML

Hypertext Markup Language (HTML)

Describes the *content* and *structure* of information on a web page

- Not the same as the *presentation* (appearance on screen) - that's where CSS will come in!

There are a *ton* of HTML tags, but the most important thing is to use ones that are semantically appropriate, and meet current web standards.

MDN is really the only resource you should use outside of this class for looking up specific tags.

Basic Structure of an HTML Page

```html
<!DOCTYPE html>
<html>
  <head>
    information about the page
  </head>
  <body>
    page contents
  </body>
</html>
```

HTML

The `<head>` tag describes the page and the `<body>` tag contains the page's content

An HTML page is saved into a file ending with extension `.html`

The `DOCTYPE` tag tells the browser to interpret our page's code as HTML5, the lastest/greatest version of the language

Using HTML5 Semantic Tags to Define Structure

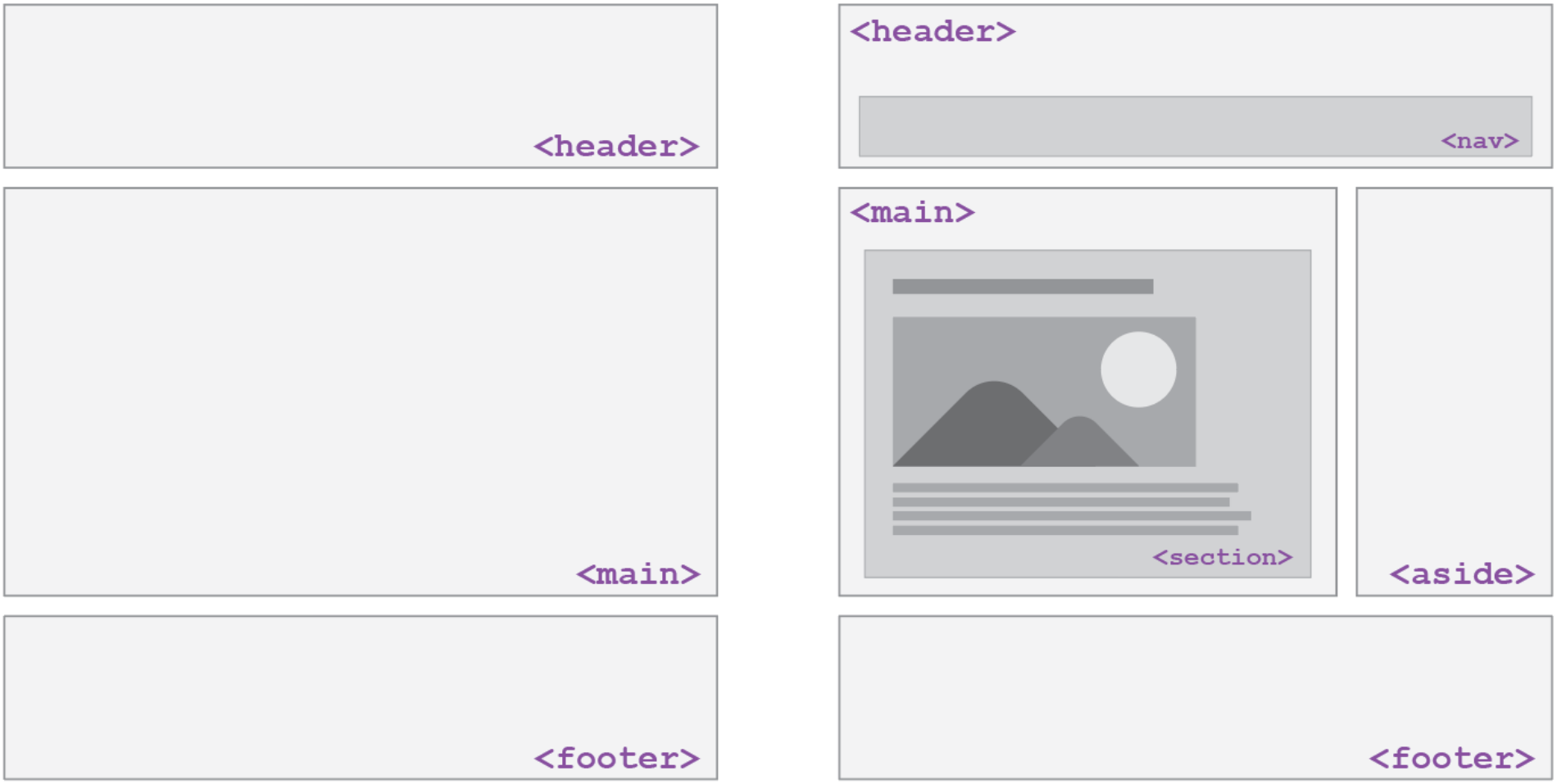


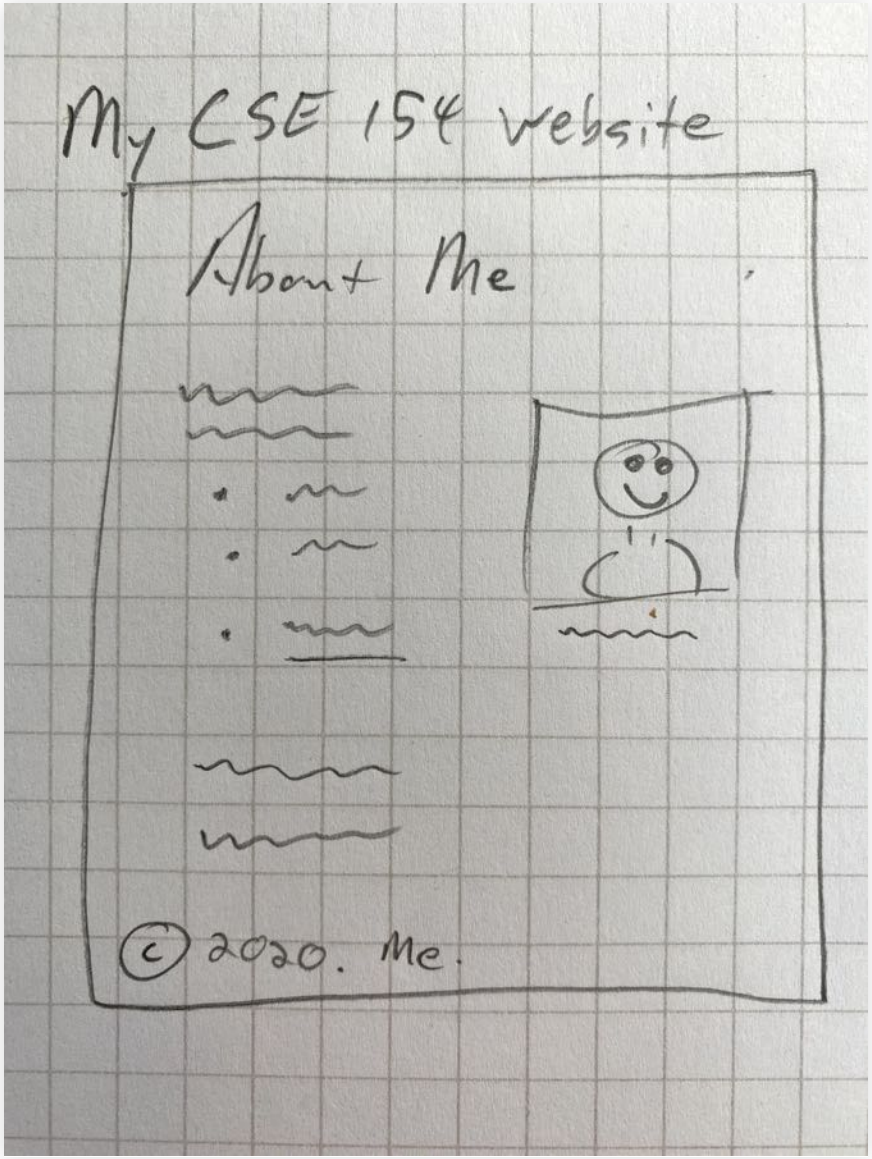
Image source: Hudson Gilmore (CSE154 TA!)

