

Cascading Style Sheets (CSS)

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Driving problem behind CSS

What font type and size does `<h1>Introduction</h1>` generate?

Answer: Some default from the browser (HTML tells **what** browser **how**)

Early HTML - Override defaults with attributes

```
<table border="2" bordercolor="black">
```

Style sheets were added to address this:

Specify style to use rather than browser default

Not have to code styling on every element

Key concept: Separate style from content

Content (what to display) is in HTML files

Formatting information (how to display it) is in separate style sheets (.css files).

Use an element attribute named **class** to link (e.g. ``)

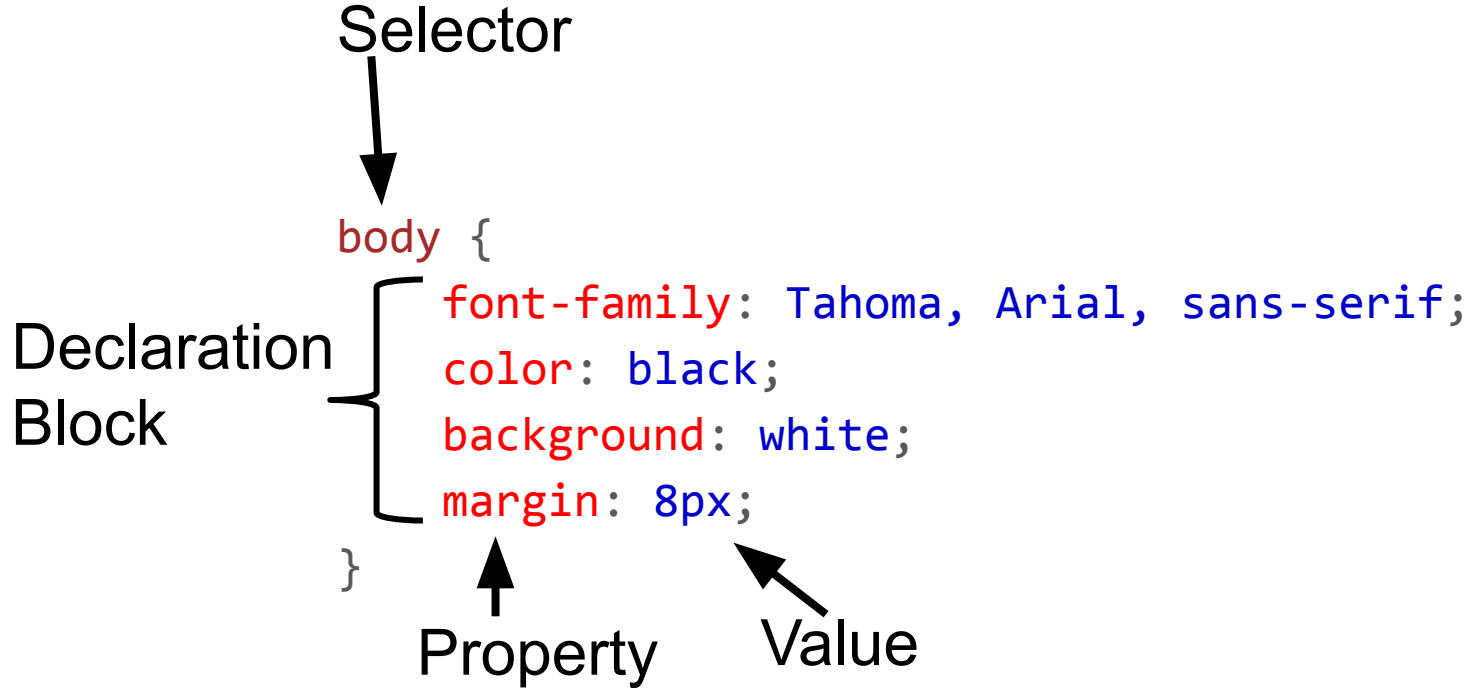
Result: define style information once, use in many places

Consider can you make all the text in the app slightly bigger?

Or purple is our new company color.

