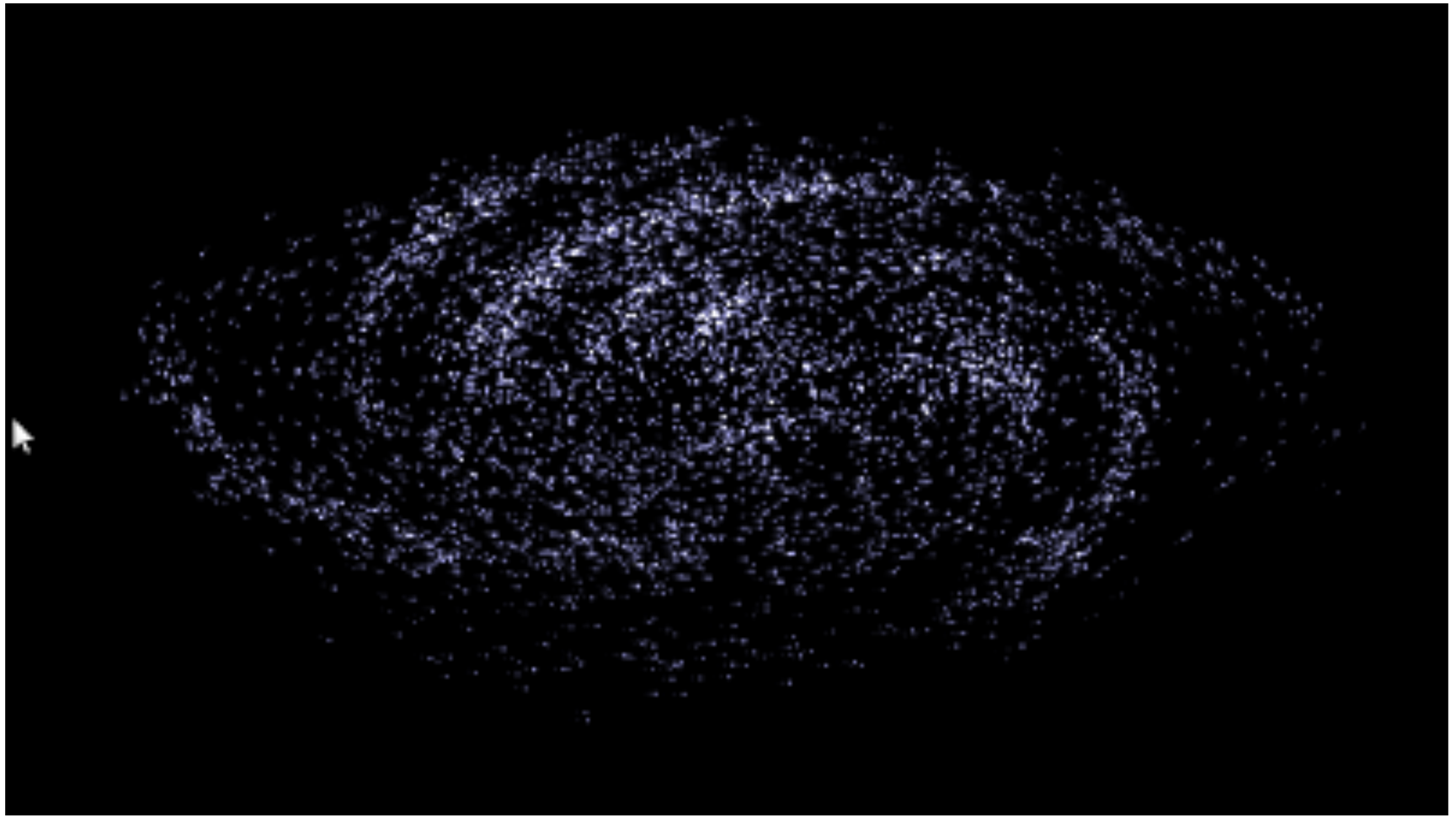
CSC4130
Introduction to Human-Computer Interaction

Lecture 6
User Interface Technology: HTML and CSS

Simulation



Game

Visualization and interaction

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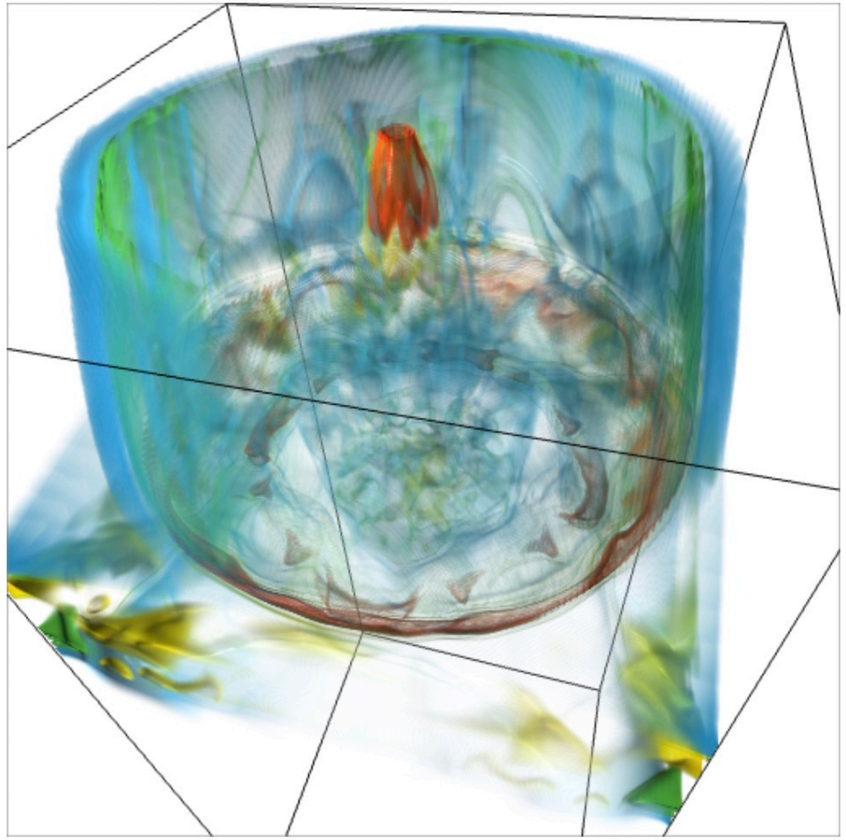
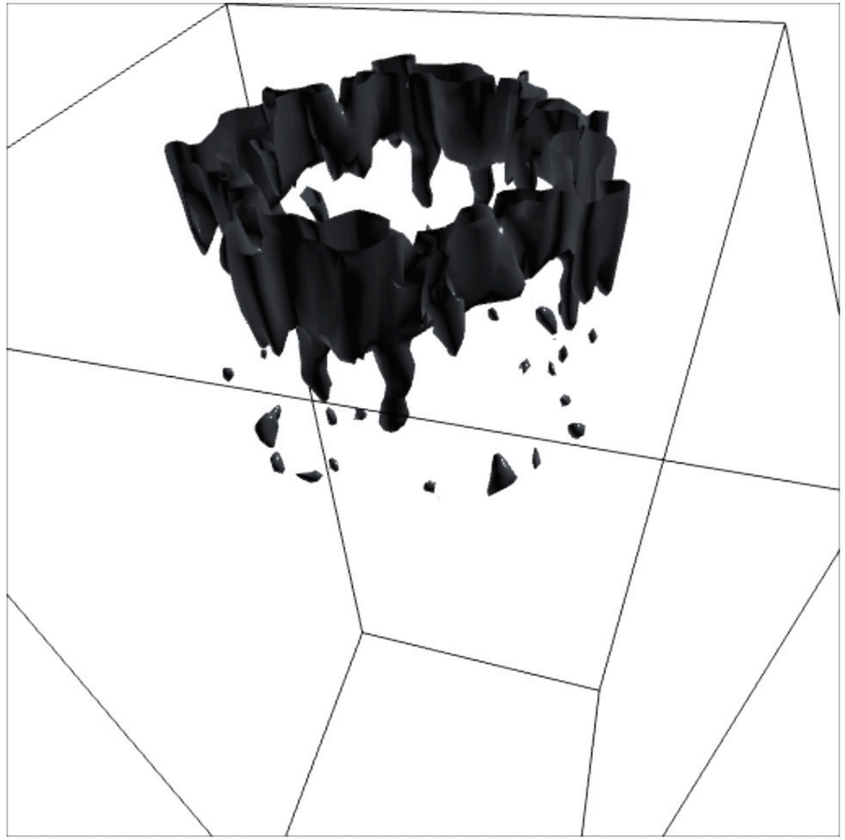
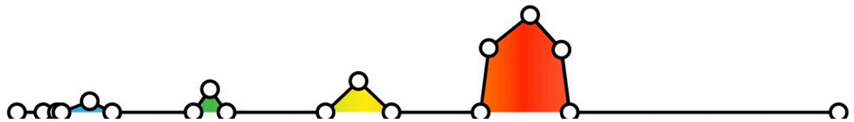
VolumeVisual







Control Panel about help?