Tip when drafting HTML/CSS webpages

Always start with a sketch/wireframe before jumping into code!

A great resource on getting started with wireframes can be found here.

You don't need to be an artist.



General Outline with HTML5

General outline of a document body (template):

```html
<body>
  <header>
    <!-- Header of the webpage body (e.g. logo, navigation bar) -->
  </header>
  <main>
    <!-- Main section of the webpage body (where most content is) -->
  </main>
  <footer>
    <!-- Footer of the webpage body (e.g. copyright info) -->
  </footer>
</body>
```

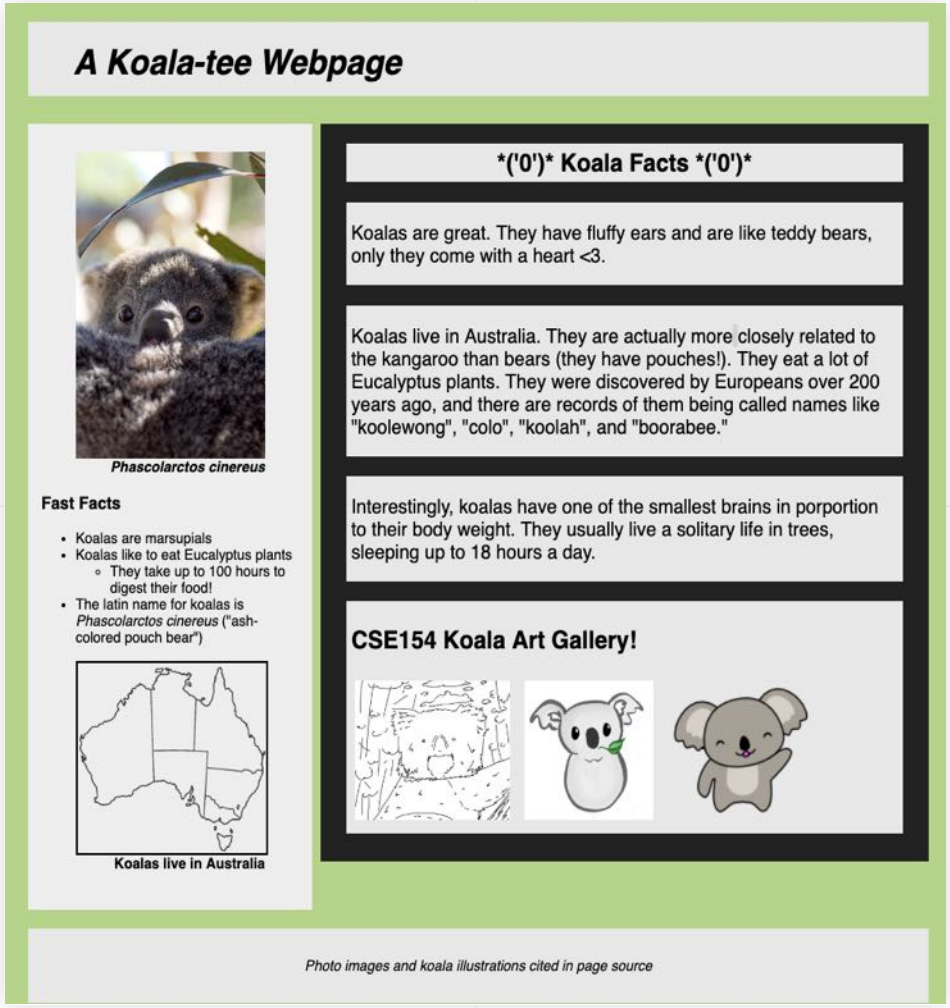
HTML

For different types of pages, you may have more elements (e.g. `nav`, `aside`), but these are the ones you should follow as a guide for most of your webpages.

