Comp 324/424 - Client-side Web Design

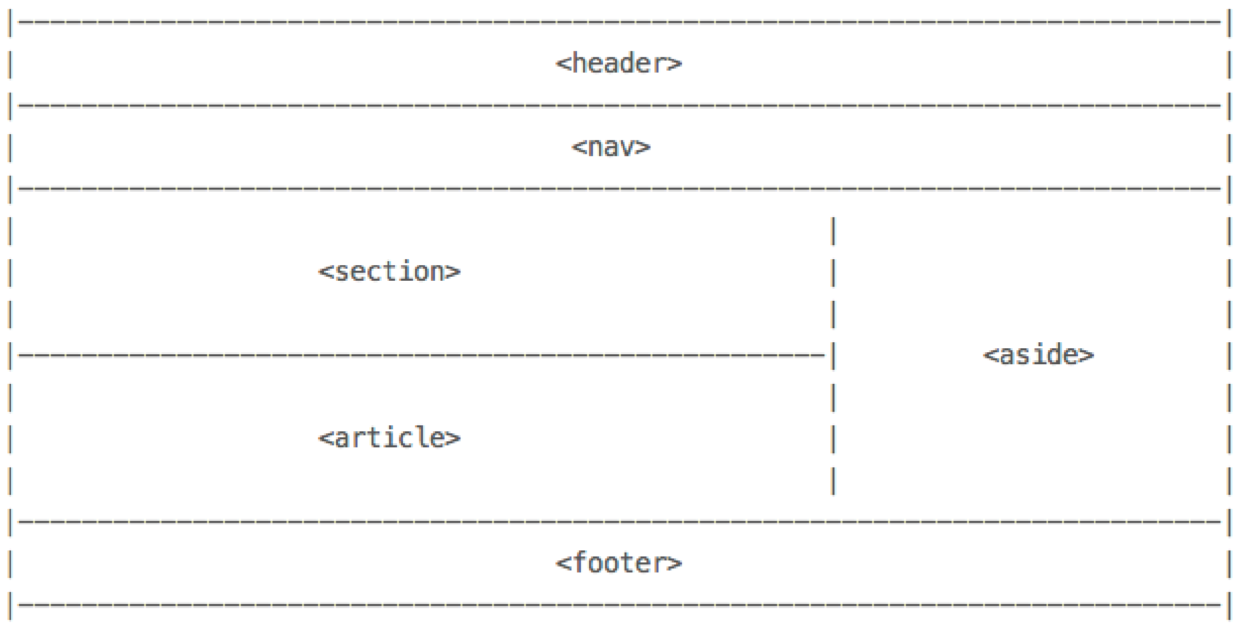
Spring Semester 2017 - Week 3

Dr Nick Hayward

Contents

Image - HTML5 page structure - part 1

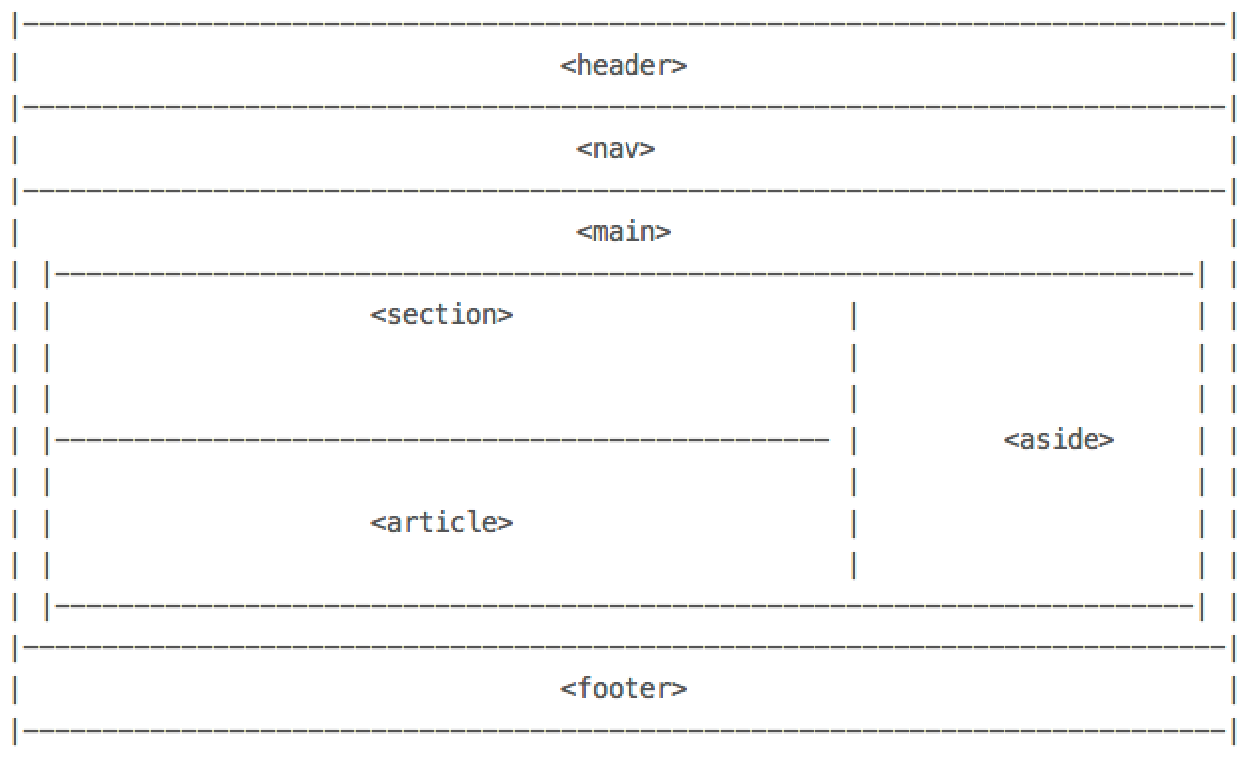
semantic elements



HTML5 - Structure

Image - HTML5 page structure - part 2

semantic elements



```
|----------------------------------------------------------------------|
|                              <header>                                |
|----------------------------------------------------------------------|
|                               <nav>                                  |
|----------------------------------------------------------------------|
|                               <main>                                 |
|  |----------------------------------------------------------------|  |
|  |           <section>                   |                        |  |
|  |                                       |                        |  |
|  |                                       |                        |  |
|  |---------------------------------------|        <aside>         |  |
|  |                                       |                        |  |
|  |           <article>                   |                        |  |
|  |                                       |                        |  |
|  |----------------------------------------------------------------|  |
|----------------------------------------------------------------------|
|                              <footer>                                |
|----------------------------------------------------------------------|
```

HTML5 - Structure

HTML5 page structure - part 3

- not included `<html>` and `<body>` tags in diagrams
  - *required for all HTML documents*
- divided the page into four logical, semantic divisions