Ionization (PD)

Cutting Plane

Lighting Parameters

Ambient
0.0 1.0

Diffuse
0.0 1.0

Specular
0.0 1.0

Shininess
2.0 128.0

Contrast
0.0 1.0

Viewing Parameters

Volume Rendering

Virtual reality

Outline

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- HTML
- CSS

Outline

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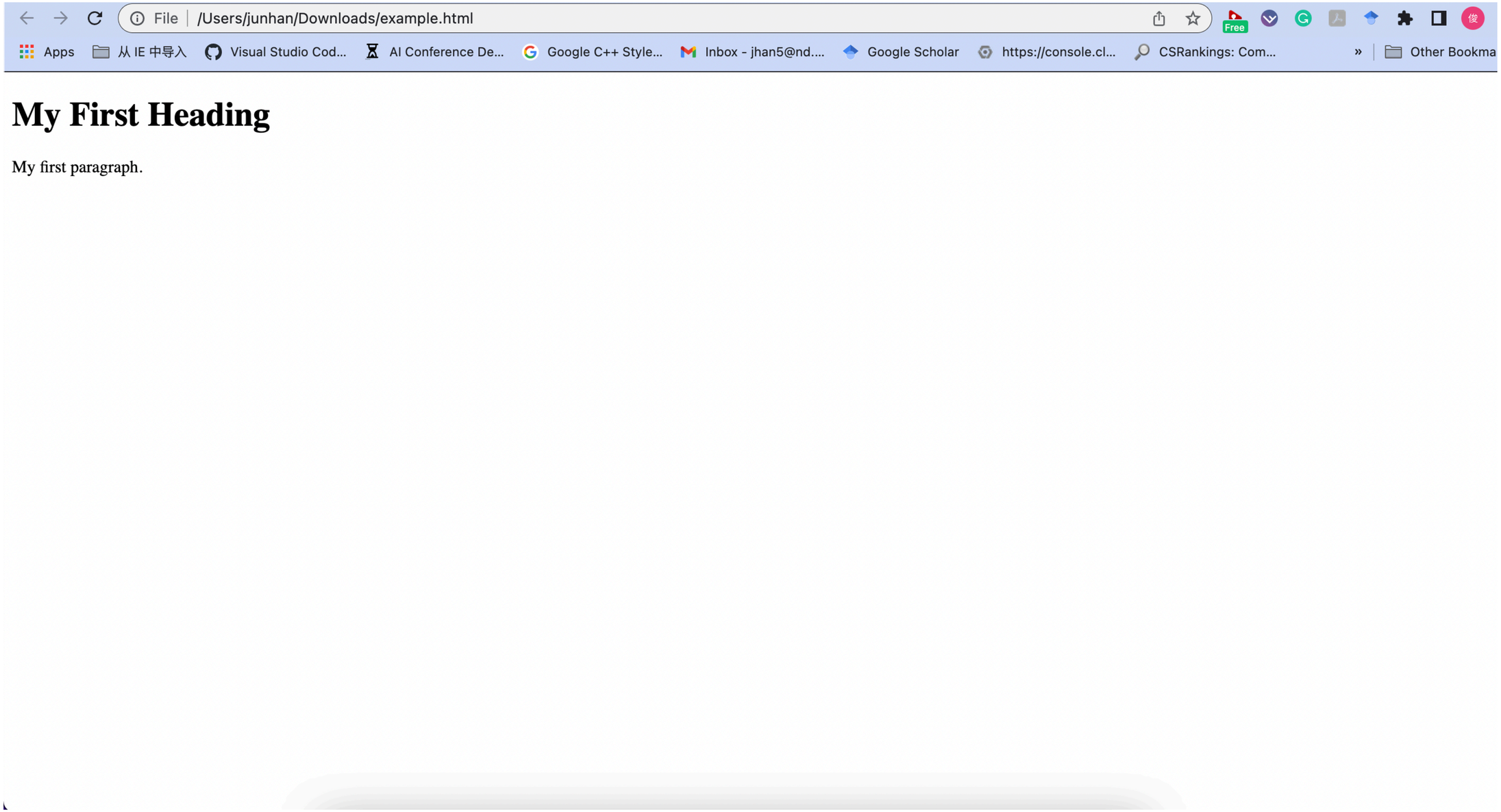
- HTML
- CSS

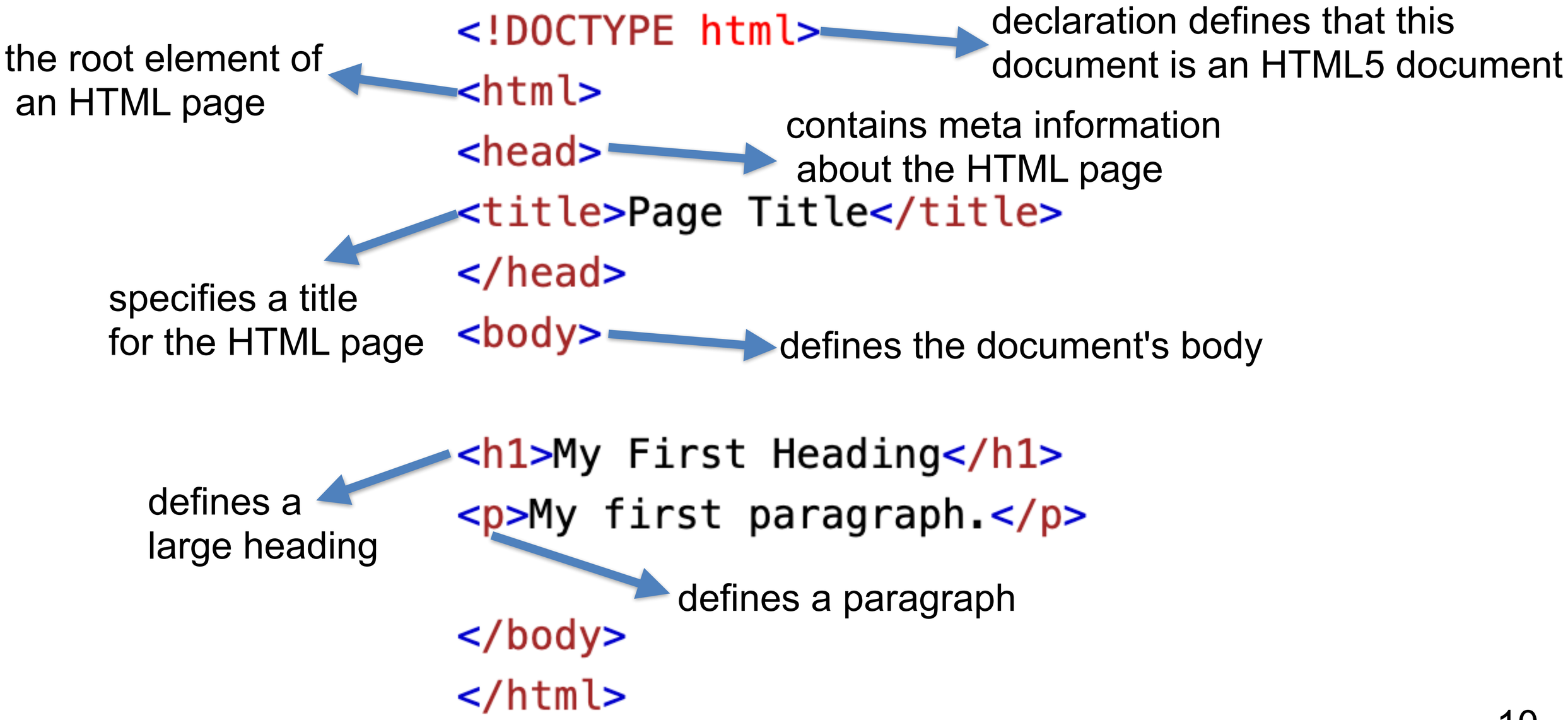
HTML

- Hyper Text Markup Language (HTML)
  - The language for publishing web pages on the World-Wide-Web
  - A Document Description Language , which is the standard markup language for documents designed due displayed in a web browser
  - Is a text document and is human-readable
  - Works together with CSS (Cascading Style Sheets) for layout and JavaScript for programing

HTML document



HTML document



HTML page structure


```
<html>
  <head>
    <title>Page title</title>
  </head>
  <body>
    <h1>This is a heading</h1>
    <p>This is a paragraph.</p>
    <p>This is another paragraph.</p>
  </body>
</html>
```

HTML page structure

- <html lang="en">
  - Specify the language used to write the content of a web page
  - en is for English
  - zh is for Chinese
  - en-US, en-IN, en-GB
- <meta charset="utf-8">
  - Specify the character encoding for the HTML document

HTML element

- An HTML document is a collection of elements having the form. <tag> content </tag>
- Elements can and frequently do nest <tag1><tag2> content </tag2><tag1>
- Self closing tags used when no content is necessary <tag>
  - E.g., <img> and

HTML element

- Defined by a start tag, some content, and an end tag

<tagname> Content goes here... </tagname>

Start tag	Element content	End tag
<h1>	My First Heading	</h1>
	My first paragraph.	
 	none	*none*

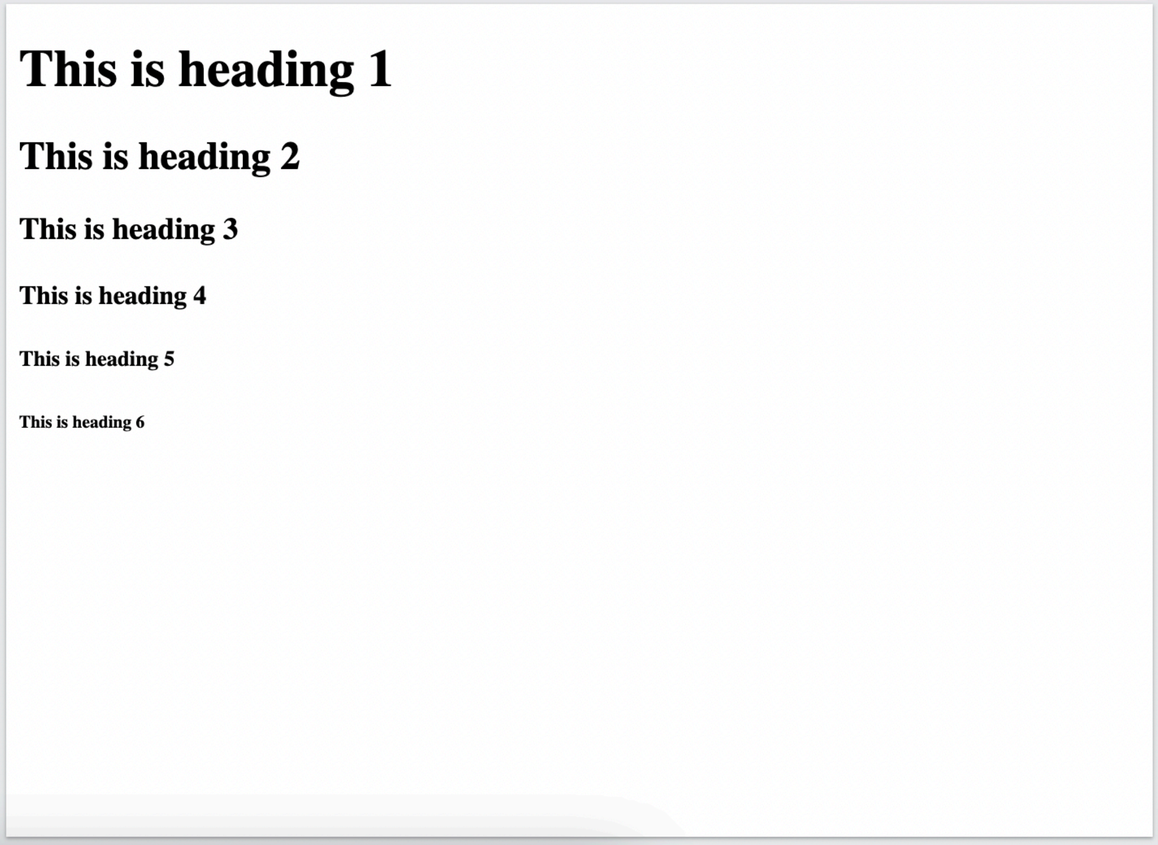
HTML headings

- Defined with the <h1> to <h6> tags
- <h1> defines the most important heading and <h6> defines the least important headings

```
<!DOCTYPE html>
<html>
<body>

<h1>This is heading 1</h1>
<h2>This is heading 2</h2>
<h3>This is heading 3</h3>
<h4>This is heading 4</h4>
<h5>This is heading 5</h5>
<h6>This is heading 6</h6>

</body>
</html>
```



