CSS Overview

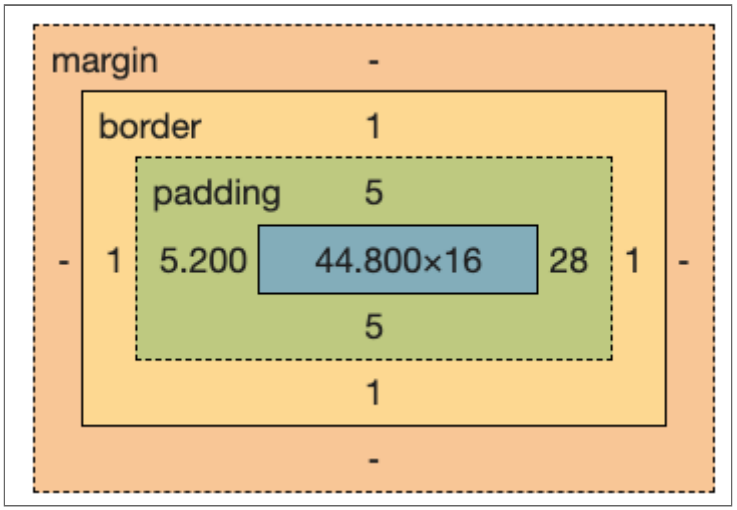
CSS provides

- Rules for appearance of HTML
- Based on structure

CSS Box Model

Every rendered element is a "**box**":

- content has **height** and **width**
- **padding** around it has size in four directions
- a **border** on all four sides has a width
- **margins** between the border and adjacent boxes has a width in four directions



Box Sizing

How wide is the below element?

```
p {
  width: 100px;
  padding: 10px;
}
```

- With `box-sizing: content-box;` (default) = 120px
- With `box-sizing: border-box;` = 100px;

Common to see:

```
* {
  box-sizing: border-box;
}
```

Stylesheets

There are a few ways to apply CSS to HTML

- inline CSS on element (don't do)
- `<style>` element (don't do)
- A stylesheet file linked via `<link>`

Inline CSS

(Generally don't do this)

CSS can be applied to an element as an attribute

```
<div style="color: red;">Example</div>
```

Example

Why not use Inline CSS?

- Hard to override
- Impossible to reuse
- Really annoying to edit

Using a style element

(Generally don't do this)

```
<head>
  <style>
    #demo {
      color: red;
    }
  </style>
</head>
<body>
  <div id="demo">Example</div>
</body>
```

Example

Why not use style element?

- Makes for big files
- Impossible to reuse between files
- Annoying to edit

Using a stylesheet file

```
<link rel="stylesheet" href="example.css"/>
// in example.css

#demo {
  color: red;
}

.selected {
  color: black;
  background-color: red;
}
```

How many stylesheets?

Varies, but typical to have:

- 1 file for site-wide standards
- 1 file for page-specific css

Sites might have 1 stylesheet, might have 5

- all about level of abstraction and reuse

Exceptions

Okay to use style element

- if tools build it for you
- You don't suffer any of the downsides
- fewer requests

Okay to use inline CSS

- if assigned with JS *and*
- values aren't just class names
    - such as changing position by dragging

CSS Rules

CSS is made up of **rules**

- A rule is **selector(s)** and **declarations**

```
p {
  color: #C0FFEE;
}

li {
  border: 1px solid black;
  padding: 0px;
}
```

invalid rules/declarations are skipped and the next rule/declaration tried.

Selectors

A rule has one or more comma separated **selectors**
https://developer.mozilla.org/en-US/docs/Learn/CSS/Building_blocks/Selectors

```
p, li {
  background-color: #BADA55;
}
```

- tag name: `p {...}`
- id `#demo {...}`
- a class `.example {...}`
- descendants `div .wrong {...}`
- direct children `div > .wrong {...}`
- many other options

Declarations

The "body" of a CSS rule is declarations.

```
{
  css-property: value;
  another-property: value;
}
```

If a property doesn't exist, the next will be tried

Browsers have specific properties with "prefixes"

- example: `--webkit-transform-style: flat;`
- you generally should avoid these in modern CSS

Shorthand properties

Some properties accept multiple values to apply to multiple properties:

```
p {
  border: 1px solid black;
}

p {
  border-width: 1px;
  border-style: solid;
  border-color: black;
}
```

Use these where the meaning is understood

Nothing wrong with being more explicit for clarity

CSS colors

- A named color **https://drafts.csswg.org/css-color/#named-colors**
- a hexadecimal RGB color (e.g. `#BADA55`)
    - 3, 4, 6, and 8 character varieties
    - 3 or 4 have hex chars doubled
        - e.g. `#639` is `#663399`
    - 4 or 8 include alpha aka opacity
- `rgb()` or `rgba()` passing 3 RGB vals and an alpha
    - passed RGB values are decimal
    - alpha is 0-1 or 0%-100%
- non-RGB systems like `hsl()` or `hwb()`