  - *header*
  - *nav*
  - *main*
  - *footer*
- we could also add a sidebar etc for further division of content

HTML5 - extra elements

intro

- many other interesting and useful new HTML5 elements
  - *in addition to semantic elements*
- some struggle for browser compatibility
- useful new elements such as
  - *graphics and media*
- HTML5 APIs introduced as well, including
  - *App Cache*
  - *Drag/Drop*
  - *Geolocation*
  - *Local Storage*
  - ...
- again, check browser support and compatibility

Browser check

- Can I Use______?
  - e.g. *Can I Use Drag and Drop?*

HTML5 - Extra elements - media - part 1

video

`<video>` element

- until HTML5, video playback reliant on plugins
  - *e.g. Adobe Flash*
- embed video using element tag `<video>`
- add attributes for
  - *height, width, controls...*
- not all web browsers support all video codecs
- option to specify multiple video sources
- best supported codecs include
  - *MP4 (or H.264), WebM, OGG...*
- good general support for `<video>` element
- check browser support for `<video>` element
  - *Can I use_____video?*

HTML5 - Extra elements - media - part 2

video example

`<video>` - a quick example might be as follows,

```
<video width="300" height="240" controls>
  <source src="media/video/movie.mp4" type="video/mp4">
  <source src="media/video/movie.webm" type="video/webm">
  Your browser does not support the video tag.
</video>
```

- Demo - HTML5 Video playback

HTML5 - Extra elements - media - part 3

audio

`<audio>` element

- HTML5 also supports standardised element for embedded audio
- supported codecs for `<audio>` playback include
  - *MP3 and mp4*
  - *WAV*
  - *OGG Vorbis*
  - *3GP*
  - *m4a*
- again, check browser support and compatibility
  - *Can I use_____audio?*
- fun test of codecs
  - *HTML5 Audio*