HTML vs Rendered Web Page

```
<!DOCTYPE html>
<html>
  <head>
    <title>Koala Fan Page</title>
  </head>
  <body>
    <header>
      <h1>A Koala-tee Webpage</h1>
    </header>
    <main>
      <aside>
        <!-- Left sidebar -->
      </aside>
      <section>
        <!-- Koala facts (header and parag

        <article>
          <!-- Koala art gallery -->
        </article>
      </section>
```



HTML5 and Semantic Tags

`<main>`

Main content of the document - unlike <header> and <footer> tags, there can only be one main element in the <body>. The content inside should be unique and *not* contain content that is repeated across pages (e.g. sidebars, nav link, search bars, etc.)

`<header>`

Header element - contains header information for page body or section/article, including logos, navigation bar, etc.

`<footer>`

Footer element - contains footer information for page body or section/article, including copyright information, contact, links, etc. Also often used with block quotes to cite sources (see CP1 about.html for an example!).

`article` VS `section`

We get this question a LOT

Others ask this too

Here are two resources to help you:

- Ian Devlin article (a course reading)
- YouTube video

Articles are complete, standalone content. Sections are pieces of a greater whole.

And remember: `div` div has no semantic meaning, should only be added for selecting content in CSS/JS, and should be your "last resort"

Some Important HTML Details

HTML Tag Attributes

Some tags can contain additional information called **attributes**

- Syntax:
  `<element attribute="value" attribute="value">` *`content`* `</element>`
- Example:
  `<a href="my-other-page.html">Next page</a>`

Some tags don't contain content and can be opened and closed in one tag (self-closing or "void")

- Syntax:
  `<element attribute="value" attribute="value">`
- Example:
  `<br>, <hr>`
  - You may see things like <br />, <hr /> around. These are from different (usually older) types of HTML. In HTML5, the `/` is optional and ignored.
- Example:
  `<img src="bunny.jpg" alt="pic from Easter">`

Links (Anchors): <a>

links, or "anchors", to other pages (inline)

```html
<p>
  Search for it on <a href="http://www.google.com/">Google</a>!
</p>
```

HTML

Search for it on Google!

output

Uses the `href` (Hypertext REFerence) attribute to specify the destination URL

- Can be absolute (to another web site) or relative (to another page on this site)

Anchors are inline elements; must be placed in a block element such as `<p>` or `<h1>`

Images: `<img>`

Inserts a graphical image into the page (inline)

```html
<img src="img/koala-with-leaf.png" alt="A Koala with a leaf" title="Logo">
```

HTML

output

The `src` attribute specifies the image URL

Motivating alt text

HTML5 also requires an `alt` attribute describing the image, which improves accessibility for users who can't otherwise see it.

The value of the `alt` attribute is also what you see if the image is not successfully loaded.

```html
<img src="img/koala-with-leaf-broken.png" alt="A Koala with a leaf" title="Logo">
```

HTML

A Koala with a leaf

output

More About Images

```html
<a href="https://courses.cs.washington.edu/courses/cse154/20sp/">
  <img src="img/cse154logo.png" alt="CSE154 Course Logo" title="Logo">
</a>
```

HTML

output

If placed in an `<a>` anchor tag, the image becomes a link.

Relative vs. Absolute Paths for Links and Images

Relative: paths are relative to the document linking to the path.

- Linked files **within the same directory**: `"filename.jpg"`

```html
<a href="my-other-page.html">Check out my other page!</a>
```

- Linked files within a subdirectory (e.g. "img") `"img/filename.jpg"`

```html
<img src="img/koala-with-leaf.png" alt="A Koala with a leaf" title="Logo">
```

Absolute: paths refer to a specific location of a file, *including the domain and protocol*.

