

4.1 Using CSS in HTML

Introduction to CSS

CSS (Cascading Style Sheets) is a textual language for describing how a web page is styled for visual presentation. Web browsers use CSS to determine how a web page is rendered on the screen, printed to paper, or presented via other media. The CSS acronym highlights the two main characteristics of presenting a web page:

PARTICIPATION
ACTIVITY

4.1.1: Understanding the CSS acronym.



Mouse: Drag/drop. Refresh the page if unable to drag and drop.

Style Sheet

Cascading

The process of combining multiple style rules and resolving conflicting styles.

Describes the visual presentation of structured documents.

Reset

A web developer uses CSS to write a list of rules. A **CSS rule** consists of a selector followed by a declaration block between braces (`{ }`).

- A CSS **selector** specifies the HTML elements to which the specific style rule applies.
- A **declaration block** contains one or more declarations separated by semicolons (`;`).
- A CSS styling **declaration** is a CSS property followed by a colon (`:`) and the property value.

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Figure 4.1.1: Parts of a CSS rule.

A diagram illustrating the structure of a CSS rule. It shows a selector (`span`) at the top, followed by a brace indicating the declaration block. Inside the declaration block, there are two entries: `color: green;` and `font-size: 16pt;`. Red arrows point from the words "selector", "declaration block", "property", and "value" to their corresponding parts in the code.

```
span {  
    color: green;  
    font-size: 16pt;  
}
```

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Semicolons are only required to separate rule declarations. A common error is to forget the separating semicolon when adding a new declaration to a declaration block. Good practice is to place each declaration on a separate line and to add a semicolon to the end of each declaration block, even when a semicolon is not required, so that adding the semicolon is not forgotten later when adding more declarations.

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4.1.2: Valid CSS.



1) `h1 {
 color: black;
}`



- Valid
 Invalid

2) `p {
 background-color = blue;
}`



- Valid
 Invalid

3) `span { font-weight: bold; font-size: 2em; }`



- Valid
 Invalid

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4) `div {
 font-family: serif
}`



- Valid
 Invalid

Applying CSS

CSS can be applied to HTML in three ways:

1. An **inline style** places CSS declarations inside a tag's **style attribute**.
2. An **embedded stylesheet** places CSS rules in an HTML document's head using `<style>` tags.
3. An **external stylesheet** places CSS rules in a separate file that is imported into an HTML document with a `<link>` tag.

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The `style` attribute may be used on any tag. The `<style>` and `<link>` tags may be placed anywhere in a web page, but good practice is to place `<style>` and `<link>` tags inside the document head (before the `<body>` tag).

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4.1.3: Three ways to apply CSS.



Animation content:

An HTML snippet of an inline style is shown: `<p style="color:green"> I'm green </p>`. This inline style turns the sentence, "I'm green." to green.

An HTML snippet of an embedded stylesheet is shown:

```
<style>p { color:orange; }</style>
<p> I'm orange. </p>
```

This embedded stylesheet turns the sentence, "I'm orange." to orange.

An HTML snippet is shown:

```
<link href="styles.css" rel="stylesheet">
<p> I'm purple. </p>
```

An external stylesheet is displayed below the HTML snippet:

```
/* styles.css */
p { color:purple; }
```

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This external stylesheet turns the sentence, "I'm purple." to purple.

Animation captions:

1. An inline style uses an element's style attribute to turn the paragraph text green.
2. An embedded stylesheet defines CSS rules in `<style>` tags. The `p` selector makes all paragraphs have orange text.

3. A <link> tag imports an external stylesheet into an HTML document. styles.css makes all paragraphs have purple text.

PARTICIPATION ACTIVITY**4.1.4: Applying CSS.**

1) An inline style does not use a selector.

- True
- False

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2) An inline style uses curly braces ({}).

- True
- False



3) The embedded stylesheet from the animation above makes *all* paragraphs in the web page orange.

- True
- False



4) A website should use an external stylesheet to create styles that apply to all web pages.

- True
- False



5) Inline styles cannot be used with embedded stylesheets or external stylesheets.

- True
- False



Inheritance and conflict

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Every browser has a default stylesheet that specifies styling for each HTML element. Ex: The default style declarations for <h1> elements typically specify a bold-weighted font that is twice the normal font size. CSS style declarations override the default style declarations.

The style declarations from a parent element cascade down and are applied to any child elements, a concept called **inheritance**. Each element inherits the style declarations from the element's parent.

The element's parent inherits style declarations from the parent's parent element, and so on up to the top-level <body> element.

When two style declarations with identical properties apply to the same element, a **conflict** occurs.

Two common conflicts include:

1. A parent's style declaration conflicts with a child's style declaration. Ex: The parent element's text is blue, but a child element's style declaration indicates the color should be green. When a conflict occurs, the child's declaration overrides the parent's declaration.
2. An embedded or external stylesheet's style declaration conflicts with an inline style. Ex: An inline style says the element should be blue, but the embedded stylesheet says the element should be green. When a conflict occurs, an inline style overrides the embedded or external stylesheet's declaration.

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Specificity and !important

The browser uses **specificity**, a scoring system that resolves more complex CSS conflicts, to determine what style declarations apply to an element. See the "Exploring further" section below for more information on CSS specificity.

The **!important** rule may be used on a style declaration to override other declarations and disregard specificity. Ex: `p { color: red !important; }` makes the paragraph red, even if an inline style attempts to make the paragraph green. Stylesheets that use **!important** are hard to understand and difficult to maintain, so good practice is to avoid using **!important**.

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4.1.5: Overriding CSS properties.



Animation content:

The following code snippet is displayed:

```
<style>
p    { color:orange; }
span { color:green; }
</style>
<p>
    Part of this sentence is orange,
    <span>while the rest is green.</span>
</p>
```

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```
<p>
    Part of this sentence is orange,
    <span style="color:blue">while the rest
        is blue.</span>
</p>
<p style="color:red">
    This sentence is red.
```

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To the right of this code snippet, the following sentences are displayed inside a browser:

Part of this sentence is orange, while the rest is green.

Part of this sentence is orange, while the rest is blue.

This sentence is red.

Animation captions:

1. The browser's default styling colors the text black.
2. The embedded stylesheet uses a p selector to color all paragraph text orange.
3. The embedded stylesheet uses a span selector to color all span text green. The first span's color overrides the parent's color.
4. The second span's inline style overrides the embedded stylesheet, so the text is blue.
5. The third paragraph's inline style overrides the embedded stylesheet, so the text is red.

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4.1.6: Inheritance and conflicts.



Use the HTML below to answer the questions. Assume the HTML in each question is inserted into the `<body>`.

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```
<!DOCTYPE html>
<html lang="en">
  <head>
    <title>Presidential Facts</title>
    <style>
      body {
        color: blue;
      }

      div {
        color: green;
      }
    </style>
  </head>
  <body>
    <!-- Content goes here -->
  </body>
</html>
```

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1) What color is the text? 

```
<p>George Washington was the
first president of the United
States.</p>
```

- Black
- Blue
- Green

2) What color is the text? 

```
<p style="color:yellow">George
Washington was president from
1789 until 1797.</p>
```

- Yellow
- Blue
- Green

3) What color is the text? 

```
<div>George Washington did not
have a middle name. Middle
names were not common in the
colonies until the early 19th
century.</div>
```

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- Black
- Blue
- Green



4) What color is the text?

```
<div style="color:orange">George Washington never lived in the White House because construction was completed several years after he retired from the presidency.</div>
```

- Orange
- Blue
- Green

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4.1.7: Applying CSS declarations.