HTML5 - Extra elements - media - part 4

audio example

`<audio>` - a quick example might be as follows,

```
<audio controls>
  <source src="media/audio/audio.mp3" type="audio/mpeg">
  Your browser does not support the audio tag.
</audio>
```

- Demo - HTML5 Audio playback

HTML5 - Extra elements - graphics - part I

canvas

- graphics elements are particularly fun to use
- use them to create interesting, useful graphics renderings
- in effect, we can draw on the page
- `<canvas>` element acts as a placeholder for graphics
  - *allows us to draw with JavaScript*
- draw lines, circles, text, add gradients...
  - *e.g. draw a rectangle on the canvas*

HTML5 - Extra elements - graphics - part 2

canvas example

`<canvas>` will be created as follows,

```
<canvas id="canvas1" width="200" height="100">
  Your browser does not support the canvas element.
</canvas>
```

then use JavaScript to add a drawing to the canvas

```
<script type="text/javascript">
var can1 = document.getElementById("canvas1");
var context1 = can1.getContext("2d");
context1.fillStyle="#000000";
context1.fillRect(0,0,150,75);
</script>
```

Result is a rendered black rectangle on our web page.

- Demo - HTML5 Canvas - Rectangle

HTML5 - Extra elements - graphics - part 3

canvas example

A square can be created as follows,

```
<script type="text/javascript">
function draw() {
/*black square*/
var can1 = document.getElementById("canvas1");
var context1 = can1.getContext("2d");
context1.fillStyle="#000000";
context1.fillRect(0,0,50,50);
}
</script>
```

Again, we end up with the following rendered shape on our canvas.

- Demo - HTML5 Canvas - Square

HTML5 - Extra elements - graphics - part 4

canvas examples

- modify drawing for many different shapes and patterns
  - *simple lines, circles, gradients, images...*

    1. shows different rendered shapes on a canvas.

- Demo - HTML5 Canvas - Assorted Shapes

    2. little retro games

- Demo - HTML5 Canvas - Retro Breakout Game

CSS Basics - intro

- CSS allows us to define stylistic characteristics for our HTML
  - *helps us define how our HTML is displayed and rendered*
  - *colours used, font sizes, borders, padding, margins, links...*
- CSS can be stored
  - *in external files*
  - *added to a `<style>` element in the `<head>`*
  - *or embedded as inline styles per element*
- CSS not intended as a replacement for encoding semantic and stylistic characteristics with elements
- add a link to our CSS stylesheet using the `<style>` element.

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

- change will replicate throughout our site wherever the stylesheet is referenced
- embed styles per element using **inline** styles
  - *limitations and detractors for this style of CSS*
  - *helped by the growth and popularity of React...*

CSS Basics - pros

Pros

- inherent option and ability to abstract styles from content
- isolating design styles and aesthetics from semantic markup and content
- cross-platform support offered for many aspects of CSS
  - *CSS allows us to style once, and apply in different browsers*
  - *a few caveats remain...*
- various CSS frameworks available
- support many different categories of device
  - *mobile, screen readers, print, TVs...*
- accessibility features

CSS Basics - cons

Cons

- still experience issues as designers with rendering quirks for certain styles
  - *border styles, wrapping, padding, margins…*
- everything is global
  - *CSS matches required selectors against the whole DOM*
  - *naming strategies can be awkward and difficult to maintain*
- CSS can become a mess very quickly
  - *we tend to add to CSS instead of deleting*
  - *can grow very large, very quickly…*

CSS Basics - intro to syntax

- simple, initial concepts for CSS syntax
- follows a defined syntax pattern, e.g.
- selector
  - *e.g. body or p*
- declaration
  - *property and value pairing*

```
body {
  color: black;
  font-family: "Times New Roman", Georgia, Serif;
  }
```

- `body` is the selector, `color` is the property, and `black` is the value.