HTML paragraphs

- Defined with the <p> tag

```
<!DOCTYPE html>
<html>
<body>
<p>This is a paragraph.</p>
<p>This is another paragraph.</p>
</body>
</html>
```

This is a paragraph.

This is another paragraph.

HTML links

- Defined with the <a> tag

```
<!DOCTYPE html>
<html>
<body>

<h2>HTML Links</h2>
<p>HTML links are defined with the a tag:</p>

<a href="https://www.w3schools.com">This is a link</a>

</body>
</html>
```

HTML Links

HTML links are defined with the a tag:

This is a link

HTML images

- Defined with the <img> tag

```
<!DOCTYPE html>
<html>
<body>

<h2>HTML Images</h2>
<p>HTML images are defined with the img tag:</p>

<img src="w3schools.jpg" width="104" height="142">

</body>
</html>
```

HTML Images

HTML images are defined with the img tag:

Debug on Web

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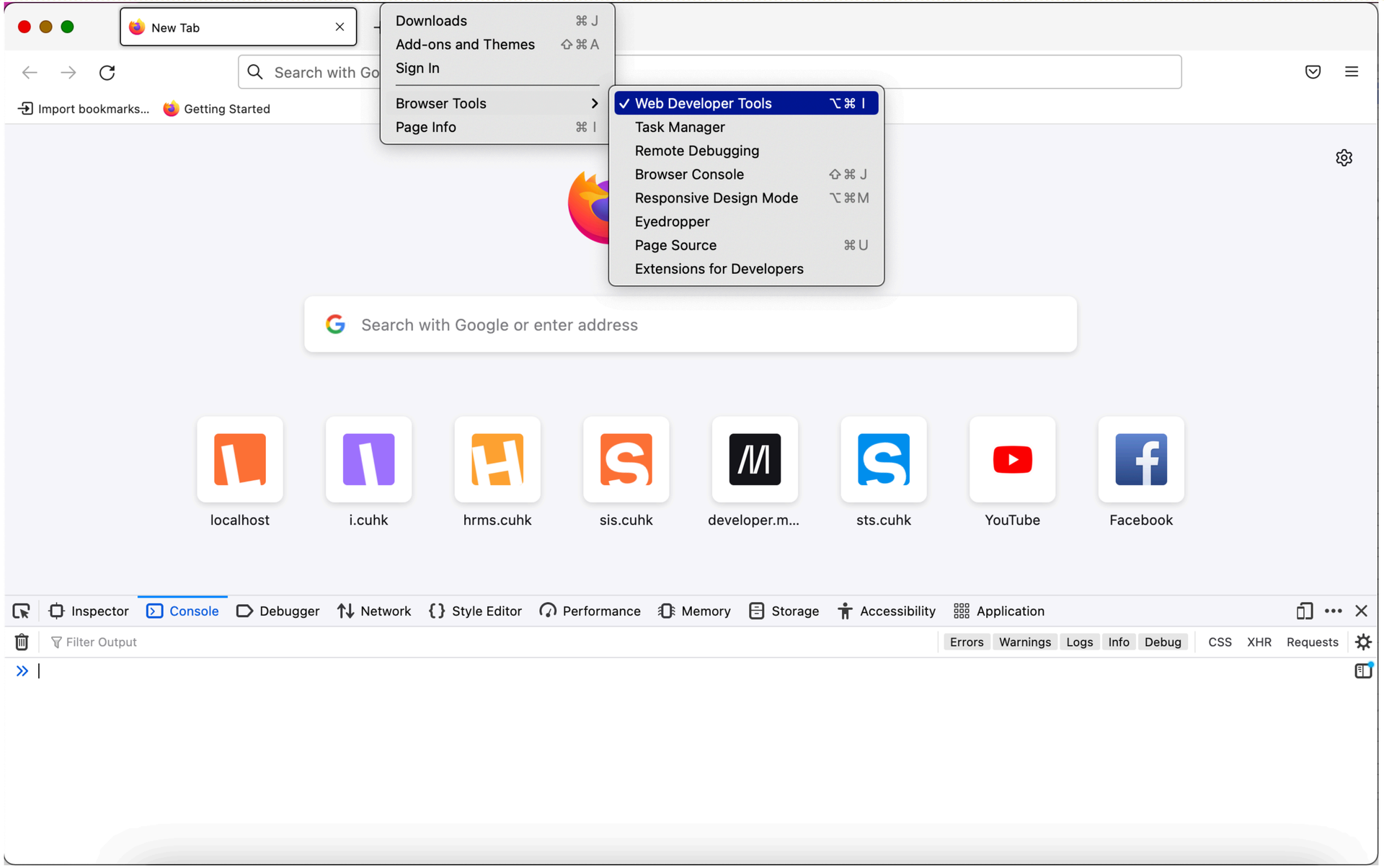


HTML attributes

- href: a URL of a page link
- src: a path to the image
- width and height: image size
- style: color, font, size, and so on
- id: specify a unique name for an HTML element
- class: specify one or more class names for an HTML element
- etc.

HTML id vs. class

- id
  - Suggest that each tag should have a unique id in an HTML document
  - Case sensitive
- class
  - Can be used by multiple HTML elements

HTML id


```
<h2 id="myheader">The id Attribute</h2>
<p>Use CSS to style an element with the id "myHeader":</p>

<h1 id="myHeader">My Header</h1>
<h2 id="myHeader">My Header 2</h2>
<script >
  h = document.getElementById("myHeader")
  console.log(h)
</script>
```

What is the output of h?

HTML class


```
<h1 id="myHeader">My Cities</h1>

<h2  class="city">London</h2>
<p>London is the capital of England.</p>

<h2  class="city">Paris</h2>
<p>Paris is the capital of France.</p>

<h2 class="city">Tokyo</h2>
<p>Tokyo is the capital of Japan.</p>

<script >
  h = document.getElementsByClassName("city")
  console.log(h)

</script>
```

What is the output of h?

HTML comment

- HTML comments are enclosed between <!-- and -->

```
<!--
<h1>hello, world</h1>
-->
```

HTML style

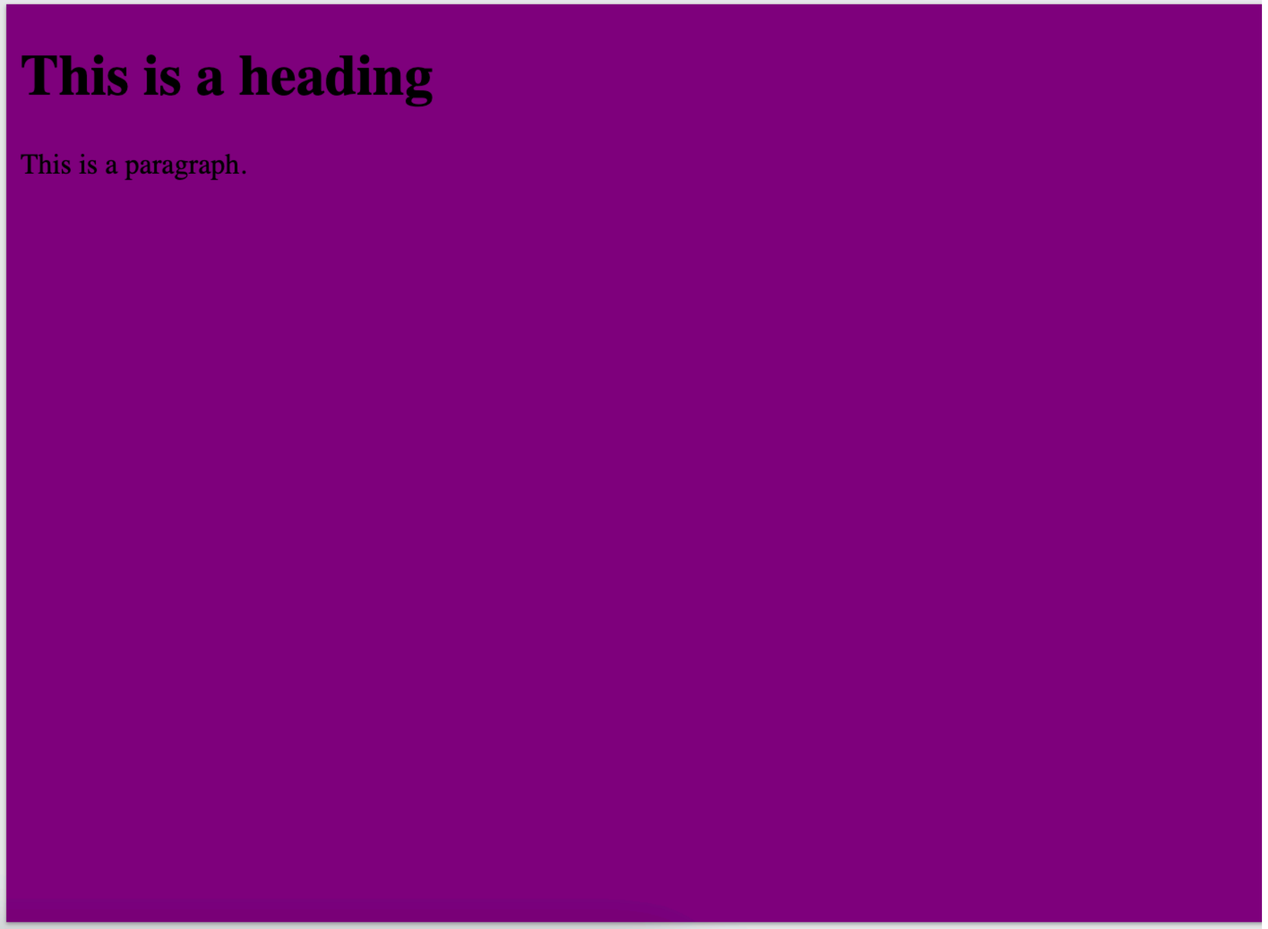
- text color
- background color
- fonts
- text size
- text alignment
- etc.