Given the following HTML and CSS files, indicate which color the web browser will use to display the words. The CSS uses the **inherit** keyword, which specifies that a property should inherit the parent element's value.

hello.html:

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <link href="hello.css" rel="stylesheet">
    <style>
      p {
        color: black;
      }
    </style>
    <title>A Sample CSS Page</title>
  </head>
  <body>
    <p>Hello, <span style="color: green">World</span>!</p>
    <p style="color: inherit">Good day</p>
  </body>
</html>
```

hello.css:

```
body {
  color: red;
}
```

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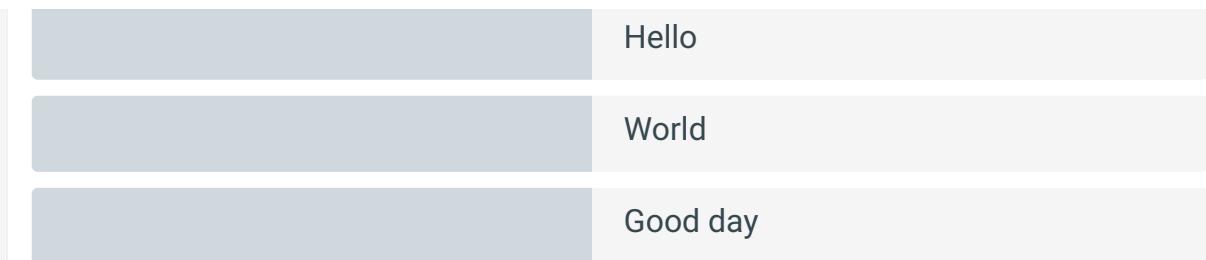
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Mouse: Drag/drop. Refresh the page if unable to drag and drop.

green

red

black



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Viewing CSS with Chrome DevTools

The Chrome DevTools shows the CSS declarations being applied to the web page elements. In the screenshot below, the span's inline style makes the span text green. The span element's `color: green` declaration overrides the p element's `color: black` declaration and the body element's `color: red` declaration.

A Sample CSS Page

File | C:/temp/example.html

Hello, World!

Good day

Elements Console Sources Network Performance Memory Application

Styles Computed Event Listeners

Filter :hov .cls +

element.style {
 color: green;
}

Inherited from p

p {
 color: black;
}

Inherited from body

body {
 color: red;
}

html body p span

hello.css:1 example.html:5

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4.1.1: Writing CSS rules.

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Start

Using a <style> tag, set the color to green for all <p> tags. **SHOW EXPECTED**

```
1 <!-- Your solution goes here -->
2
3 <p>Paragraph 1 content</p>
4 <p>Paragraph 2 content</p>
5 <p>Paragraph 3 content</p>
```

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1

2

3

4

5

Check

Next

Exploring further:

- [Cascade and inheritance](#) from MDN
- [CSS inherit Keyword](#) from W3Schools
- [CSS Specificity](#) from W3Schools

4.2 Basic selectors

CSS has many ways to specify the selector. Five common selector types are:

1. The **element selector** matches elements with the specified element names.
Ex: `p { color: blue; }` selects all `p` elements.
2. The **class selector**, specified with a period character followed by the class name, matches elements that have the specified class name.
Ex: `.notice { color: blue; }` selects all elements with a `class="notice"` attribute.

3. The **ID selector**, specified with a hash character followed by the ID name, matches the element that has the specified ID.

Ex: `#byLine { color: blue; }` selects the element with the `id="byLine"` attribute.

4. The **descendant selector**, specified with a selector followed by a space and another selector, matches elements that are contained in other elements.

Ex: `h2 em { color: blue; }` selects `em` elements contained in `h2` elements.

5. The **pseudo-class selector**, specified with a colon character followed by a pseudo-class name, matches elements based on user behavior or element metainformation.

Ex: `:hover { color: blue; }` selects elements under the mouse cursor.

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HTML class names allow CSS rules and JavaScript code to modify all HTML elements belonging to a class. An HTML tag's **class attribute** specifies the classes to which the tag belongs, with each class name separated by a space. Ex: `` has two classes, `highlight` and `first`. While HTML elements' IDs are unique, many elements may use the same HTML class name.

PARTICIPATION ACTIVITY

4.2.1: Applying styles to HTML elements.



Animation content:

A block of CSS is shown:

```
p { color:blue; }
.gr { color:green; }
#second { color:orange; }
p span { color:red; }
p:hover { background-color: yellow; }
```

A block of HTML is shown:

```
<p>Children of Men</p>
<p id="second">Her</p>
<p><span>Attack</span> the Block</p>
<p class="gr">Moon</p>
```

A browser displays four paragraphs. The first says "Children of Men" in blue text. The second says "Her" in orange text. The third says "Attack the Block" with "Attack" in red text and "the Block" in blue text. The fourth says "Moon" in green text.

Animation captions:

1. The default styling colors the text black with a white background.

2. The element selector p matches all paragraph elements and colors the text blue.
3. The class selector .gr matches all elements with gr class attribute and colors the text green.
4. The ID selector #second matches the paragraph with second ID attribute and colors the text orange.
5. The descendant selector p span matches span elements contained in a paragraph and colors the text red.
6. The pseudo-class selector p:hover matches the paragraph under the hovering cursor and colors the background yellow.

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PARTICIPATION ACTIVITY**4.2.2: Basic selectors.**

Refer to the following HTML fragment.