- Typically used when pointing to a link that is published online (not within your own website).
- Example: `"https://validator.w3.org/"`

Citing External Material

How to cite images that aren't yours?

```html
<figure>
  <!--
    Image source: Wikipedia, Made by User:Golbez
    [CC BY-SA 3.0 (http://creativecommons.org/licenses/by-sa/3.0/)]
  -->
  <img src="https://upload.wikimedia.org/wikipedia/commons/thumb/3/3b/Australia_states_blank.png/257
       alt="Koala-land map">
  <figcaption>Koalas live in Australia</figcaption>
</figure>
```

HTML

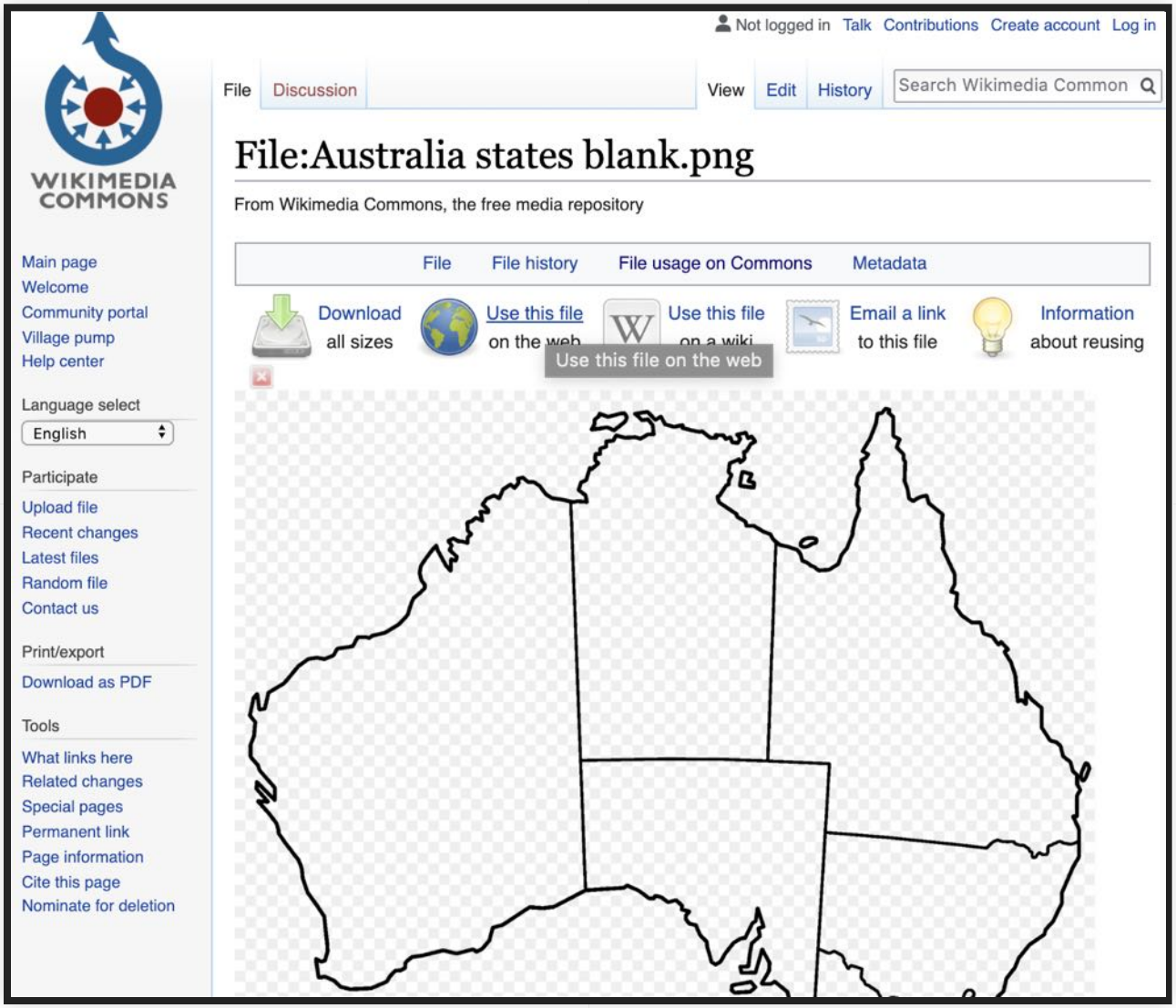
See slides **below** for how to get the citation image for this Wikimedia image.