DRY principle: Don't Repeat Yourself

Style sheet contain one or more **CSS Rules**



CSS Selector	CSS	HTML
Tag name	<pre>h1 { color: red; }</pre>	<pre><h1>Today's Specials</h1></pre>
Class attribute	<pre>.large { font-size: 16pt; }</pre>	<pre><p class="large">...</pre>
Tag and Class	<pre>p.large {...}</pre>	<pre><p class="large">...</pre>
Element id	<pre>#p20 { font-weight: bold; }</pre>	<pre><p id="p20">...</pre>

CSS Pseudo Selectors

hover - Apply rule when mouse is over element (e.g. tooltip)

```
p:hover, a:hover {  
  background-color: yellow;  
}
```

a:link, a:visited - Apply rule when link has been visited or not visited (link)

```
a:visited {  
  color: green;  
}  
a:link {  
  color: blue;  
}
```

CSS Properties

Control many style properties of an element:


- Coloring
- Size
- Position
- Visibility
- Many more: (e.g. `p: { text-decoration: line-through; }`)


- Also used in animation


Color - Properties: `color` & `background_color`

Must ultimately turn into red, green, and blue intensities between 0 and 255:

- Predefined names: `red`, `blue`, `green`, `white`, etc.

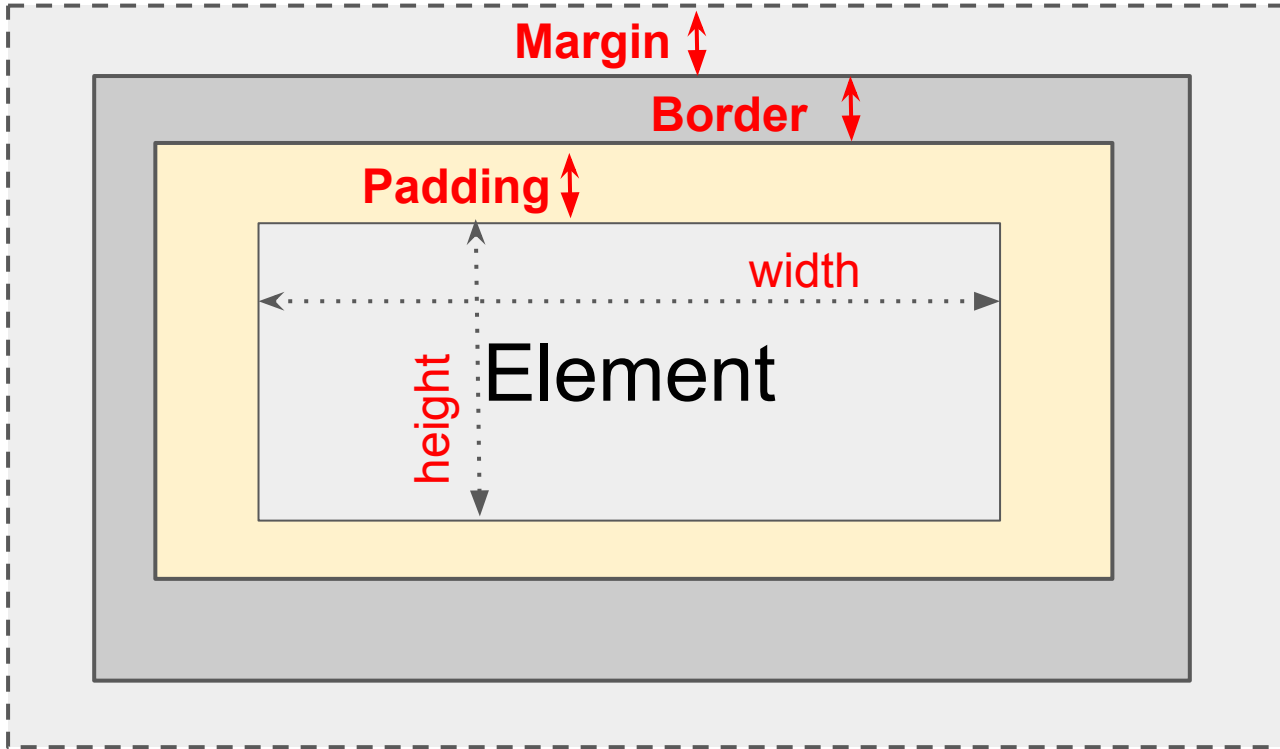
- 8-bit hexadecimal numbers for red, green, blue: `#ff0000` → 
 R G B

- 0-255 decimal intensities: `rgb(255, 255, 0)` → 
 R G B

- Percentage intensities: `rgb(80%, 80%, 100%)` → 
 R G B

Example: `h1: { color: red; }`

CSS Box Model



Total element width =
width +
left padding +
right padding +
left border +
right border +
left margin +
right margin