```
<ol class="numbers">
  <li id="first">First number</li>
  <li id="second">Second number</li>
  <li id="third">Third <span class="important">number</span></li>
</ol>
<ul>
  <li>A <span class="bullet">bullet</span></li>
  <li>Another <span class="bullet">bullet</span></li>
  <li>Another <span class="important">important item</span></li>
</ul>
```

- 1) What CSS selector matches all the `` elements?

Check**Show answer**

- 2) What CSS selector matches the last `` element in the ordered list?

Check**Show answer**

- 3) What CSS selector matches the `numbers` class attribute?

Check**Show answer**©zyBooks 09/12/22 23:11 1361418
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- 4) What CSS selector matches only the `` elements in the unordered list?

Check**Show answer**

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4.2.3: Descendant matching.

Assume the CSS below applies to each of the following.

```
p span {  
    background-color: yellow;  
}
```

- 1) Will "text" appear highlighted?

```
<p>The <span>text</span> is  
highlighted.</p>
```

- Yes
 No

- 2) Will "text" in the first `` element appear highlighted?

```
<ol>  
    <li>The <span>text</span> is  
highlighted.</li>  
    <li>The text is not  
highlighted.</li>  
</ol>
```

- Yes
 No

- 3) Will "text" appear highlighted?

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

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- Yes
 No

- 4) Will "text" appear highlighted in both `` elements?

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

 Yes No

5) Will "text" appear highlighted?

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```
<span><p>text</p></span>
```

 Yes No

Pseudo-class selectors match elements based on user behavior or metainformation about HTML elements. Example pseudo-class selectors include:

- `:enabled` - Element is enabled.
- `:hover` - Mouse is hovering over the element.
- `:empty` - Element has no child elements.
- `:lang(language)` - Element contains text in a specified language.

Class selectors and pseudo-class selectors can combine with element names to match more specific elements. Ex: `a:hover` selects only the anchor tag the mouse is hovering over, and `span.highlight` selects only `span` elements that have the `highlight` class attribute.

PARTICIPATION ACTIVITY

4.2.4: Basic CSS selector matching.



Match each CSS selector to the description that best describes the selector.

Mouse: Drag/drop. Refresh the page if unable to drag and drop.

img**img:last-child****img.red****figure img**

Matches all `img` elements.

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Matches `img` elements with `red` class name.

Matches any `img` element that is the last child of another element.

Matches `img` elements contained in a

figure element.

Reset**PARTICIPATION ACTIVITY**

4.2.5: Practice identifying CSS selectors.



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Choose the selector name that correctly matches the CSS selector used.

1) 
`td {
 background-color: yellow;
}`

- Element
- Class
- ID
- Pseudo-class
- Descendant



2) 
`td img {
 background-color: yellow;
}`

- Element
- Class
- ID
- Pseudo-class
- Descendant



3) 
`.hidden {
 background-color: yellow;
}`

- Element
- Class
- ID
- Pseudo-class
- Descendant



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PARTICIPATION ACTIVITY

4.2.6: Practice using CSS selectors.



Complete the selector for each CSS rule.

- 1) Cause all heading 1 text to be displayed with the bold font-weight attribute.

```
[ ] {  
    font-weight: bold;  
}
```

[Check](#)[Show answer](#)

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- 2) Cause all hyperlinks inside a table to be displayed with the bold font-weight attribute.

```
[ ] {  
    font-weight: bold;  
}
```

[Check](#)[Show answer](#)

- 3) Cause all elements with the class name logbase to be displayed as superscript text.

```
[ ] {  
    vertical-align: super;  
    font-size: smaller;  
}
```

[Check](#)[Show answer](#)

- 4) Cause the element with the ID special to be displayed with the text color red.

```
[ ] {  
    color: red;  
}
```

[Check](#)[Show answer](#)

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- 5) Cause the text background of any div to be changed to light blue when the mouse **hovers** (moves over) any part of the div contents.



```
background-color:  
lightblue;  
}
```

Check**Show answer**

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**PARTICIPATION ACTIVITY****4.2.7: Element, class, and ID selectors.**

Modify or add one CSS rule for each requirement below using the specified selectors.

1. Element selector: Change the text **color** from **green** to **blue** for the list items.
2. Class selector: Set the **text-decoration** to **underline** for all HTML elements with the class name **footnote**.
3. ID selector: Set the text **color** to **orange** and the **font-style** to **italic** for the HTML element with the ID **footnote-1**.

HTML **CSS**

```
1 <section>  
2   <h2>Facts about CSS</h2>  
3   <ul>  
4     <li>According to Wikipedia, CSS was first proposed by Håkon Wium  
5     <li>The first W3C CSS Recommendation (CSS1) was released in 1996.  
6     <li>CSS was selected over competing stylesheet technologies because it  
7       allowed a document's style to be influenced by multiple sty  
8         <a href="#footnote-1">[1]</a></li>  
9     <li>Four years passed from when CSS1 was released before any browser  
10       <a href="#footnote-2">[2]</a></li>  
11   </ul>  
12   <p id="footnote-1" class="footnote">[1] <a href="https://en.wikipedia.org/w/index.php?title=CSS&oldid=107314182">[1]</a></p>  
13   <p id="footnote-2" class="footnote">[2] <a href="https://en.wikipedia.org/w/index.php?title=CSS&oldid=107314182">[2]</a></p>  
14  
15  
16
```

Render webpage**Reset code**

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Your webpage**Expected webpage**

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4.2.8: Pseudo-class and descendant selectors.



Add one CSS rule for each requirement below using the specified selectors.

1. Pseudo-class selector: Set the `background-color` to `pink` for any button that is `:disabled`.
2. Descendant selector: Set the `background-color` to `lightgreen` if the button is a descendant of a `fieldset`.

HTML **css**

```
1 <section>
2   <h2>Muppet Town Mayoral Elections</h2>
3   <p>
4     Muppet Town has decided that the town needs a mayor. Miss Piggy in
5     Kermit-over his objections-also ended up on the ballot.
6   </p>
7   <p>
8     Kermit is not receiving any votes. He thinks that the ballot looks
9     because nothing appears to happen when other muppets try voting fo
10    </p>
11   <fieldset><label>Mayoral Ballot</label>
12   <button>Vote for Miss Piggy</button>
13   </fieldset>
14   <button disabled="true">Vote for Kermit The Frog</button>
15 </section>
```

[Render webpage](#)[Reset code](#)**Your webpage****Expected webpage**

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CHALLENGE ACTIVITY

4.2.1: Basic selectors.



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[Start](#)Set background-color to gold for all elements with class: subtle [SHOW EXPECTED](#)[CSS](#) [HTML](#)

1

/* Your solution goes here */

2

3

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1

2

3

4

5

Exploring further:

- [CSS Selectors Reference](#) from W3Schools.
 - [CSS Pseudo-classes](#) from W3Schools.
 - [CSS Attribute Selectors](#) from W3Schools.