CSS Basics - rulesets

- a CSS file is a group of rules for styling our HTML documents
- rules form **rulesets**, which can be applied to elements within the DOM
- rulesets consist of the following,
  - *a selector - `p`*
  - *an opening brace - {*
  - *a set of rules - `color: blue`*
  - *a closing brace - }*
- for example,

```
body {
  width: 900px;
  color: #444;
  font-family: "Times New Roman", Georgia, Serif;
  }
```

- HTML Colour Picker

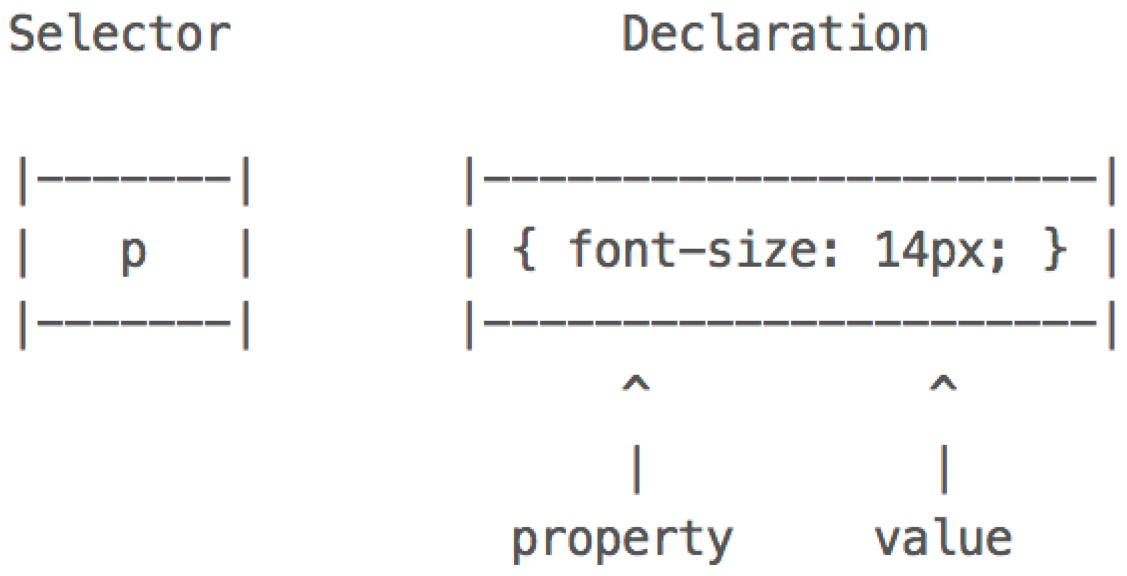
CSS Basics - comments

- add comments to help describe the selector and its properties,

```
/* color can be set to a named value or HEX value (e.g. #444) */
p {
  color: blue;
  font-size: 14px;
  }
```

- comments can be added before the selector or within the braces

Image - CSS Syntax



```
Selector          Declaration

|--------|        |----------------------|
|   p    |        | { font-size: 14px; } |
|--------|        |----------------------|
                        ^           ^
                        |           |
                     property     value
```

CSS Syntax

CSS Basics - display

- display HTML elements in one of two ways
  - *inline - e.g. `<a>` or `<span>`*
  - *displays content on the same line*

```
<div class="content">
  <p>
    <a href="...">Philae</a> is a <span>Ptolemaic</span> era temple in E
  </p>
</div>
```

- more common to display elements as `block-level` instead of `inline` elements
- element's content rendered on a new line outside flow of content
- a few sample block elements include,
  - *`<article>`, `<div>`, `<figure>`, `<main>`, `<nav>`, `<p>`, `<section>`...*
- *block-level* is not technically defined for new elements in HTML5

CSS Basics - inline elements

Current inline elements include:

- b | big | i | small | tt
- abbr | acronym | cite | code | dfn | em | kbd | strong | samp | var
- a | bdo | br | img | map | object | q | script | span | sub | sup
- button | input | label | select | textarea

Source - MDN - Inline Elements

n.b. not all inline elements supported in HTML5

CSS Basics - block-level elements

Current block-level elements include:

- address | article | aside | blockquote | canvas | dd | div | dl
- fieldset | figure | figcaption | footer | form
- h1 | h2 | h3 | h4 | h5 | h6
- header | hgroup | hr | main | nav | noscript
- ol | output | p | pre | section | table | tfoot | ul | video

Source - MDN - Block-level Elements

n.b. *block-level* is not technically defined for new elements in HTML5

CSS Basics - HTML5 content categories - part I

- **block-level** is not technically defined for new elements in HTML5
- now have a slightly more complex model called **content categories**
- includes three primary types of content categories

These include,

- **main content categories** - describe common content rules shared by many elements
- **form-related content categories** - describe content rules common to form-related elements
- **specific content categories** - describe rare categories shared by only a small number of elements, often in a specific context