HTML style


```
<!DOCTYPE html>
<html>
<body style="background-color:purple;">

<h1>This is a heading</h1>
<p>This is a paragraph.</p>

</body>
</html>
```



https://www.color-hex.com/

HTML style


```
<!DOCTYPE html>
<html>
<body>

<h1 style="background-color:powderblue;">This is a heading</h1>
<p style="background-color:tomato;">This is a paragraph.</p>

</body>
</html>
```

HTML style


```
<!DOCTYPE html>
<html>
<body>

<h1 style="color:blue;">This is a heading</h1>
<p style="color:red;">This is a paragraph.</p>

</body>
</html>
```

This is a heading

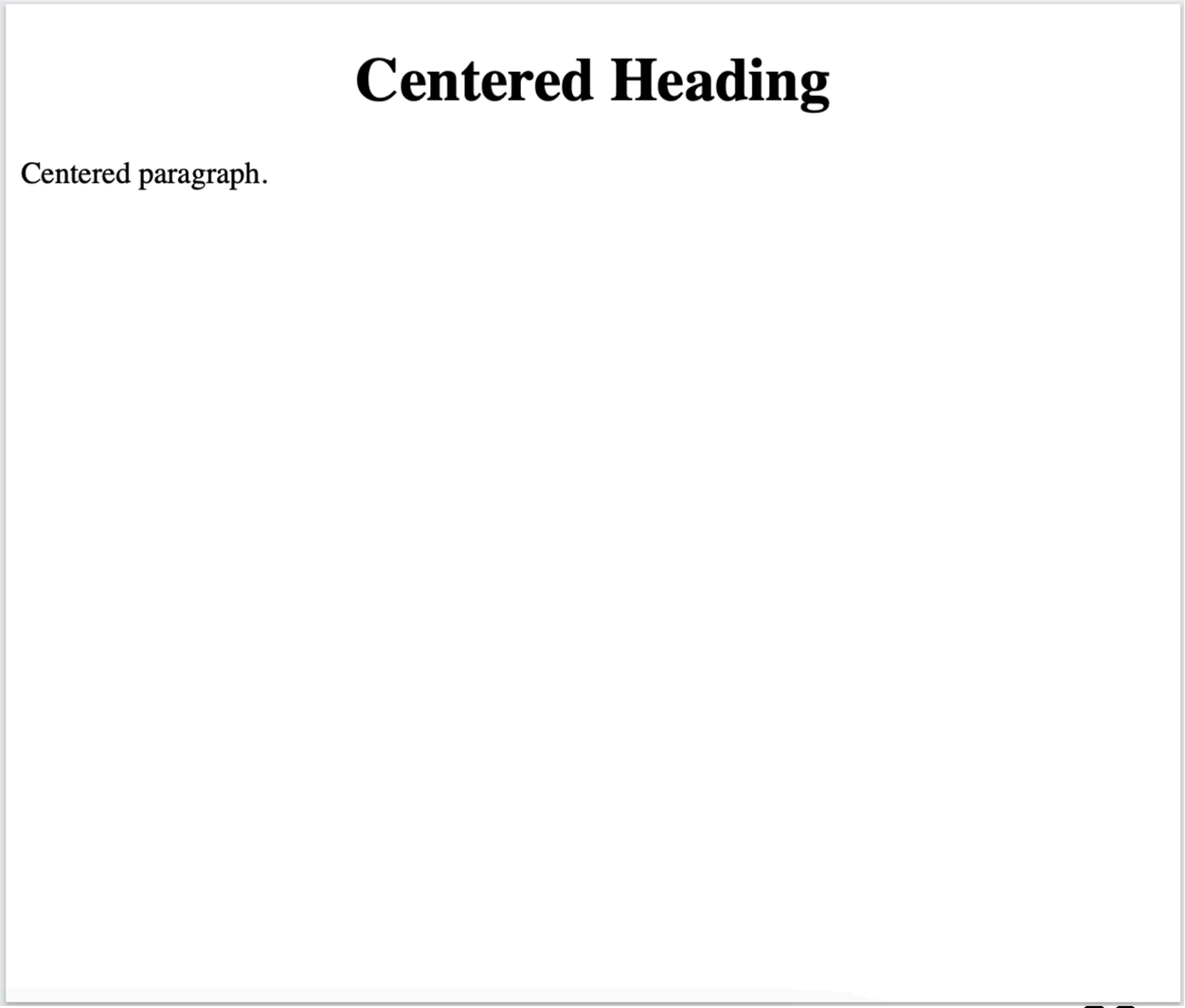
This is a paragraph.

HTML style


```
<!DOCTYPE html>
<html>
<body>

<h1 style="text-align:center;">Centered Heading</h1>
<p style="text-align:left;">Centered paragraph.</p>

</body>
</html>
```

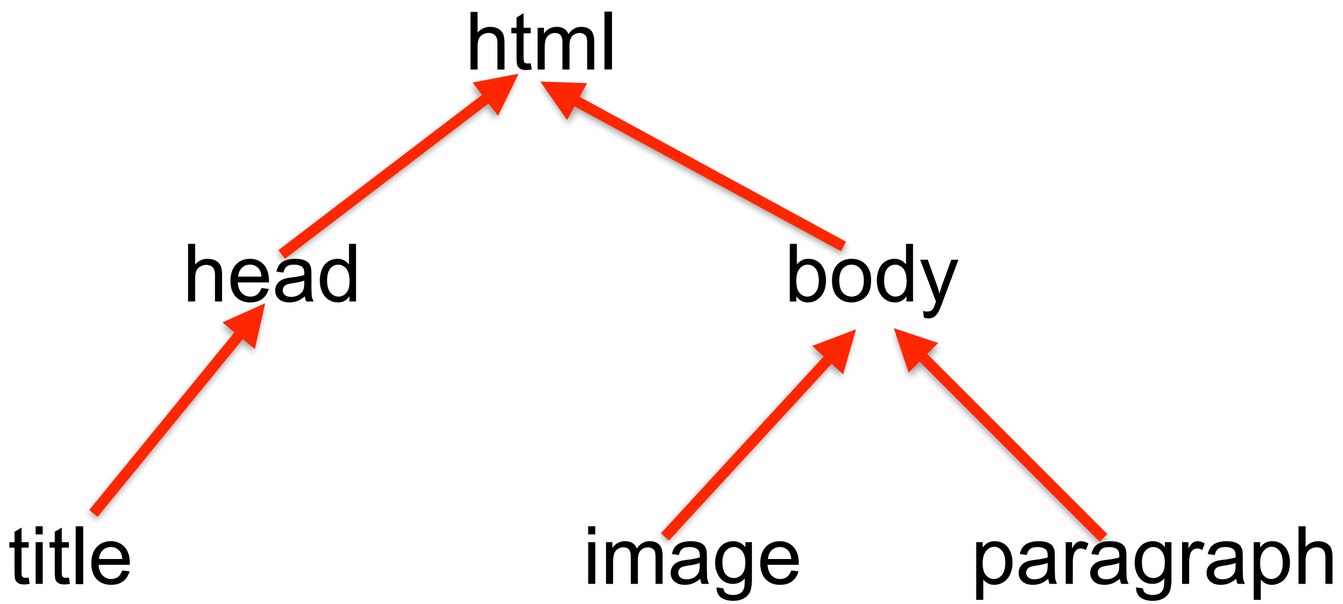


Good HTML syntax

- There are lots of ways to encode HTML that your browser frequently will be able to handle
- A syntax checker can often be helpful in debugging: http://validator.w3.org/

DOM

- Stand for Document Object Model
- A programming interface for web document
- The nested structure of tags form a tree, with the root element being <html></html> and then all of its children contained within



HTML exercises

- Stylize “<h1 >Centered Heading</h1>” so that the text is aligned in center
- Stylize This is a paragraph. to change text font
- Use <ul> and <li> to generate a list

HTML exercises

- <h1 style="text-align:center;">Centered Heading</h1>
- This is a paragraph.

```
<ul>
  <li>Coffee</li>
  <li>Tea</li>
  <li>Milk</li>
</ul>
```