4.3 Advanced selectors

Universal selector

The ***universal selector***, specified using an asterisk character (*), matches *all* elements in the web page. The universal selector is implied when an element name is not specified. Ex: The CSS selectors `.highlight` and `*.highlight` match exactly the same elements, where the universal selector is implied in `.highlight` and explicit in `*.highlight`.

Multiple selector

The **multiple selector**, specified using a comma (,) to separate selectors, matches all listed elements to apply a style rule. Ex: The figure below shows two CSS examples that apply the same styles to `` and `` elements. The CSS on the left unnecessarily duplicates the styling declarations for `` and `` elements, whereas the CSS on the right uses a single style declaration using a multiple selector.

Figure 4.3.1: Comparing separate and multiple selectors.

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Separate selectors	Multiple selector
	<pre>ul, ol { background-color: gray; color: white; font-weight: bold; }</pre>

```
ul {  
    background-color:  
gray;  
    color: white;  
    font-weight: bold;  
}  
ol {  
    background-color:  
gray;  
    color: white;  
    font-weight: bold;  
}
```

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Child selector

The **child selector**, specified using a greater than character (>) between two selectors, matches any elements where the second element is a direct child of the first element. The child selector is similar to the descendant selector (space between selectors), but the matching child element in the child selector must be a direct child of the matching parent element.

PARTICIPATION
ACTIVITY

4.3.1: Styling background color with child selector.



Animation content:

The stylesheet reads:

```
p em {  
    background-color: yellow;  
}  
p > em {  
    background-color: green;  
}
```

The HTML reads:

```
<p>  
    The name  
    <strong><em>Neo</em></strong>  
    is an anagram for  
    <em>One</em>.  
</p>
```

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The browser displays "The name Neo is an anagram for One." Neo is bold and italicized with a yellow background. One is italicized with a green background.

Animation captions:

1. The em elements are descendants of the paragraph element, so the descendant selector matches both elements.
2. The "Neo" em element is a direct child of the strong element, not the p element, so the p > em child selector does not match the "Neo" em.
3. The p > em child selector does match the "One" em element since the em is a direct child of p.

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PARTICIPATION ACTIVITY

4.3.2: List item selectors.



Match the CSS selectors to the best descriptions.

Mouse: Drag/drop. Refresh the page if unable to drag and drop.

ol li

ol > li

li

Match all list items.

Match all list items that are descendants of ordered lists.

Match all list items that are direct children of ordered lists.

Reset

PARTICIPATION ACTIVITY

4.3.3: Matching specific elements.



Refer to the HTML below.

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< p > James Bond is known to drive the < span class="mfg" >Aston Martin</ span> DB5. Below are a few cars James Bond has driven in recent Bond films according to < a href="https://en.wikipedia.org/wiki/List_of_James_Bond_vehicles" >Wikipedia</ a>. </ p >

```

< ol >
    < li >< cite >Casino Royale</ cite > (2006)
        < ul >
            < li >< span class="mfg" >Bentley</ span > 4.5 Litre</ li >
            < li >< span class="mfg" >Aston Martin</ span > DB5</ li >
        < /ul >
    < /li >
    < li >< cite >Quantum of Solace</ cite > (2008)
        < ul >
            < li >< span class="mfg" >Aston Martin</ span > DBS V12</ li >
        < /ul >
    < /li >
    < li >< cite >Skyfall</ cite > (2012)
        < ul >
            < li >< span class="mfg" >Jaguar</ span > XJ (X351)</ li >
            < li >< span class="mfg" >Mercedes</ span > S400</ li >
            < li >< span class="mfg" >Aston Martin</ span > DB5</ li >
        < /ul >
    < /li >
    < li >< cite >Spectre</ cite > (2015)
        < ul >
            < li >< span class="mfg" >Aston Martin</ span > DB10</ li >
        < /ul >
    < /li >
< /ol >

```

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- 1) What CSS selector matches all list items?

Check

Show answer



- 2) What selector matches list items that are direct children of ordered lists but not unordered lists?

Check

Show answer

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- 3) What selector matches *all* elements with the mfg class attribute?

Check

Show answer



[Check](#)[Show answer](#)

- 4) What selector matches ordered and unordered lists?

[Check](#)[Show answer](#)

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- 5) What selector matches `<cite>`, ``, and `<a>` elements?

[Check](#)[Show answer](#)**PARTICIPATION ACTIVITY****4.3.4: Child and multiple selectors.**

Modify or add a CSS rule for each requirement below to change the `background-color` property as specified.

1. Add a rule to change the background color for `` elements to be `magenta`.
2. Modify the `ol li` selector so the yellow background color applies only to `` elements that are direct children of `` elements.
3. Add a rule to change the background color to `cyan` for `` elements that are descendants of `` elements.
4. Add a rule to change the background color to `cyan` for `` elements that are descendants of `` elements.
5. Combine the previous two rules into a single rule using a multiple selector.

[HTML](#)[CSS](#)