In your CP's, you must cite all resources that were not original (and you should give your own images credits) either on the page (as in about.html or in a footer) and/or in the page source code.

More examples:

- Example 1 (citing your own images)
- Example 2 (citing other images)

Getting the CC citation info from a public Wikimedia source



Getting the CC citation info from a public Wikimedia source

Nested Lists

A list can contain other lists:

```
<ul>
  <li>Koalas are marsupials</li>
  <li>Koalas like to eat Eucalyptus plants
    <ul>
      <li>
        They take up to 100 hours to digest their food!
      </li>
    </ul>
  </li>
  <li>
    The latin name for koalas is
    <em>Phascolarctos cinereus</em>
    ("ash-colored pouch bear")
  </li>
</ul>
```

HTML

Fast Facts

- Koalas are marsupials
- Koalas like to eat Eucalyptus plants
  - They take up to 100 hours to digest their food!
- The latin name for koalas is *Phascolarctos cinereus* ("ash-colored pouch bear")

HTML Character Entities

a way of representing any Unicode character within a web page

character(s)	entity
< >	< >
é è ñ	é è ñ
™ ©	™ ©
π δ Δ	π δ Δ
И	И
" &	" &

- Complete list of HTML entities
- How would you display the text `&` on a web page?

Example: HTML-encoding text

What if I wanted to put THIS into a rendered web page?

  Search Google for grump cat

output

Example: HTML-encoding text

What if I wanted to put THIS into a rendered web page?

  Search Google for grump cat

output

To display the link text in a web page, its special characters must be encoded like this *in* the HTML:

```
&lt;p&gt;
  &lt;a href=&quot;http://google.com/search?q=grumpy+cat&amp;ie=utf-8&quot;&gt;
    Search Google for grumpy cat
  &lt;/a&gt;
&lt;/p&gt;
```

HTML

View the above output in this example

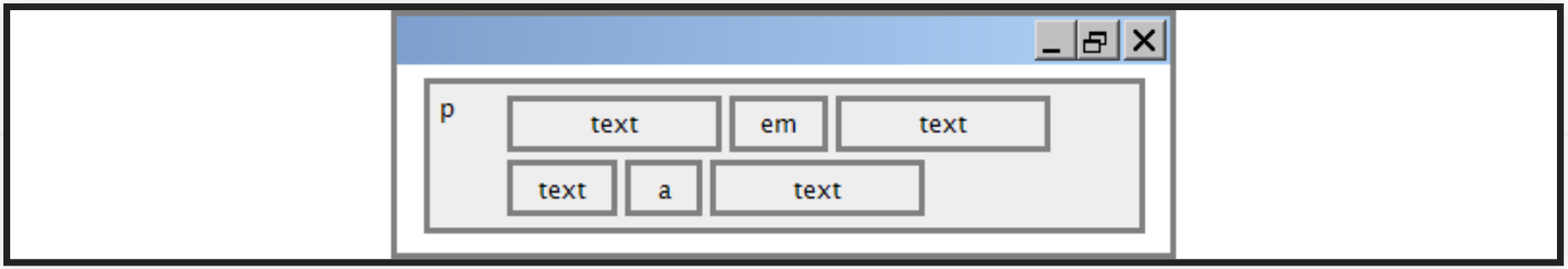
Practice: How can you fix this page to show <pre> using HTML entities?

References for more HTML Tags

You don't need to memorize all of the HTML tags, but should be able to use the right tag for the right purpose (semantics).

Refer to this slide deck for a list of the common tags you should know, and MDN's element reference for a much more comprehensive and detailed list (includes browser compatibility for each!)

Block and Inline Elements (explanation)



Block elements contain an entire large region of content

- Examples: paragraphs, lists, table cells
- The browser places a margin of whitespace between block elements for separation

Inline elements affect a small amount of content

- Examples: bold text, code fragments, images
- The browser allows many inline elements to appear on the same line
- Must be nested inside a block element

Block and Inline Elements: Example

```
<em>text</em>
<em>text</em>
<em>text</em>
<p>text</p>
<p>text</p>
<p>text</p>
```

HTML

text text text

text

text

text

output

Rules and exceptions...