Outline

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- HTML
- CSS

CSS

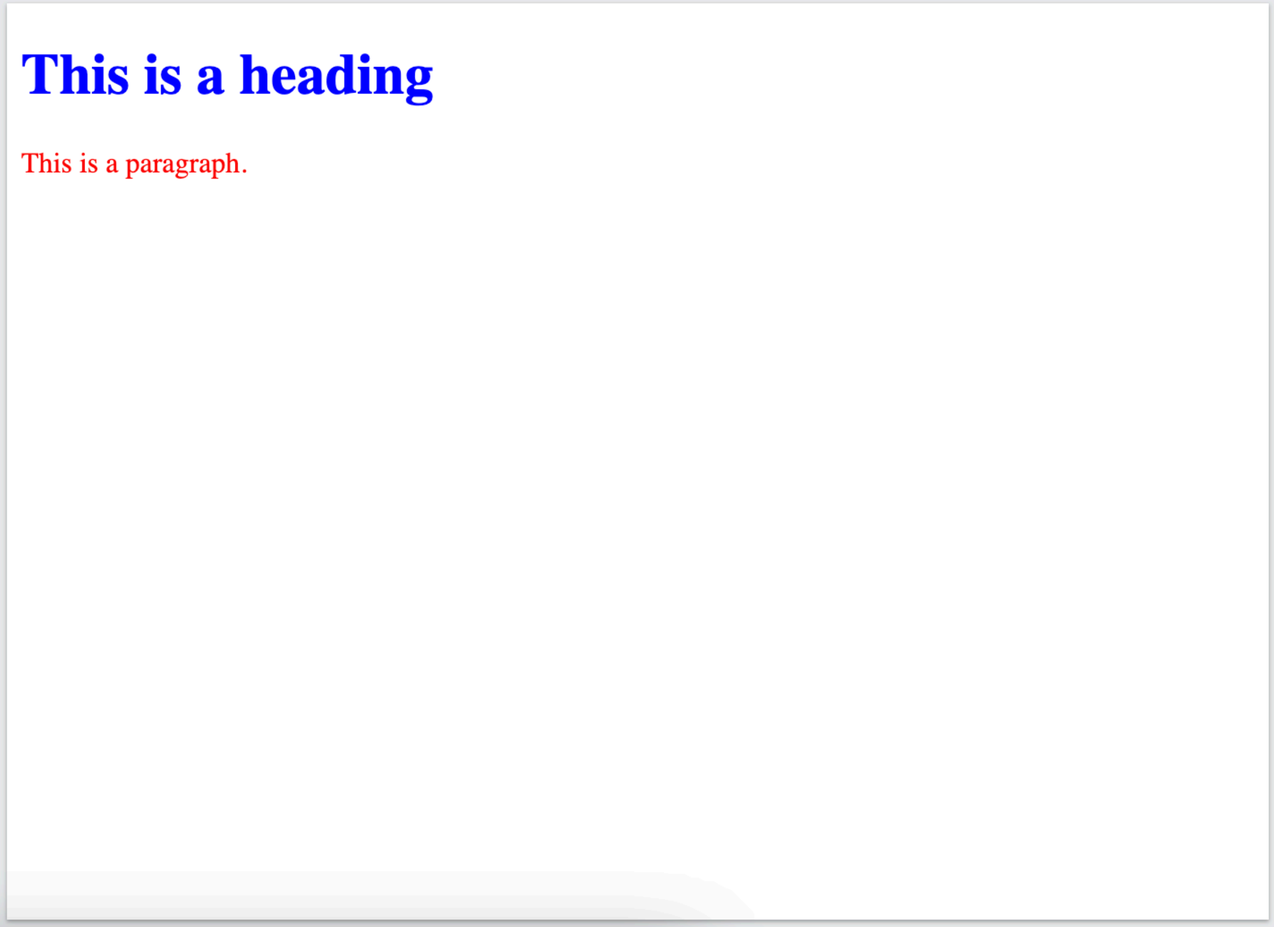
- Cascading Style Sheets
  - Control the layout of multiple web pages at once

CSS


```
<!DOCTYPE html>
<html>
<body>

<h1 style="color:blue;">This is a heading</h1>
<p style="color:red;">This is a paragraph.</p>

</body>
</html>
```



Content vs. appearance

- The HTML document provides a decomposition of the content of the document
- CSS provide mechanisms to control appearance (style) in a very fine granularity
- CSS is rule-based, using names, ids, and classes to specify rules that applied sequentially

CSS rules

- General format

```
selector {
property1: value;
property2: value;
}
```

- Selectors can be
  - Names (to apply to all tags of that name) name {….}
  - IDs (applying to specific tags with that uniques id) #id {…}
  - Classes (to allow for user-defined groups) class {…}

Inline styles


```
<!DOCTYPE html>
<html>
<body>
  <p style="font-size:66px; font-family:monospace">This paragraph uses 66px monospace font.</p>
  <p>This paragraph uses default font.</p>
  <p>This paragraph uses <span style=“font-size:53.3px”>53.3px inside this span</span>
  but default font size here.</p>
</body>
</html>
```

This paragraph uses 66px monospace font.

This paragraph uses default font.

This paragraph uses 53.3px inside this span but default font size here.

Internal CSS


```
<!DOCTYPE html>
<html>
<head>
  <style>
    body {
      background-color:cyan;
    }
    h2 {
      color:white;
      background-color:black;
    }
    p.monospace {
      font-size:16px;
      font-family:monospace;
    }
    p.f20px {
      font-size:20px;
    }
  </style>
</head>
<body>
  <h2>H2 is white on black</h2>
  <p>This paragraph is normal.</p>
  <p class="monospace">This paragraph uses 16-px monospace font.</p>
  <p class="f20px">This paragraph uses 20-px font.</p>
</body>
</html>
```

External CSS


```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="utf-8">
  <link href="TestExternal.css" rel="stylesheet">
</head>
<body>
  <h2>H2 is white on black</h2>
  <h2 id="green">This H2 is green on black</h2>
  <p>The default paragraph uses 12-pt small-cap font.</p>
  <p class="f24pt">This paragraph uses 24-pt, italics font with text-indent of 1cm.
  It inherits the small-cap property from the default paragraph selector.</p>
</body>
</html>
```

CSS style conflict

- Style conflict on an element arises
  - A property is inherited from multiple ancestors
  - More than one rules are applicable to the element. For example, Tag-selector p, Class-selector .red and Id-selector #comment are all applicable to element <p id="comment" class="red">.

CSS style conflict

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- Nearest ancestor wins
  - If a property is not defined for an element and is inheritable, it will be inherited from the nearest ancestor

```
<head>
<style>
p { color:black; background-color:lightblue; }
.red { color:red;   }
#comment { color:yellow;}
</style>
</head>
<body>
<p id="comment" class="red"> This is a test.</p>
</body>
```

CSS style conflict

- Nearest ancestor wins
- Specificity
  - Specificity means that "the more specific the selector, the stronger the rule"

```
<head>
<style>
p     { color:black; background-color:white; }
/* Override the color properties */
p.red { color:red;   }
p#id1 { color:yellow; background-color:lightblue; }
p#id2 { color:blue;  }
p#id1 { color:green; }
</style>
</head>
<body>
<p id="id1">Paragraph with id of "id1" (green)</p>
<p id="id2">Paragraph with id of "id2" (blue)</p>
<p class="red">Paragraph of class of "red" (red)</p>
<p id="id1" class="red">Paragraph with id of "id1" and class of "red" (green)</p>
<p>Paragraph without id and class with default colors (black)</p>
</body>
```

CSS style conflict

- Nearest ancestor wins
- Specificity
- Locality
  - If the "Law of Specificity" cannot resolve the conflict, apply the "Law of Locality". The style-rule that read in last by the browser takes effect. In the above example, there are two ID-selector for id1, the latter takes effect.
  - The inline style (applied to a specific tag via style attribute) overrides the internal style (defined in <style>) and external style sheet (defined via <link>). For internal and external styles, the order of <link> and <style> elements determine the precedence. It is recommended to place the <link> before <style> so that the internal styles can override the external styles.

HTML attributes id and class

- All the HTML elements supports two optional attributes: id="id-value" and class=“class-value"
- You can assign an id="id-value" attribute to an HTML element to uniquely identify that element. The id-value must be unique within the HTML document. In other words, no two elements can have the same id-value. The id attribute can be used by CSS (as well as JavaScript) to select that particular element.

```
<div id="header"><h1>Header Section</h1> ..... </div>
<div id="content"><h1>Content Section</h1> ..... </div>
<div id="footer"><h1>Footer Section</h1> ..... </div>
```

HTML attributes id and class

- All the HTML elements supports two optional attributes: id="id-value" and class=“class-value"
- Similarly, you can assign class="class-value" attribute to a class of elements having the same presentation properties and appearance. The class-value needs not be unique. That is, the same class-value can be assigned to many HTML elements. In other words, these HTML elements form a sub-class (hence, the keyword class). The class attribute is primarily used by CSS to apply a common set of styles to all the elements of the same class.

HTML id vs class attributes

- id and class are used for reference HTML elements by Jvascript and CSS
- id must be unique in an HTML document, but class needs not
- An element can have one id, but many classes
- CSS's Id-selector begins with # (e.g., #header), Class-selector begins with dot (.) (e.g., .header)

CSS tag-selector

- A CSS tag-selector selects HTML elements based on the tag-name

```
/* tag selector */
h2 { background-color:black; color:white; text-align:center; }
```

CSS id-selector

- A CSS id-selector, which begins with a '#' followed by an id value, selects a unique element (because id value is supposed to be unique) in the document

```
/* ID-selector (id-value is unique in a document) */
#header   { font-size:18px; color:cyan; }
#content  { font-size:14px; color:black; }
#footer   { font-size:12px; color:orange; }
```

CSS class-selector

- A CSS class-selector, which begins with a '.' followed by a classname, selects ALL elements having that class value.

```
/* Class-selector (class value needs not be unique) */
.highlight { background-color: #ff0; }
.underline { text-decoration: underline; }
.green     { color:green; text-decoration:underline; }
.blue      { color:blue;  }
```

CSS group selector

- You can apply the same style definitions to multiple selectors, by separating the selectors with a commas ‘,'

```
h1, h2, h3 { background-color:black; color:white; }
```

CSS descendant selector

- You can define a style rule that takes effect only when a tag occurs within a certain contextual structure, e.g., descendant, immediate-child, first-child, sibling, etc
- To create a descendant selector, list the tags in their hierarchical order, with no commas separating them (commas are meant for grouping selectors).

```
ul li       { color:red;   }
ul ul li    { color:blue;  }
ul ul ul li { color:green; }
```

CSS tag-cum-class selector

- The selector T.C selects all tag-name T with classname of C. This is a restricted form of the class selector, which applies to the specific tag-name only.

```
p          { color:black; }   /* default style for all <p> tags */
p.red      { color:red;   }   /* applicable to <p class="red"> tags (override default) */
p.blue     { color:blue;  }   /* applicable to <p class="blue"> tags (override default) */
h1, h2, h3 { color:green; }   /* default style for <h1>, <h2> and <h3> tags */
h3.white   { color:white; }   /* applicable to <h3 class="white"> tags (override default) */
h3.upper   { text-transform:uppercase; }
<p>This paragraph is in black (default style)</p>
<p class="red">This paragraph, of class="red", is in red.</p>
<p class="blue">This paragraph, of class="blue", is in blue.</p>
<h2>H2 in green (default style)</h2>
<h3>H3 in green (default style)</h3>
<h3 class="white upper">This H3, of class="white", is in white</h3>
```

CSS universal selector

- The universal selector * selects ALL the elements in the document.

```
* { margin:0; padding:0; }  /* all tags have margin and padding of 0 */
```

CSS pseudo-class selector

- Pseudo-class describes a special state for an element, e.g. hover and focus. CSS defines a number of pseudo-classes for anchor elements <a>, namely, a:link (unvisited link), a:visited (visited link), a:focus (on focus), a:hover (mouse pointer hovers over), a:active (clicked or active link). Take note that colon ":" is used to identify pseudo classes instead of "." for ordinary classname
- These pseudo classes is commonly-used with the <a> element. But :hover, :focus, and :active can also be applied to other elements, such as <p>, <li>, and etc.