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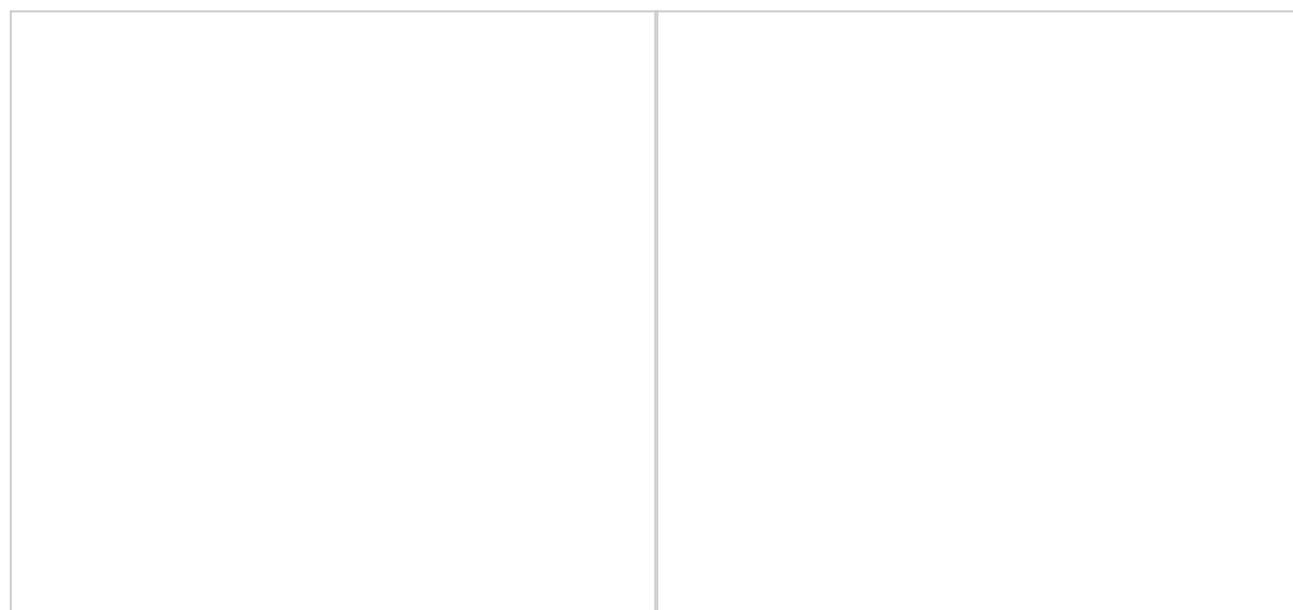
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```
1 <ol>
2 <li>The <em><span>Muppets</span></em> were created in 1955.</li>
3 <li>The first two <span><em>Muppets</em></span> performers were married
4   <li>Jim <span>Henson</span></li>
5   <li>Jane <span>Henson</span></li>
6 </ul></li>
7 <li>The <span>Muppets</span> were also in comic strips and movies.</li>
8 </ol>
9
10 <ul>
11 <li>The <em><span>Muppets</span></em> were created in 1955.</li>
12 </ul>
13
14 <p>Every <span>"Muppets"</span> and <span>"Henson"</span> word is color
```

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Render webpageReset code**Your webpage****Expected webpage**

Sibling selectors

Sibling elements are elements that share the same parent element. The **general sibling selector**, specified using a tilde character (~) between two selectors, matches the second element if the second element occurs after the first element and both elements are siblings. Any number of other elements can be placed between two general sibling elements. In the example below, the heading and the paragraphs are children of the section element. Consequently, the two paragraphs are both general siblings of the heading element.

Figure 4.3.2: General sibling selector.

HTML and CSS	Render
<pre> <style> h1 ~ p { border-top: 1px solid gray; } </style> <section> <h1>Classifieds</h1> <p>Dog for adoption. Call 555-1234. </p> <p>Guard dog wanted. Call 555-4321. </p> </section> </pre>	<h1>Classifieds</h1> <p>©zyBooks 09/12/22 23:11 1361418 Dog for adoption. Call 555- 1234. Jared Robbins UISCSC452DavisFall2022</p> <hr/> <p>Guard dog wanted. Call 555- 4321.</p>

The **adjacent sibling selector**, specified using a plus character (+) between two selectors, matches an element that immediately follows another element, where both elements have the same parent. Ex: The adjacent selector `h1 + p` in the figure below matches the first paragraph immediately following the `<h1>` header element, where both the paragraph and heading share the same section element parent.

Figure 4.3.3: Adjacent sibling selector.

HTML and CSS	Render
<pre> <style> h1 + p { border-top: 1px solid orange; } </style> <section> <h1>My Book Report</h1> <p>I thoroughly enjoyed this book. The story made me laugh and cry and jump for joy.</p> <p>I recommend this book to anyone who loves to read.</p> </section> </pre>	<h1>My Book Report</h1> <hr/> <p>I thoroughly enjoyed this book. The story made me laugh and cry and jump for joy.</p> <p>I recommend this book to anyone who loves to read.</p> <p>©zyBooks 09/12/22 23:11 1361418 Jared Robbins UISCSC452DavisFall2022</p>

Combinators are CSS selectors that match specific relationships between other selectors. The descendant, child, adjacent sibling, and general sibling selectors are all combinators.

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**PARTICIPATION ACTIVITY**

4.3.5: Identify CSS selector names.

Identify which CSS selector is used in each question.

1) li ~ img



- Universal selector
- Multiple selector
- Child selector
- General sibling selector
- Adjacent sibling selector

2) *.hide



- Universal selector
- Multiple selector
- Child selector
- General sibling selector
- Adjacent sibling selector

3) h1 + p



- Universal selector
- Multiple selector
- Child selector
- General sibling selector
- Adjacent sibling selector

4) p > img



- Universal selector
- Multiple selector
-

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- Child selector
- General sibling selector
- Adjacent sibling selector

Attribute selector

The **attribute selector**, specified with an attribute name and optional value comparison enclosed in square brackets ([and]), matches elements with the specified attribute or the specified attribute and value. Ex: `a[target]` selector matches anchor elements with a `target` attribute specified. The attribute selector can be more specific by matching elements with attributes having a specific value. Ex: `a[target="_blank"]` attribute selector matches anchor elements with a target attribute value of `_blank`.

Table 4.3.1: Common attribute selector comparators.

Comparator	Matches element when	CSS example	Matching examples
=	Attribute has exact value	<code>[target="_blank"]</code>	<code></code>
~=	Attribute contains whole word	<code>[alt~="sad"]</code>	<code></code>
^=	Attribute begins with value	<code>[class^="nav"]</code>	<code><ul class="nav-level0"></code> <code><ul class="navigation-item"></code>

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4.3.6: Attribute selectors.



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Complete the CSS attribute selectors to implement the specified behavior. Jared Robbins
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- 1) Set the text color for input buttons of type submit.



```
<button
type="submit">Submit</button>
```

```
button[ ] {  
    color: green;  
}
```

Check**Show answer**

- 2) Set the input area width for any text input elements to 300 pixels.

```
<input type="text"  
name="firstName">  
  
input[ ] {  
    width: 300px;  
}
```

Check**Show answer**

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- 3) Set the text color to blue for any links where the `rel` attribute contains `nofollow`.

```
<a rel="abstract nofollow"  
href="https://example.com">  
  
a[ ] {  
    color: blue;  
}
```

Check**Show answer**

- 4) Create a border for images where the `alt` attribute starts with `test`.

```
  
  
img[ ] {  
    border: red 1px solid;  
}
```

Check**Show answer**

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Pseudo-element selector

The **pseudo element selector**, specified with two colon characters (::) followed by a pseudo-element, matches parts of elements. The pseudo-element selectors allow styles to apply to the first line or first letter of text of an element or to text that is selected by the user, or allow additional content to be inserted before or after an element.

Table 4.3.2: Common pseudo-element selectors.

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Pseudo-element	Explanation	CSS example
::after	Add content after the matched element.	li::after { content: "<" }
::before	Add content before the matched element.	li::before { content: "***" }
::first-line	Match the first line of text in a block element.	p::first-line { color: red }
::first-letter	Match the first letter of text in a block element.	p::first-letter { font-size: 200% }
::selection	Matches the text selected by user.	::selection { background: yellow }

PARTICIPATION ACTIVITY

4.3.7: Pseudo-element selectors.



Complete the CSS pseudo-element selectors to implement the specified behavior.

- 1) Change the text color to green for any text that is currently selected using the mouse.

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```
[ ] {
    color: green;
}
```

Check

Show answer



- 2) Make the first letter uppercase in all list items.

```
<li>Bread</li>
```

```
{  
    text-transform:  
    uppercase;  
}
```

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[Check](#)[Show answer](#)

- 3) Underline the first line in each blockquote.

```
<blockquote>To be or not to  
be...</blockquote>
```

```
{  
    text-decoration:  
    underline;  
}
```

[Check](#)[Show answer](#)

- 4) Add a red asterisk at the end of each paragraph.

```
<p>Turn the switch on.</p>
```

```
{  
    content: "*";  
    color: red;  
}
```

[Check](#)[Show answer](#)**CHALLENGE ACTIVITY**

4.3.1: Advanced selectors.