Property Inheritance

Some properties on parents are inherited by children unless overridden

- Some other properties are not inherited
- Ex: "color" is inherited
- Ex: "width" is not inherited
- Most colors and typography are inherited
- Sizes and positioning are not

Using Box Model

- We do not yet know how to *layout* a page
- One step at a time
- Focus on styling element boxes right now

Basic Box Example - HTML

index.html

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <title>Box Model Sample</title>
  <link href="/styles.css" rel="stylesheet"/>
</head>
<body>
  <p>Text with <a href="./index.html">link</a></p>
  <div>Here is more content</div>
</body>
</html>
```

Box Model CSS Starting Point

styles.css

```
* {
    box-sizing: border-box;
}
```

Basic Box Properties

Make the element box visible:

```
p {
    background-color: burlywood;
    border: 1px solid black;
}
```

Dimensions:

```
p {
    background-color: burlywood;
    border: 1px solid black;
    height: 50px;
    width: 300px;
}
```

Padding is Between Border and Content

```
p {
    background-color: burlywood;
    border: 1px solid black;
    height: 50px;
    width: 300px;

    padding: 5px;
}
```

Try increasing/decreasing padding in DevTools

Margin is between border and neighbor elements

Make neighbor box visible

```
div {
  border: 1px solid black;
}
```

Notice the `<p>` has a DEFAULT margin!

```
p {
    background-color: burlywood;
    border: 1px solid black;
    height: 50px;
    width: 300px;
    padding: 5px;

    margin: 0px;
}
```

Try increasing/decreasing margin in DevTools

Inline vs Block

Most HTML Elements are naturally either:

- inline
    - they take up size based on content
    - CSS resizing highly limited
    - do not break the "flow" of text
- block
    - they will shift to fill width of container
    - height as needed by content
    - CSS resizing fully available
    - break flow before and after

Rules set by `display` property

Notes about inline elements

- Do not break flow
    - means some sizing properties don't do anything

Notes about Block elements

Take up full-width of container by default

- AND break flow

Breaking flow means changing the size alone won't stop it

inline Example

```
a {
    background-color: aqua;
    border: 1px solid red;
    height: 30px;
    width: 50px;
}
```

height/width don't work!

- because `<a>` is `display: inline;` by default

Notes about inline block elements

```
display: inline-block;
```

- Does not break flow
- Does allow for resizing

If you are changing `display`, it will tend to be to `inline-block` or one of the layout options

- Don't swap `inline` to `block` or vice-versa

inline-block Example

```
a {
    background-color: aqua;
    border: 1px solid red;
    height: 30px;
    width: 50px;

    display: inline-block;
}
```

Now height/width take effect!

Notes about floating

`float: left;` (etc)

Used to have inline elements flow around it

- e.g. a paragraph of text wrapping around a small image

DO NOT USE TO FAKE LAYOUT

- Was a common fix before flexbox/grids
- Only use to wrap text around an image
- A lot of outdated online advice

What If?

If an element matches different selectors?

```
p {
  color: aqua;
}
.wrong {
  color: red;
}
```

Resolve via **specificity**

CSS Specificity

- `!important` is the most specific (overrules all)
    - *Only* use this to override an external library
- Inline CSS is the next most specific
    - You should also not be doing this
- id selectors (`#example`) are next
- class selectors (`.example`) are next
- element selectors (`p`) are next

Selectors can combine to increase specificity

- `.example.wrong` is more specific than `.example`
    - still less specific than `#example`

Same Specificity?

If two selectors have the same specificity

- the winner will be the "most recent"
    - later in the file or page

Avoid Specificity War

If you have multiple sources of CSS

- the different sources will use specificity to override one another
- This can lead to "specificity wars":
    - one source will make a selector more specific
    - but that breaks another place
    - so the source of the other place raises THEIR specificity
- There is only pain and tears in a specificity war
    - avoid by having a way to target each "level" of source

Scoping on a shared page

A semi-common pattern:

- Your content container has an id
- Use classes (not ids) for lower levels
- Use `#YOUR-ID .YOUR-CLASS` as your CSS pattern

Means you only have to have one unique id per source of content

- Ensures your class styling won't impact outside your content

Emmet

- Editor may have "snippets"
    - define expansions of known content
- Emmet is a generic standard
    - for HTML and CSS (and lorem ipsum text)

https://docs.emmet.io/

Lorem Ipsum

Fake text

- taken randomly from an old latin speech
- see how a layout looks with "text-like" content
- Real content is always better
    - But rarely available at design time
- Many tools to generate "lorem text"
    - in-editor or websites to cut/paste

CSS Units

- `%` of container
- `vh` and `vw`
    - "viewport"
- `px` vs `rem` vs `em`
    - `px` is (mostly) fixed
        - fixed is often bad
    - `em` causes inheritance problem
    - sizes based off of "root" font "em" width
        - "root" is `<html>` element
    - **https://css-tricks.com/html-vs-body-in-css/**
    - `rem` useful with browser text settings

CSS Variables

Often we have values that we want to reuse

- height/widths of elements interacted with (nav?)
- colors (background, accent, highlight, etc)

Technically these are "custom properties", and follow the normal cascading/precedence rules

Outside CSS

CSS took a long time to add variables

We will talk about SASS and LESS later, they have their own solutions

- But SASS/LESS aren't actual CSS

This is the pure (but limited) CSS solution

Using a CSS Custom Property

Assign:

```
.some-selector {
  --my-var: black;
  --another: 5rem;
}
```

Use:

```
p {
  color: var(--my-var);
}
```

"Global" assign:

```
:root {
  --main-bg-color: #BADA55;
}
```

Pseudo-classes

Added to a selector to indicate a state

- `:hover`
- `:focus` and `:focus-within`
- `:active`
- `:not()`
- `:first-child`
- `:nth-child()`

Pseudo-elements

Not elements, but allow you to style them like one

- `::selection`
- `::first-line` and `::first-letter`
- `::before` and `::after`
    - These require a `content` property

CSS Properties

- `filter`
  - `filter: brightness()`
- `opacity`
- `font-family`
- `visibility`
  - hides without removing from layout
  - can be good/bad for accessibilty

CSS Functions

- `calc()`
- `max()` and `min()`
- `clamp()`
    - 3 args, preferred should be a value that changes

Media Queries

- Wraps CSS Rules
- Rules applied or not based on query
- Says if the rules are matched

Screen Width

If CONDITION, apply CSS rules

```
@media (min-width: 1000px) {
  body {
    background-color: red;
  }
}
```

Reduced Motion

- options are `no-preference` or `reduce`
- which involves less work?

```
@media (prefers-reduced-motion: no-preference) {
  .my-element {
    animation: flashy-zoom-in-out 1s;
  }
}
```

Orientation

- If you care past width…

```
@media (orientation: portrait) {
  body {
    display: flex;
    flex-direction: column;
  }
}
```

Printing

A deep rabbithole

- Alternative to generating PDFs
- Not always the best alternative

```
@media print {
  h3 {
    page-break-before: always;
  }
}
```

Summary - CSS Purpose

CSS provides rules for appearance

- based on structure
- where structure matches rules, appearance applies

Summary - Box Model

Every element is a "box" of "boxes"

- content width and height
- padding width and height
- border width and height
- margin width and height

`box-sizing` property

- `content-box`: `width` and `height` are content
- `border-box`: w + h are content+padding+border?

Summary - Stylesheets

CSS added to your page:

- inline in elements
    - rare except for specific needs
    - can't reuse
- in `<style>` element
    - rare without tools
    - can't reuse
- as a separate `.css` file
    - via `<link>` element with `href` attribute
    - common
    - multiple CSS files when different reuse cases

Summary - Rules

- Rules are selector(s) + declarations
- invalid rules skipped over

Summary - Selectors

- comma separated
- if any selectors match, declarations applied
- symbols indicate type of selector, no symbol = element selector
- Connected symbols = must match all:
  - `div#root.active`
    - "div with id root and class of active"
- space = descendant, easiest to read backwards
  - `div .wrong`
    - "element with a class of wrong that is a descendant of a div"

Summary - Declarations

- kebab-case, each ends in semicolon
- "prefixes" (`--webkit-*`) mostly retired
- "shorthand" properties set multiple properties
    - use where understandable
    - avoid where confusing (be explicit then)
- Color values can be
    - RGB 3,4,6,8 hex characters starting with `#`
    - rgb() or rgba() (decimal values)
    - hsl() or hwb()
    - transparency/opacity is "alpha"
        - 0.0-1.0 or 0%-100%

Summary - Cascade

All matching rules are applied

- some properties are inherited from parent element
  - generally text and color related properties
  - not size, display, or layout related properties

Summary - Specificity

If a property gets two different values, which takes effect?

- both do, but one is overridden
- Selector Specificity
    - which rules have properties overridden
    - `!important` > inline > id > classes > element
- Same specificity:
    - most "recent" overrides
    - order of file loading
    - place in file