CSS pseudo-class selector

- The order is important for anchor pseudo-classes in applying styles. It shall be link-visited-focus-hover-active (LVFHA)
- It is called pseudo-class, as it sub-divide the <a> tag into four sub-classes that cannot be marked out manually
- You can further restrict the selections via a.classname:pseudo-classname

```
a        { font-size:14px;  }  /* all <a> tags */
a:link    { color:red;       }  /* unvisited link */
a:visited { color:green;     }  /* visited link */
a:focus   { color:lightblue; }  /* on focus via tab key */
a:hover   { color:blue;      }  /* mouse over link */
a:active  { color:black;     }  /* currently selected link */
```

CSS pseudo-elements selector

- Pseudo-class describe a special state, e.g., hover or focus. Pseudo-Element is a part of an element, e.g., first-letter, first-line (of a <p>). Pseudo-class selector begins with colon (:), whereas pesudo-element selector begins with double colons (::) in CSS3 to differentiate with the pesudo-class selector

```
.title::before {
  content: "\0022"; /* Add a double quote before */
  color: "red";
}
.title::after {
  content: "\0022"; /* Add a double quote after */
  color: "red";
}
```

Types of CSS selectors

Selector	Examples	Description
*	* { }	Universal Selector: select ALL elements in the document
tag-name	h1 { }	Tag Selector: select all <h1> elements
#id-name	#header { }	ID Selector: select the unique element with id="header"
.class-name	.new { }	Class Selector: select elements with class="new"
:pseudo-class	:first-child { } :focus { } a:active { }	Pseudo-Class Selector: select a special state such as focus and hover.
::pseudo-element	::first-line { } ::first-letter { } ::before { } ::after { } ::selection { }	Pseudo-Element Selector: select a part of an element and may modify the selected element.

https://www.w3schools.com/cssref/css_selectors.asp

Types of CSS selectors

Selector	Examples	Description
S1,S2,S3	h1, h2 { }	Group Selector: Apply the style to S1, S2 and S3
S1 S2	div p { }	Descendant Selector (separated by a space): select if S2 is a descendant (child, grandchild, etc.) of S1
S1>S2	tr > td { }	Child (Direct Descendant) Selector: only if S1 is an immediate child of S1
S1:S2	ul:li { }	First-Child Selector: only if S2 is the first child of S1
S1+S2	a + span { }	Adjacent Sibling Selector: the (one) S2 that is immediately after S1
S1~S2	a ~ span { }	General Sibling Selector: All S2(s) that are siblings after S1
T.C	div.example { }	Tag cum Class Selector:
T#C	div#header { }	Tag cum ID Selector:
.C1.C2	.new.example { }	Multiple Class Selector (no space in between):

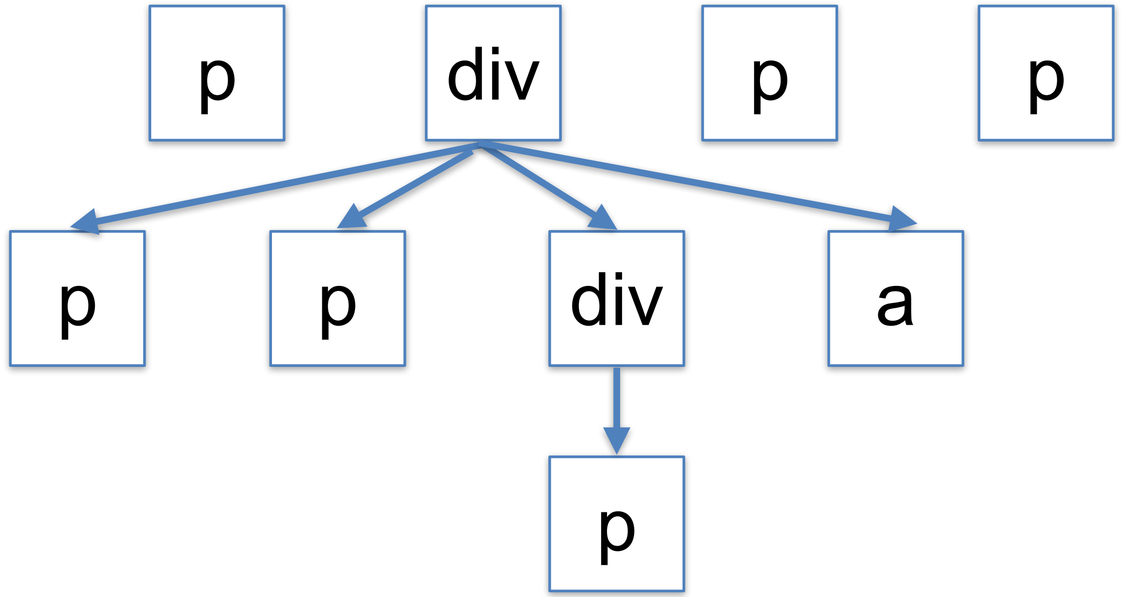
https://www.w3schools.com/cssref/css_selectors.asp

CSS selector

- #section1 p

```
  <p> Section 1 </p>
<div id = 'section1'>
  <p> 1.1 </p>
  <p> 1.2 </p>
  <div>
    <p> 1.2.1 </p>
  </div>
    <a href = "#"> 1.3 </a>
</div>
<p> Section 2 <p>
<p> Section 3 <p>
```

Descendant Selector (separated by a space):
select if S2 is a descendant (child, grandchild, etc.) of S1

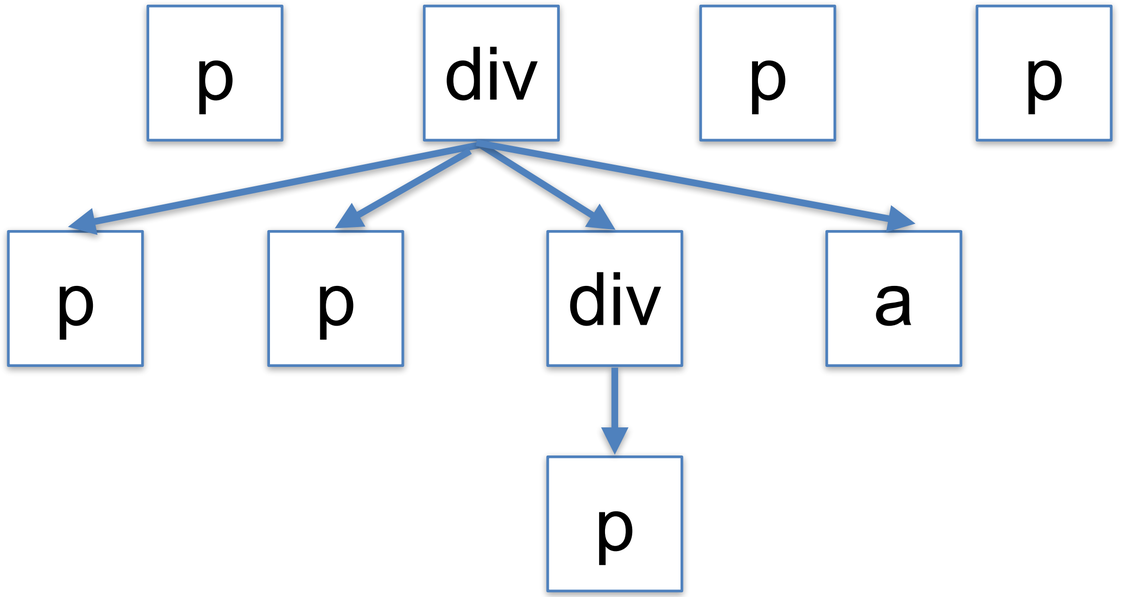


CSS selector

- #section1>p

Child (Direct Descendant) Selector: only if S1 is an immediate child of S1

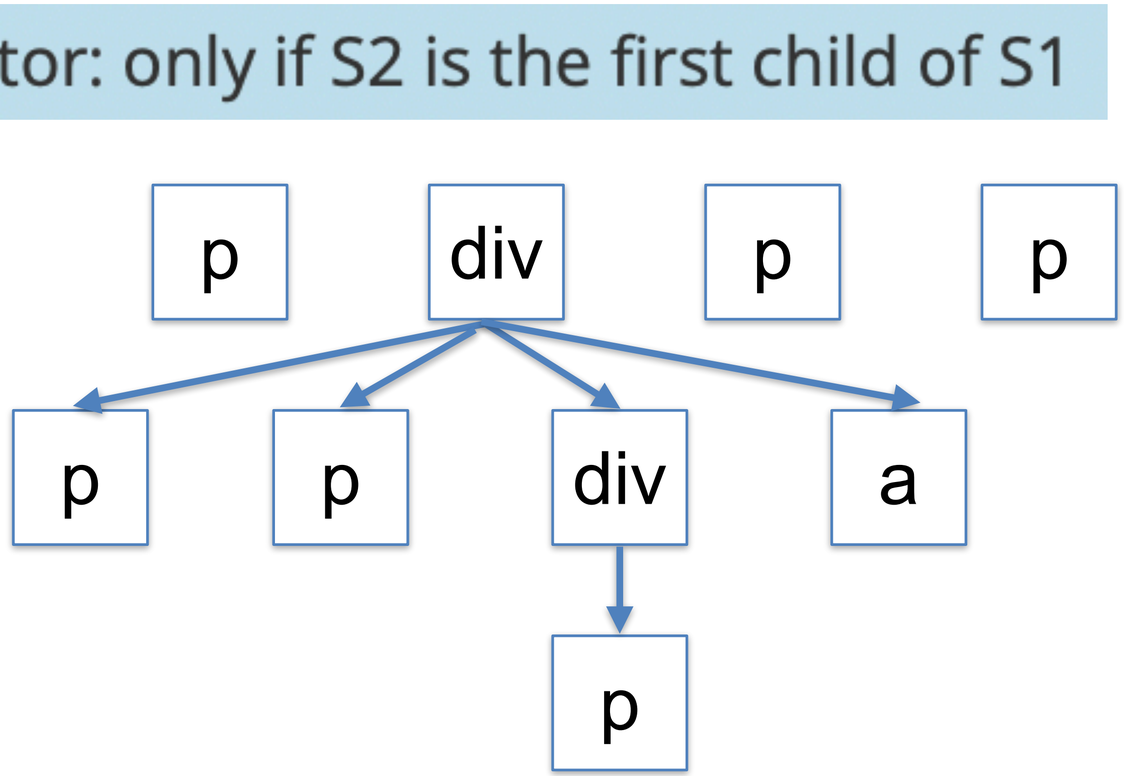
```
  <p> Section 1 </p>
<div id = 'section1'>
  <p> 1.1 </p>
  <p> 1.2 </p>
  <div>
    <p> 1.2.1 </p>
  </div>
    <a href = "#"> 1.3 </a>
</div>
<p> Section 2 <p>
<p> Section 3 <p>
```