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[Start](#)

Use a multiple selector to apply the below rules to all `<p>` and `<h3>` tags. [SHOW EXPECTED](#)

[CSS](#) [HTML](#)

```
1 /* Your solution goes here */
2   color: coral;
3 }
```

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1

2

3

4

[Check](#)[Next](#)

Exploring further:

- [CSS selector reference](#) from W3 Consortium.

4.4 Common properties

Color property

The **color** CSS property changes the text color to a specified color value. A color value can be specified in several ways:

- CSS defines 140 color names. Ex: `white`, `blue`, `black`, `gray`, `forestgreen`, `magenta`.
- An **RGB color value** specifies a color using the **`rgb(red, green, blue)`** function by indicating the red, green, and blue intensities. Each intensity for red, green, and blue is between 0 and 255, where 0 is the lowest intensity and 255 is the highest.
Ex: `rgb(0, 0, 0)` is black, `rgb(0, 0, 255)` is blue, `rgb(255, 255, 0)` is yellow, and `rgb(255, 255, 255)` is white.

- A **hexadecimal color** specifies a color using the `#RRGGBB` format by indicating the red, green, and blue intensities. Each intensity for red, green, and blue is between 00 and FF hexadecimal numbers, where 00 is the lowest intensity and FF is the highest.
Ex: `#000000` is black, `#0000FF` is blue, `#FFFF00` is yellow, and `#FFFFFF` is white.
- An **HSL color value** specifies a color using the `hsl(hue, saturation, lightness)` function by indicating the hue, saturation, and lightness values. The hue value ranges between 0 and 360, and the saturation and lightness values range between 0% and 100%. Ex: `hsl(0, 0%, 100%)` is black, `hsl(120, 100%, 50%)` is green, and `hsl(0, 100%, 25%)` is dark red.

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The HSL color specification method is harder to understand and is not used as frequently as the RGB and hexadecimal color specification methods.

- The RGB and HSL color values can add an alpha value to allow for transparency. The **RGBA color value** specifies a color using the `rgba(red, green, blue, alpha)` function by indicating the red, green, blue, and alpha intensities. The **HSLA color value** specifies a color using the `hsla(hue, saturation, lightness, alpha)` function by indicating the hue, saturation, lightness, and alpha intensities. The intensities have the same ranges as for RGB or HSL color values, but the alpha intensity is between 0 and 1. An alpha of 0 means fully transparent, 1 means fully opaque, and 0.5 means half transparent.

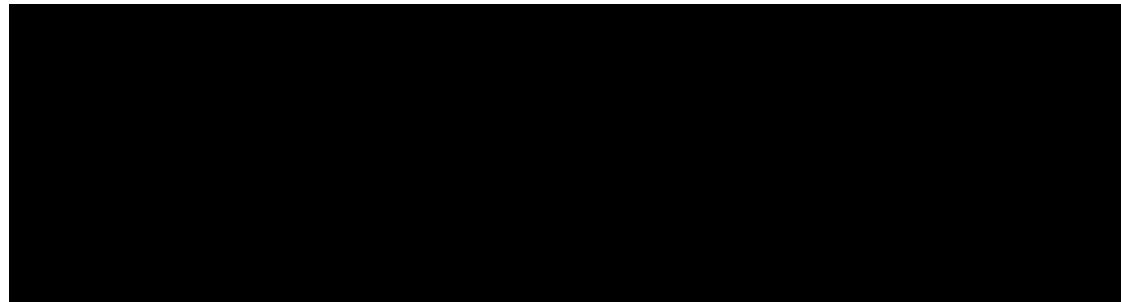
Color picker.

`rgb(0 , 0 , 0)`

Each value ranges 0 to 255

`#000000`

Value ranges 000000 to FFFFFF



PARTICIPATION ACTIVITY

4.4.1: Color values and names.



Use the color picker above to help match each color value to the color name.

Mouse: Drag/drop. Refresh the page if unable to drag and drop.

rgb(80, 80, 80)

#0000FF

rgb(144, 238, 144)

#FFD700

#006400

#FFFFFF

rgb(0, 0, 0)

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Blue

Black

White

DarkGreen

LightGreen

Gray

Gold

Reset

PARTICIPATION ACTIVITY

4.4.2: CSS text color.



Modify or add one CSS rule for each requirement below to change the text **color** property as specified.

1. By color name: change the text color for **byname** class elements from **black** to **blue**.
2. By RGB values: change the text color for **byrgb** class elements from black (**rgb(0, 0, 0)**) to green by modifying the second number to be 255.
3. By HSL values: change the text color for **byhsl** class elements from black (**hsl(0, 0%, 0%)**) to cyan by modifying the first number to be 200, the second number to 100%, and the third number to 50%.

HTML

CSS

```
1 <p class="byname">The text is blue</p>
2
3 <p class="byrgb">The text is green</p>
4
5 <p class="byhs1">The text is cyan</p>
6
```

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[Render webpage](#)[Reset code](#)**Your webpage****Expected webpage**

Background properties

Every element in a web page has a set of background properties. The web browser first draws the element's background and then draws the element's content. If the element's background is not fully opaque, the element's parent is visible under the element's content. Common background properties include:

- The **background-color** property specifies the background color.
- The **background-image** property specifies a background image.
- The **background** property is shorthand for setting several of the element's background properties at the same time.

Background colors are specified using color names, a color function (RGB, RGBA, HSL, HSLA), or one of the values such as `transparent`. Background images are specified with the `none` value or the `url('URL')` function, where URL indicates the location of the image. By default, the initial background color is `transparent` and background image is `none`, which means the element's parent's background will display underneath the element's content. When a background color and image are both specified, the background image is rendered on top of the color.