CSS Basics - HTML5 content categories - part 2

- **Metadata content** - modify presentation or behaviour of document, setup links, convey additional info...
  - *`<base>`, `<command>`, `<link>`, `<meta>`, `<noscript>`, `<script>`, `<style>`, `<title>`*
- **Flow content** - typically contain text or embedded content
  - *`<a>`, `<article>`, `<canvas>`, `<figure>`, `<footer>`, `<header>`, `<main>`...*
- **Sectioning content** - create a section in current outline to define scope of `<header>` elements, `<footer>` elements, and *heading* content
  - *`<article>`, `<aside>`, `<nav>`, `<section>`*
- **Heading content** - defines title of a section, both explicit and implicit sectioning
  - *`<h1>`, `<h2>`, `<h3>`, `<h4>`, `<h5>`, `<h6>`, `<hgroup>`*

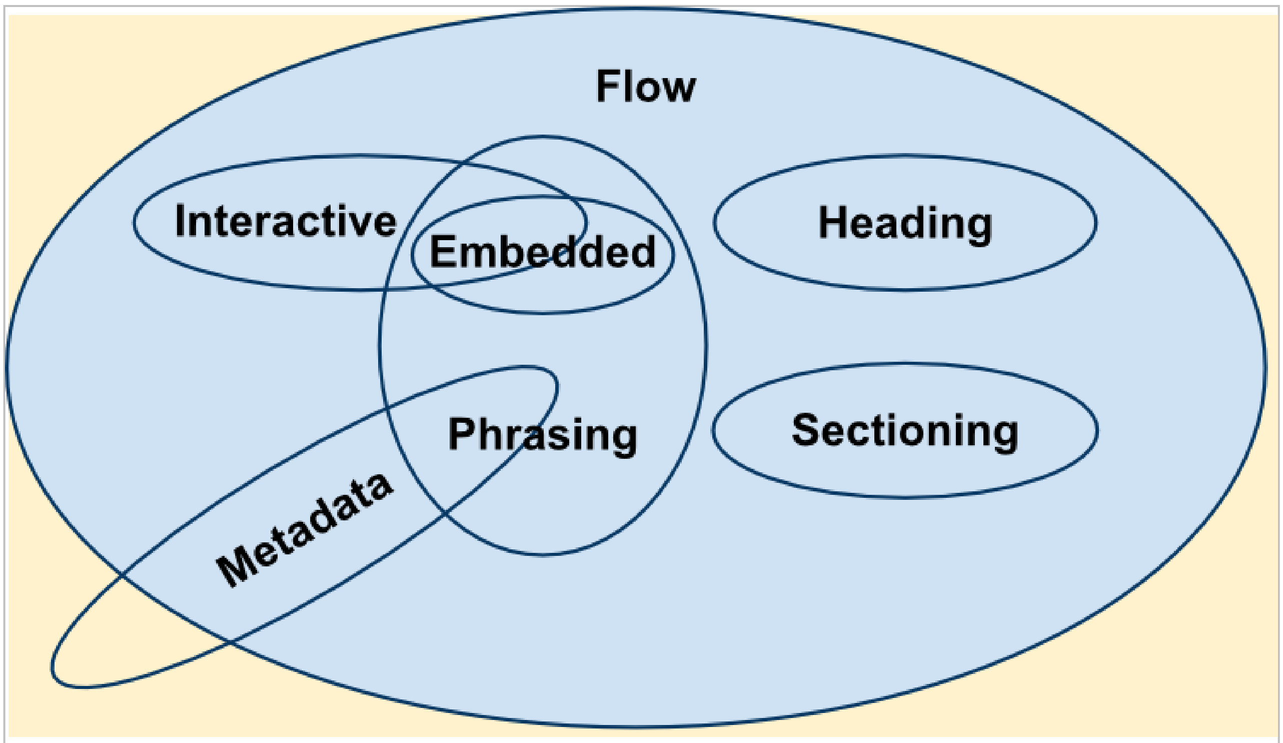
Source - MDN Content Categories

CSS Basics - HTML5 content categories - part 3

- **Phrasing content** - defines the text and the mark-up it contains
  - *`<audio>`, `<canvas>`, `<code>`, `<img>`, `<label>`, `<script>`, `<video>`...*
  - *other elements can belong to this category if certain conditions are met. e.g. `<a>`*
- **Embedded content** - imports or inserts resource or content from another mark-up language or namespace
  - *`<audio>`, `<canvas>`, `<embed>`, `<iframe>`, `<img>`, `<math>`, `<object>`, `<svg>`, `<video>`*
- **Interactive content** - includes elements that are specifically designed for user interaction
  - *`<a>`, `<button>`, `<details>`, `<embed>`, `<iframe>`, `<keygen>`, `<label>`, `<select>`, `<textarea>`*
  - *additional elements, available under specific conditions, include*
  - *`<audio>`, `<img>`, `<input>`, `<menu>`, `<object>`, `<video>`*
- **Form-associated content** - elements contained by a form parent element
  - *`<button>`, `<input>`, `<label>`, `<select>`, `<textarea>`...*
  - *there are also several sub-categories, including listed, labelable, submittable, resettable*

Source - MDN Content Categories

Image - HTML5 Content Categories



HTML5 Content Categories

Source - MDN - Content Categories

CSS Basics - box model - part 1

- consideration of the CSS box model
- a document's attempt to represent each element as a rectangular box
- boxes and properties determined by browser rendering engine
- browser calculates size, properties, and position of these required boxes