CSS selector

- p:first-child

```
  <p> Section 1 </p>
<div id = 'section1'>
  <p> 1.1 </p>
  <p> 1.2 </p>
  <div>
    <p> 1.2.1 </p>
  </div>
    <a href = "#"> 1.3 </a>
</div>
<p> Section 2 <p>
<p> Section 3 <p>
```

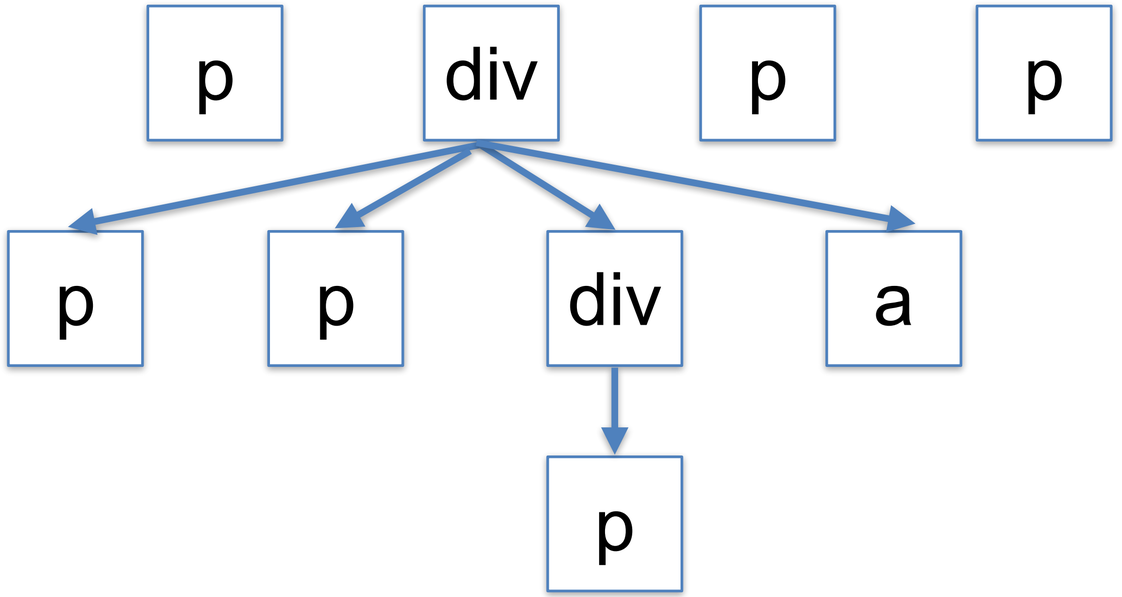


CSS selector

- #section1+p

Adjacent Sibling Selector: the (one) S2 that is immediately after S1

```
  <p> Section 1 </p>
<div id = 'section1'>
  <p> 1.1 </p>
  <p> 1.2 </p>
  <div>
    <p> 1.2.1 </p>
  </div>
    <a href = "#"> 1.3 </a>
</div>
<p> Section 2 <p>
<p> Section 3 <p>
```

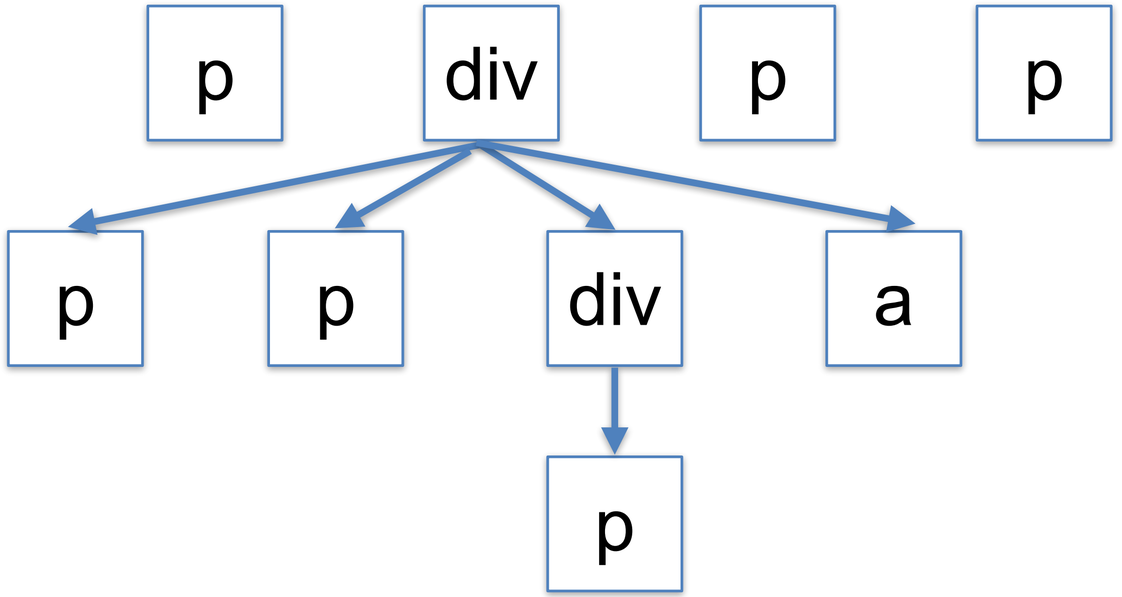


CSS selector

- #section1~p

General Sibling Selector: All S2(s) that are siblings after S1

```
  <p> Section 1 </p>
<div id = 'section1'>
  <p> 1.1 </p>
  <p> 1.2 </p>
  <div>
    <p> 1.2.1 </p>
  </div>
    <a href = "#"> 1.3 </a>
</div>
<p> Section 2 <p>
<p> Section 3 <p>
```



Types of CSS attribute selectors

Selector	Example	Description
`T[att]`		Select tags with the attribute, regardless of its value
`T[att='value']`		Select tags with the attribute and `value`
`T[att^='value']`		Select tags with the attribute, beginning with `value`
`T[att$='value']`		Select tags with the attribute, ending with `value`
`T[att*='value']`		Select tags with attribute, containing the `value`
`T[att~='value']`		Select tags with attribute having `value` in the list space-separated values.
`T[att|='value']`		Select tags with attribute, beginning with value followed by dash (-)
`T[att='value' i]`		Select tags with attribute and value, where value is case-insensitive

CSS inheritance

- Many (but not all) CSS properties, such as color and font-family, affect not only the elements selected by the selector, but also inherited by their descendants
- Inheritance is a big time-saver for designing styles
- Some properties (such as border, margin, padding, width, height, background-color) are not inherited

CSS inheritance


```
span {
  color: blue;
  border: 1px solid black;
}

.extra span {
  color: inherit;
}
</style>
</head>
<body>

<div>
  Here is <span>a span element</span> which is blue, as span elements are set to be.
</div>

<div class="extra" style="color:green">
  Here is <span>a span element</span> which is green, because it inherits from its parent.
</div>

<div style="color:red">
  Here is <span>a span element</span> which is blue, as span elements are set to be.
</div>
```

CSS color and background-color properties

- Color can be expressed as
  - RGB in the form of rgb(r, g, b). The r, g, b can be expressed in a decimal value between 0 and 255; or in percentage between 0% and 100%
  - RGBA in the form of rgba(r, g, b, a): RGB with an additional A (alpha channel). The A is used to control the transparency/opacity, with a=1 for opaque; and a=0 for totally transparent
  - HSL in the form hsl(hue, saturation, lightness): Hue is the color on the color wheel in degrees between 0 to 360. Saturation (purity of color) is expressed in percentage between 0% and 100% (pure color). Lightness (brightness or intensity) is also expressed in percentage between 0% (darkest) and 100% (brightest)
  - HSLA in the form of hsla(hue, saturation, lightness, alpha)

CSS color and background-color properties

CSS color properties

- The most important color properties are color and background-color:
  - color: #rrggbb|rgb(r,g,b)|rgba(r,g,b,a)|color-name: Set the color of the text (or foreground). Color values are inherited by descendants.
  - background-color: #rrggbb|rgb(rrr,ggg,bbb)|rgba(r,g,b,a)|color-name|transparent|inherit|initial: Set the background color of an element. The default is transparent and NOT inherited, so as to create a see-through effect. The initial sets to its default value.