PARTICIPATION ACTIVITY**4.4.3: Styling background color and image.**

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**Animation content:**

A block of HTML is shown with a style block containing CSS:

```
<style>
p {
    background-color: LightSkyBlue;
}
.clouds {
    background-image: url('clouds.png');
}
<p>
    The sky is light blue.
</p>
<p class="clouds">
    Fluffy, soft, and white are
    the clouds.
</p>
<p>
    Without the sun, black.
</p>
```

The browser displays three lines of text:

Line 1: "The sky is light blue." with a light blue background color.

Line 2: "Fluffy, soft, and white are the clouds." with an image of clouds in the background.

Line 3: "Without the sun, black." with a light blue background color.

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1. The elements display with transparent backgrounds.
2. The p element has a LightSkyBlue background color.
3. The clouds class uses a background image that displays over the p element's background.

PARTICIPATION ACTIVITY**4.4.4: Determining background properties.**

Given the HTML below, indicate the background properties used for the elements. Assume that the smiley.gif image has a transparent background.

```
<p>Below is the word "Hello" in different languages.</p>
<ul id="americas" style="background-color: #ffff00">
  <li id="hola" style="background-image: url('smiley.gif')">Hola</li>
  <li id="olá" style="background: green url('smiley.gif')">Olá</li>
</ul>
<ul id="europe" style="background-image: url('clouds.png');">
  <li id="salut" style="background: blue">Salut</li>
  <li id="hej" style="background: red url('smiley.gif')">Hej</li>
  <li id="bog" style="background: transparent url('smiley.gif')">Bog</li>
</ul>
```

Mouse: Drag/drop. Refresh the page if unable to drag and drop.

smiley face on clouds

smiley face on green

smiley face on yellow

smiley face on red

blue

Hola

Olá

Salut

Hej

Bog

Reset

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Float property

CSS properties **float** and **clear** control how text flows around HTML elements, making web pages look like a magazine or newspaper article where the article's text wraps around the images in the page.

The **float** property specifies whether the element will float to the right or left of the element's parent container, allowing text to flow around the element. Values for the **float** property include:

- **left** - Element floats to parent container's left side
- **right** - Element floats to parent container's right side
- **none** - Element does not float (default value)

The **clear** property can stop elements from floating. Values for the **clear** property include:

- **both** - No elements allowed to float
- **left** - No element allowed to float on parent container's left side
- **right** - No element allowed to float on parent container's right side
- **none** - Elements allowed to float (default value)

PARTICIPATION
ACTIVITY

4.4.5: Floating images.



Modify the CSS below to float to the right the first image with **floatright** class, to float to the left the second image with **floatleft** class, and to clear floating elements on both sides of the p element with **nofloats** class.

HTML CSS

```
1 <h1>Classifieds</h1>
2
3 <p>
4   
10  
13
14 <p>
15  Call 555-4321 for more information.
16
```

Render webpage

Reset code

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Your webpage**Expected webpage**

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PARTICIPATION ACTIVITY

4.4.6: Float property values.



Specify the correct CSS values.

- 1) What CSS value floats an element to the right?



`float: ;`

Check**Show answer**

- 2) What CSS value stops elements from floating left?



`clear: ;`

Check**Show answer**

Display property

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The **display** property controls the layout of the element on a web page. Values for the display property include:

- **inline** - Displays the element as an inline element, like **span** or **a** elements.
- **block** - Displays the element as a block element, like **p**, **h1**, or **div** elements.
- **none** - Hides the element from being displayed, like **style** elements.

- **inline-block** - Displays the contents of the element as a block element, but formats the element as an inline element.
- **list-item** - Displays the contents of the element as a list item element.

PARTICIPATION ACTIVITY**4.4.7: Display CSS values.**

Provide the CSS display value that correctly styles the following HTML as displayed.

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```
<style>
.animal {
    background: yellow;
    width: 50px;
    height: 40px;
    display: ...;
}
</style>

My favorite breed of
<span class="animal">cat</span>
is Russian Blue.
```

1)

My favorite breed of cat is
Russian Blue.



display:

Check**Show answer**

2)

My favorite breed of is Russian
Blue.



display:

Check**Show answer**

3)

My favorite breed of
cat

is Russian Blue.



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display:

Check**Show answer**



4)

My favorite breed of
 • cat
 is Russian Blue.

display: //

Check**Show answer**

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5)

My favorite breed of cat is
 Russian Blue.

display: //

Check**Show answer**

CSS variables

Many websites have complex stylesheets with repeated values. Ex: The same background color may be used in numerous places, and changing the background color requires searching and replacing throughout the stylesheet. CSS variables simplify the process of creating CSS values that are used repeatedly in a stylesheet.

A **CSS variable** is a custom CSS property that defines a value. A CSS variable is declared in a CSS selector that defines the variable's scope. A CSS variable can have global scope by declaring the variable in the **:root** selector, which targets the highest DOM element: the **<html>** element.

A CSS variable is defined with two dashes preceding the variable name. Ex: **--my-variable: red;**
 A CSS variable is accessed with the **var()** function. Ex: **var(--my-variable);**

PARTICIPATION ACTIVITY

4.4.8: Using CSS variables.



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Animation content:

A block of HTML is shown with a style block containing CSS:

```
<style>
:root {
  --main-color: red;
  --main-bg-color: yellow;
```

```
}
```

```
p {
```

```
    color: var(--main-color);
```

```
    background-color: var(--main-bg-color);
```

```
}
```

```
</style>
```

```
<p>The sun rises and sets.</p>
```

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This code block displays a line of text that says "The sun rises and sets." in red colored text with a yellow background.

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Animation captions:

1. A CSS variable defined in the :root selector has global scope.
2. The CSS variables main-color and main-bg-color are initialized with the color values red and yellow, respectively.
3. The p selector uses the CSS variables main-color and main-bg-color to set the paragraph's text and background colors.

PARTICIPATION ACTIVITY

4.4.9: CSS variables.



- 1) What selector must a CSS variable be declared in to have global scope?



- :root
- p
- div

- 2) What is the proper syntax to declare a CSS variable set to black?



- section-color: black;
- section-color: black;
- section-color black;

- 3) What is the proper syntax to use a CSS variable called --section-color?

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- color: --section-color;
- color: var(--Section-color);
- color: var(--section-color);



4) Suppose `--main-color` from the animation above is used in 200 different CSS rules. How many CSS rules would need to be modified if `--main-color` is changed to blue?

- 0
- 1
- 200

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CHALLENGE ACTIVITY**4.4.1: Common properties.**

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Start

For the `<p>` tag, set background-color to `rgb(250, 250, 50)`. **SHOW EXPECTED**

CSS**HTML**