Block vs. inline:

- Some block elements can contain only other block elements: `<body>`, `<form>`
- `<p>` tags can contain only **inline** elements and plain text
- Some block elements can contain either: `<div>, <li>`

Some elements are only allowed to contain certain other elements:

- `<ul>` is only allowed to contain `<li>` (but `<li>` can contain `<ul>` for nested lists!)

Some elements are only allowed once per document:

- `<html>`, `<body>`, `<head>`, `<main>`

Nesting Tags

Tags can "nest" inside of other tags

```
<body>
  <p>
    This is a <em>really, <strong>REALLY</strong></em> awesome paragraph.
    And here's a neat list:
  </p>
  <ol>
    <li>with one list item</li>
    <li>with another list item</li>
  </ol>
</body>
```

HTML

This is a *really, **REALLY*** awesome paragraph. And here's a neat list...

1. with one list item
2. and another list item!

output

Incorrectly Nesting Tags

```
<p>
  HTML is <em>really,
  <strong>REALLY<em class="bad"></em></em> lots of</strong> fun!
</p>
```

Incorrectly nested HTML

Tags must be correctly nested

- A closing tag must match the most recently opened tag
- The browser may render it correctly anyway, but it is invalid HTML

How would we get the above effect in a valid way?

Incorrectly Nesting Tags

```
<p>
  HTML is <em>really,
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</p>
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Incorrectly nested HTML

Tags must be correctly nested

- A closing tag must match the most recently opened tag
- The browser may render it correctly anyway, but it is invalid HTML

How would we get the above effect in a valid way?

```
<p>
  HTML is <em>really,
  <strong>REALLY lots of</strong><em class="good"></em></em> fun!
</p>
```

Correctly nested HTML

How can we check? GitLab HTML Validator

GitLab Validation Guide

- Checks your HTML code to make sure it follows our official HTML syntax
- More picky than the browser, which may render bad HTML correctly

How can we check? GitLab HTML Validator

GitLab Validation Guide

- Checks your HTML code to make sure it follows our official HTML syntax
- More picky than the browser, which may render bad HTML correctly

NOTE: To receive full credit on your creative projects and homework assignments you MUST validate all of your files and pass with no errors.

Web Standards

Moreover, it is important to write proper HTML code and follow proper syntax

Why use valid HTML5 and web standards?

- More interoperable across different web browsers
- More likely that our pages will display correctly now and in the future
- To ensure accessibility

Tools and Resources

From the A11y Project

- A really great compendium of resources
- An accessibility workshop from GHC'18

Tools

- Web Accessability Evaluation Tool: http://wave.webaim.org/
- Color Schemes: http://colorbrewer2.org/
- Color blindness checker: http://www.color-blindness.com/coblis-color-blindness-simulator/
- Text readability: http://juicystudio.com/services/readability.php

Resources

- Web Content Accessibility Guidelines (something to know about when you apply for jobs): https://www.w3.org/WAI/intro/wcag
- Teach Access Tutorial (general background and covers an important standard called ARIA). http://teachaccess.org/initiatives/tutorial/
- Web design and development course by AccessComputing http://www.washington.edu/accesscomputing/webd2/
- A11ycast - YouTube Videos to teach developers how accessibility works.

Accessible Web Design Principles

- Use document structure (Semantic) tags: e.g., `<article>`, `<strong>`
- Don't use deprecated style tags like `<b>`
- Provide metadata: e.g., `<html lang="en">`
- Provide alternatives: e.g., img alt tag, video captions, transcripts, allow both keyboard and mouse input
- Avoid directional text: eg. "the diagram on the right shows..."

Note: These design principles help in other ways as well

- Captions allow people to watch your video without turning sound on.
- Transcripts help people find your page through Google.
- Structure and metadata help programs understand your page.

More about HTML and accessibility here.