Margin & Padding
Transparent

CSS distance units

Absolute	
2px	pixels
1mm	millimeters
2cm	centimeters
0.2in	inches
3pt	printer point 1/72 inch
Relative	
2em	2 times the element's current font size
3rem	3 times the root element's current font size

Size Properties - Element, pad, margin, border

width - Override element defaults
height

padding-top
padding-right
padding-bottom
padding-left

margin-top
margin-right
margin-bottom
margin-left

border-bottom-color
border-bottom-style
border-bottom-width
border-left-color
border-left-style
border-left-width
border-right-color
border-right-style
border-right-width
etc.

```
p {  
  border: 5px solid red;  
}
```

position property

`position: static;` (default) - Position in document flow

`position: relative;` Position relative to default position via `top`, `right`, `bottom`, and `left` properties

`position: fixed;` Position to a fixed location on the screen via `top`, `right`, `bottom`, and `left` properties

`position: absolute;` Position relative to ancestor absolute element via `top`, `right`, `bottom`, and `left` properties

Fixed position (0,0) is top left corner

Some more common properties

`background-image`: image for element's background

`background-repeat`: should background image be displayed in a repeating pattern (versus once only)

`font`, `font-family`, `font-size`, `font-weight`, `font-style`: font information for text

`text-align`, `vertical-align`: Alignment: `center`, `left`, `right`

`cursor` - Set the cursor when over element (e.g. `help`)

Element visibility control properties

`display: none;` - Element is not displayed and takes no space in layout.

`display: inline;` - Element is treated as an inline element.

`display: block;` - Element is treated as a block element.

`display: flex;` - Element is treated as a flex container.

`display: grid;` - Element is treated as a grid container.

`visibility: hidden;` - Element is hidden but space still allocated.

`visibility: visible;` - Element is normally displayed

Flexbox and Grid layout

- `display: flex;` (Flexbox)
- `display: grid;` (Grid) newer layout method
 - Items flex to fill additional space and shrink to fit into smaller spaces.
 - Useful for web app layout:
 - Divide up the available space equally among a bunch of elements
 - Align of different sizes easily
 - Key to handling different window and display sizes
- Flexbox - Layout one dimension (row or column) of elements
- Grid - Layout in two dimensions (rows and columns) of elements
- Covered in discussion section

Some other CSS issues

- Inheritance
 - Some properties (e.g. `font-size`) are inherited from parent elements
 - Others (`border`, `background`) are not inherited.
- Multiple rule matches
 - General idea: most specific rule wins

```
<span>Text1</span>
```

```
<span class="test">Text2</span>
```

```
span.test { color: green }
```

```
span { color: red }
```


Adding Styles to HTML

Separate style sheet (best way)

```
<head>
  <link rel="stylesheet" type="text/css" href="myStyles.css" />
  <style type="text/css">
    body {
      font-family: Tahoma, Arial, sans-serif;
    }
  </style>
</head>
<body>
  <div style="padding:2px; ... ">
</body>
```

Page-specific styles

Element-specific styles

```
body {
  font-family: Tahoma, Arial, sans-serif;
  font-size: 13px;
  color: black;
  background: white;
  margin: 8px;
}
h1 {
  font-size: 19px;
  margin-top: 0px;
  margin-bottom: 5px;
  border-bottom: 1px solid black
}
.shaded {
  background: #d0d0ff;
}
```

CSS:

```
<body>
  <h1>First Section Heading</h1>
  <p>
    Here is the first paragraph, containing
    text that really doesn't have any use
    or meaning; it just prattles on and on,
    with no end whatsoever, no point to
    make, really no purpose for existence
    at all.
  </p>
  <div class="shaded">
    <h1>Another Section Heading</h1>
    <p>
      Another paragraph.
    </p>
  </div>
</body>
```

HTML:

Example Output

First Section Heading

Here is the first paragraph, containing text that really doesn't have any use or meaning; it just prattles on and on, with no end whatsoever, no point to make, really no purpose for existence at all.

Another Section Heading

Another paragraph.

CSS in the real world

- CSS preprocessors (e.g. less) are commonly used
 - Add variable and functions to help in maintaining large collections of style sheets
 - Apply scoping using the naming conventions
- Composition is a problem
 - It can be really hard to figure out what rule from which stylesheet is messing things up