- properties can include, for example,
  - *colour, background features, borders, width, height...*
- box model designed to describe an element's required space and content
- each box has a series of edges,
  - ***margin*** *edge*
  - ***border*** *edge*
  - ***padding*** *edge*
  - ***content*** *edge*

CSS Basics - box model - part 2

Content

- box's **content area** describes element's actual content
- properties can include `color`, `background`, `img`...
  - *apply inside the **content** edge*
- dimensions include **content width** and **content-height**
- content size properties (assuming that the `box-sizing` property remains default) include,
  - *`width`, `min-width`, `max-width`, `height`, `min-height`, `max-height`*

Demo - CSS Box Model

- Demo - CSS Box Model

CSS Basics - box model - part 3

Padding

- box's **padding area** includes the extent of the padding to the surrounding border
- background, colour etc properties for a content area extend into the padding
  - *we often consider the padding as extending the content*
- padding itself is located in the box's **padding edge**
- dimensions are the width and height of the **padding-box**.
- control space between padding and content edge using the following properties,
  - *`padding-top`, `padding-right`, `padding-bottom`, `padding-left`*
  - *`padding` (sizes calculated clock-wise)*

Demo - CSS Box Model - Padding

- JSFiddle - CSS Box Model

CSS Basics - box model - part 4

Border

- **border area** extends **padding area** to area containing the borders
- it becomes the area inside the **border edge**
- define its dimensions as the width and height of the **border-box**
- calculated area depends upon the width of the `border` we set in the CSS
- set size of our border using the following properties in CSS,
  - *`border-width`*
  - *`border`*

Demo - CSS Box Model - Border

- JSFiddle - CSS Box Model

CSS Basics - box model - part 5

Margin

- **margin area** can extend this border area with an empty area
  - *useful to create a defined separation of one element from its neighbours*
- dimensions of area defined as width and height of the **margin-box**
- control size of our margin area using the following properties,
  - *`margin-top`, `margin-right`, `margin-bottom`, `margin-left`*
  - *`margin` (sizes calculated clock-wise)*