CSS length measurements

- Many CSS properties, such as width, height, margin, border, padding, font-size and line-height, require a length measurement

```
html {
  font-size: 16px;    /* base measurement for rem (CSS3) */
}
p {
  font-size: 1rem;    /* relative to root html element */
  width: 80%;         /* 80% of the parent's width */
  margin: 0.5em 2em;  /* relative to current font-size */
  border: 5mm;        /* absolute millimeters */
  padding: 0;
  line-height: 140%;  /* 1.4 times of the current font-size */
}
```

CSS length measurements

- Two types of length measurements: relative (to another length property) and absolute (e.g., inches, centimeters, millimeters)
- The absolute units are:
  - in (inch)
  - cm (centimeter)
  - mm (millimeter)
  - pt (point): 1 inch has 72 points. 1pt is 1/72 in ≈ 0.014in ≈ 0.35mm
  - pc (pica): 1 pica is 12 points. 1 inch has 6 picas. 1pc ≈ 1/6 in ≈ 0.17in ≈ 4.2mm. pc is not commonly used
  - px: px is a measurement unit created for the CSS, where the thinest line shall have width of 1px. Today, it is defined as 1px=1/96 inch. Since 1pt is 1/72 inch; 12pt = 16px = 1/6 inch = 0.42cm

CSS length measurements

- The relative units are:
  - % (percent): in term of the percentage of a property of a referenced element, generally, the same property of the parent element
  - For example, table {width:80%} set the table's width to 80% of the width of the parent (probably a or <body>)
  - em: the width of the letter 'm' of a referenced font, generally, the current font
  - For example, margin:2em means that the margins are twice the current (referenced) font-size.
  - However, if em is used to set the font-size property, it needs to find a reference. In this case, it is referenced to the parent's font-size. For example, p {font-size:1.2em} sets the font-size of <p> to 1.2 times of the parent (possibly a or <body>)
  - rem (CSS3): relative to the font-size of the root or <html> element
  - vw, vh (CSS3): one percent of viewport width and height respectively
  - vmin, vmax (CSS3): one percent of the viewport smaller dimension or larger dimension respectively, i.e., 1vmin is equal to the smaller of 1vh or 1vw; 1vmin is the larger of 1vh or 1vw.
  - ex (not commonly-used): the height of letter 'x' of the parent's font. ex is not commonly used

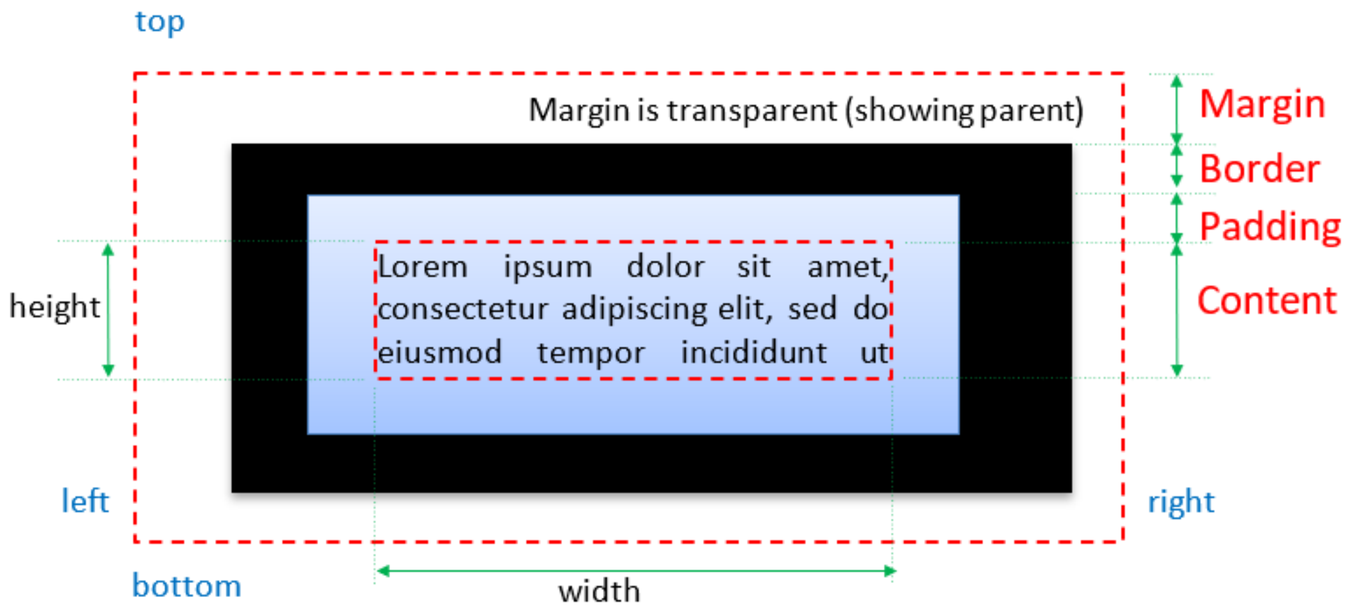
CSS length measurements


```
h6 {
  font-size: 1.2rem;    /* 1.2 times of the <html> font-size */
  width: 80%;           /* 80% of the parent's width */
  margin: 0.5em 1.2em;  /* relative to the current font's letter 'm' */
  padding: 10px;        /* 10 logical pixels */
  border: 0;            /* zero does not need a unit */
}
```

```
  line-height: 20px;   /* 20 pixels */
  line-height: 150%;   /* 150% of the parent's line-height */
  line-height: 1.2em;  /* 1.2 times of the current font's letter 'm' */
  line-height: 1.5;    /* 1.5 times of the current font */
```

CSS box model

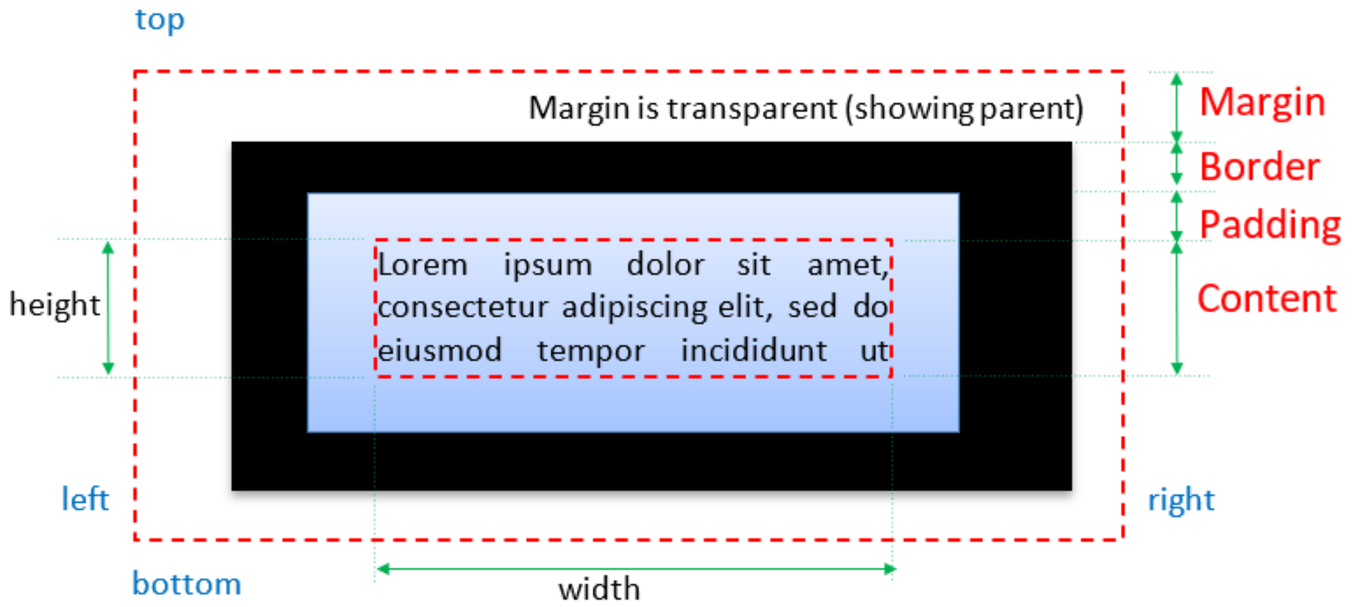
- The content area contains the texts, image, or child elements.
- The padding is the space between the content area and the border. It clears an area outside the content area. It has the same background as the content area.



CSS Box Model

CSS box model

- The border goes between padding and margin. You can set a color and a style (such as solid, dash, dotted) to the border.
- The margin is the space outside the border (to another element). It clears an area outside the border. The margin does not have a background, and is totally transparent.



CSS Box Model

CSS box model


```
#elm {
  width: 300px;
  margin: 10px;
  border: 5px solid black;
  padding: 20px;
}
```

The actual width of the element is 300+(10+5+20)x2 = 370px

CSS font

- font-family: font-name|generic-family-name
  - A prioritized list of fonts to be used. The browser will try to use the first font if the it is available, and goes down the list
- The generic font family names include: serif (with small tails), sans-serif (without small tails), monospace, cursive, fantasy. Use monospace for program listing. Use sans-serif for computer display. serif are mainly used in prints (such as "Times" for newspapers and books)
- font-size: n|n%|xx-small|x-small|small|medium|large|x-large|xx-large|smaller|larger
- font-weight: normal|bold|bolder|lighter|100|200|...|800|900
  - You can use a number between 100 to 900, in multiple of 100. The value of 400 is the normal weight; while 700 is bold

CSS font

- font-style: normal|italic|oblique
  - The italic uses italic font installed (some font families include the italic version); while the oblique is done by tilting the normal font
- font-variant: normal|small-caps
  - The small-caps is smaller than the uppercase
- font: style variant weight size/line-height family
  - Set all the font properties using a one-line shorthand notation. The properties must follow the order shown above. However, the leading and trailing items can be omitted

CSS font


```
p {
  font-size: 16px;
  font-weight: bold;
  line-height: 140%;
  font-family: Arial, sans-serif;
}
```

Other CSS properties

- Text
  - Text-align, height, transform, etc.
- Background
  - Color, position, image, etc.
- Table
  - Border-spacing, table-layout, etc.

CSS properties

- There are many properties and depending on which html tag you are applying to they may be interpreted differently
- Instead of memorizing all possible properties, use a small core set until it cannot do what I am looking for
- See https://developer.mozilla.org/en-US/docs/Web/CSS/Reference for a complete list

Additional resources

- HTML: https://www.w3schools.com/html/default.asp
- CSS: https://www.w3schools.com/css/default.asp
- CSS+HTML: https://www3.ntu.edu.sg/home/ehchua/programming/webprogramming/HTML_CSS_Basics.html