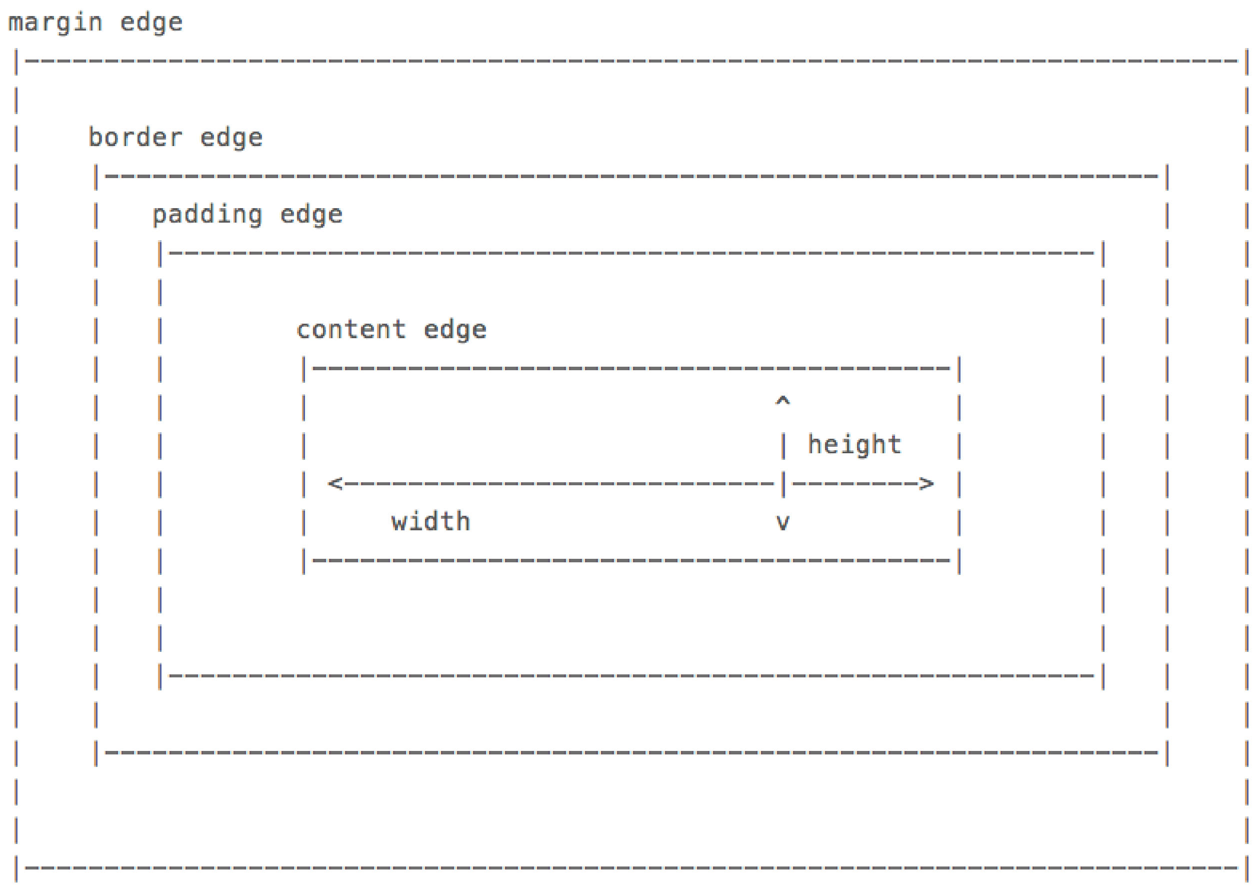
Demo - CSS Box Model - Margin

- JSFiddle - CSS Box Model

Demo - CSS Box Model

- Demo - CSS Box Model

Image - CSS Box Model



CSS Box Model

Source - MDN - CSS Box Model

CSS Basics - selectors

- **selectors** are a crucial part of working with CSS, JS...
- basic selectors such as

```css
p {
  color: #444;
}
```

- above ruleset adds basic styling to our paragraphs
  - *sets the text colour to HEX value 444*
- simple and easy to apply
  - *applies the same properties and values to all paragraphs*
- specificity requires classes, pseudoclasses...

CSS Basics - classes

- add a **class** attribute to an element, such as a <p>
  - *can help us differentiate elements*
- also add a **class** to any DOM element
  - *e.g. add different classes to multiple <p> elements*

```
<p class="p1">paragraph one...</p>
<p class="p2">paragraph two...</p>
```

- we can now select our paragraphs by class name within the DOM
- then apply a **ruleset** for each class
- style this class for a specific element

```
p.p1 {
  color: #444;
}
```

- style all elements with the class `p1`, and not just <p> elements

```
.p1 {
  color: #444;
}
```

CSS Basics - pseudoclasses

- add a class to links or anchors, styling all links with the same ruleset
- we might also want to add specific styles for different link states
- styling links with a different colour
  - *e.g. whether a link has already been used or not*

```
a {
  color: blue;
  }

a:visited {
  color: red;
  }
```

- `visited` is a CSS **pseudoclass** applied to the `<a>` element
- browser implicitly adds this pseudoclass for us, we add style

```
a:hover {
  color: black;
  text-decoration: underline;
}
```

- pseudoclass for link element, `<a>`, `hover`

CSS Basics - complex selector - part 1

- our DOM will often become more complicated and detailed
- depth and complexity will require more complicated selectors as well
- lists and their list items are a good example

```
<ul>
  <li>unordered first</li>
  <li>unordered second</li>
  <li>unordered third</li>
</ul>
<ol>
  <li>ordered first</li>
  <li>ordered second</li>
  <li>ordered third</li>
</ol>
```

- two lists, one unordered and the other ordered
- style each list, and the list items using rulesets

```
ul {
  border: 1px solid green;
}
ol {
  border: 1px solid blue;
}
```

Demo - Complex Selectors - Part 1

- Demo - Complex Selectors Part 1

CSS Basics - complex selector - part 2

- add a ruleset for the list items, `<li>`
- applying the same style properties to both types of lists
- more specific to apply a ruleset to each list item for the different lists

```css
ul li {
  color: blue;
}
ol li {
  color: red;
}
```

- also be useful to set the background for specific list items in each list

```css
li:first-child {
  background: #bbb;
}
```

- pseudoclass of `nth-child` to specify a style for the second, fourth etc child in the list

```css
li:nth-child(2) {
  background: #ddd;
}
```

Demo - Complex Selectors - Part 2

- Demo - Complex Selectors Part 2

CSS Basics - complex selector - part 3

- style odd and even list items to create a useful alternating pattern

```
li:nth-child(odd) {
  background: #bbb;
}
li:nth-child(even) {
  background: #ddd;
}
```

- select only certain list items, or rows in a table etc
  - *e.g. every fourth list item, starting at the first one*

```
li:nth-child(4n+1) {
  background: green;
}
```

- for **even** and **odd** children we're using the above with convenient shorthand
- other examples include
  - *`last-child`*
  - *`nth-last-child()`*
  - *many others...*

Demo - CSS Complex Selectors - Part 3

- Demo - Complex Selectors Part 3

CSS Basics - cascading rules - part I

- CSS, or cascading style sheets, employs a set of **cascading** rules
- rules applied by each browser as a ruleset conflict arises
  - *e.g. issue of **specificity***

```
p {
  color: blue;
  }
p.p1 {
  color: red;
  }
```

- the more specific rule, the class, will take precedence
- issue of possible duplication in rulesets

```
h3 {
  color: black;
}

h3 {
  color: blue;
}
```

- **cascading** rules state the later ruleset will be the one applied
  - *blue heading instead of black...*

CSS Basics - cascading rules - part 2

- simple styling and rulesets can quickly become compounded and complicated
- different styles, in different places, can interact in complex ways
- a powerful feature of CSS
  - *can also create issues with logic, maintenance, and design*
- three primary sources of style information that form this cascade
  1. default styles applied by the browser for a given markup language
     - *e.g. colours for links, size of headings...*
  2. styles specific to the current user of the document
     - *often affected by browser settings, device, mode...*
  3. styles linked to the document by the designer
     - *external file, embedded, and as inline styles per element*
- basic cascading nature creates the following pattern
  - *browser's style will be default*
  - *user's style will modify the browser's default style*
  - *styles of the document's designer modify the styles further*

CSS Basics - inheritance

- CSS includes inheritance for its styles
- descendants will inherit properties from their ancestors
- style an element
  - *descendants of that element within the DOM inherit that style*

```css
body {
  background: blue;
}
p {
  color: white;
}
```

- p is a descendant of body in the DOM
  - *inherits background colour of the body*
- this characteristic of CSS is an important feature
  - *helps to reduce redundancy and repetition of styles*
- useful to maintain outline of document's DOM structure
- most styles follow this pattern but not all
- margin, padding, and border rules for block-level elements **not inherited**

Demos - DOM & HTML

- Demo - HTML5 Video playback
- Demo - HTML5 Audio playback
- Demo - HTML5 Canvas - Rectangle
- Demo - HTML5 Canvas - Square
- Demo - HTML5 Canvas - Assorted Shapes
- Demo - HTML5 Canvas - Retro Breakout Game

Demos - CSS

- Demo - CSS Box Model
- Demo - Complex Selectors Part 1
- Demo - Complex Selectors Part 2
- Demo - Complex Selectors Part 3

CSS - test and try out

- JSFiddle - CSS Box Model Padding

References - HTML5

- HTML5 Audio formats
- HTML5 Test
- W3C
  - *HTML5 Documentation*
- W3 Schools
  - *W3Schools - HTML5 Semantic Elements*

References - CSS

- CSS Tricks - nth child recipes
- JSFiddle - CSS Basics
- MDN - CSS
- CSS box model
- Perishable Press - Barebones Web Templates
- W3 CSS
- W3 Schools - CSS
- W3 Schools - HTML Colour Picker
- W3 Web Style Sheets - Even & Odd