```
1 p {  
2     /* Your solution goes here */  
3 }  
4  
5 }
```

1

2

3

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Check**Next**

Exploring further:

- [HTML Color Names](#) from W3Schools.

- [CSS Legal Color Values](#) from W3Schools.
- [Color HSL](#) from W3Schools.
- [CSS Background Property](#) from W3Schools.
- [CSS Display Property](#) from W3Schools.

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4.5 Font and text properties

Font properties

Many CSS properties control the font properties for displaying text. CSS font properties include:

- The **`font-family`** property specifies the font family, such as "Times New Roman" or `serif`.
- The **`font-size`** property changes the font size, such as `120%`, `small`, or `12px`.
- The **`font-weight`** property specifies the font weight, such as `normal` or `bold`.
- The **`font-style`** property changes the text style, such as `normal`, `italic`, or `oblique`.
- The **`font-variant`** property specifies the variant of the text, such as `normal` or `small-caps`.
- The **`font`** property is shorthand for setting several font properties at the same time. Ex:
`font: italic 12pt Georgia, serif;`

The `font-family` property contains a list of fonts specified as a family name or a generic family separated by commas.

- A **`family name`** is the name of a specific font, like "Times New Roman", "Arial", or "Georgia". Family names containing spaces must be wrapped in quotations marks, while family names without spaces do not.
- A **`generic family`** is a general group of fonts, like serif, sans-serif, cursive, fantasy, or monospace. Ex: Times New Roman and Georgia are both serif fonts because the fonts contain serifs, which are small strokes attached to the end of larger strokes on each letter.

The web browser will use the first font listed that is available. Good practice is to start the list with the intended font and end with a generic family. Ex:

`font-family: Arial, Helvetica, sans-serif;`

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Table 4.5.1: Generic family names.

Generic family	Distinguishing features	Example fonts

Serif	"Embellishments" like finishing strokes or flare ends	Garamond Georgia Times New Roman
Sans-Serif	Plain stroke ends	Arial ©zyBooks 09/12/22 23:11 1361418 Helvetica J. Robbins UISCSC452DavisFall2022 Verdiana
Cursive	Cursive or calligraphy characteristics like joined strokes	Brush Script MT Comic Sans MS Lucida Handwriting
Fantasy	Decorative	Impact Luminari
Monospace	Constant width for letters, punctuation, and space	Consolas Courier New

Web fonts

A limited number of fonts are available on all platforms: Arial, Courier New, Georgia, Times New Roman, and Verdana. Web developers can expand the number of fonts available by using web fonts. A **web font** is a CSS feature that allows custom fonts to be downloaded to the web browser.

The font size can be specified using a predefined size name, a relative size name, or a number with an absolute or relative size unit. The predefined size names are **xx-small**, **x-small**, **small**, **medium**, **large**, **x-large**, and **xx-large**, where medium is the default size. The relative size names are **smaller** and **larger** which change the font size for an element to be smaller or larger than the font size of the parent element.

An **absolute size** is a size that is fixed and independent of other CSS sizes. Absolute size units include:

- **cm** - centimeters

- **mm** - millimeters
- **in** - inches
- **px** - pixels ($1\text{px} = 1/96\text{in}$)
- **pt** - points ($1\text{pt} = 1/72\text{in}$)
- **pc** - pica ($1\text{pc} = 12\text{pt}$)

A **relative size** is a size that is relative to another size. Some common relative size units include:

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- **em** - Relative to the element's font size. Ex: $2\text{em} = 2 \times \text{current font size}$. Jared Robbins UISCSC452DavisFall2022
- **rem** - Relative to the root element's font size. Ex: $1.5\text{rem} = 1.5 \times <\text{html}>$ element's font size.
- **vw** - 1% of the viewport's width. Ex: $10\text{vw} = 10\%$ of browser's width.
- **vh** - 1% of the viewport's height. Ex: $5\text{vh} = 5\%$ of browser's height.
- **%** - Percentage of the element's font size. Ex: $120\% = 20\%$ larger than the current font size.

Most web browsers use a default font size of 16px.

Figure 4.5.1: Changing the font size for the entire web page.

```
html {
    font-size: 20px;
}
h1 {
    font-size: 2rem;      /* 20px * 2 = 40px
*/
}
h2 {
    font-size: 1.5rem;   /* 20px * 1.5 = 30px
*/
}
```

PARTICIPATION ACTIVITY

4.5.1: Computing font properties.



Given the HTML below, answer the following questions regarding font properties.

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```
<style>
p {
    font-family: "Verdana", "Arial", sans-serif;
    font-size: 10pt;
}
#band {
    font-style: italic;
    font-size: 120%;
}
#music {
    font-variant: small-caps;
}
</style>
```

<p>

My favorite band is The Shins, because their music is thought-provoking!

</p>

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- 1) What is the text size for the <p> element?

 pt

Check

[Show answer](#)



- 2) What is the text size for the element with the band id?

 pt

Check

[Show answer](#)



- 3) What is the most preferred font for the <p> element?

 //

Check

[Show answer](#)



- 4) What is the second most preferred font for the <p> element?

 //

Check

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- 5) What is the third most preferred font for the <p> element?



Check**Show answer**

- 6) What is the text variant for the `` element with the `music` id?

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Check**Show answer**

Text properties

Many CSS properties control how text is displayed. Some common CSS text properties include:

- The **`text-align`** property changes the horizontal alignment of text for an element. Possible values are: `left`, `right`, `center`, and `justify`.
- The **`text-decoration`** property can add or remove text decorations like underlining or a ~~line-through~~. Possible values are: `overline`, `line-through`, `underline`, and `none`.
- The **`text-transform`** property converts letters to UPPERCASE, lowercase, or Capitalizes Initial Letters. Possible values are: `uppercase`, `lowercase`, and `capitalize`.
- The **`text-indent`** property specifies the first line's indentation amount.

Table 4.5.2: Text alignment examples.

Alignment	CSS example	Displayed
left	<code>text-align: left</code>	Example of wrapped text using the horizontal alignment CSS property.
right	<code>text-align: right</code>	Example of wrapped text using the horizontal alignment CSS property.
center	<code>text-align: center</code>	Example of wrapped text using the horizontal alignment CSS property.
justify	<code>text-align: justify</code>	Example of wrapped text using the horizontal

alignment CSS property.

Underlined links

The CSS `text-decoration:none` is commonly used to remove the default underline from links. The underline helps users quickly identify links, so developers should use caution when removing link underlines. Relying solely on color to identify links can be problematic to users that are color blind or insensitive.

PARTICIPATION ACTIVITY

4.5.2: Text alignment.



Provide the CSS value that correctly styles the example text as displayed.

1)

Gears and Pulleys
The untold story of power
transference.



`text-align:`

//**Check****Show answer**

2)

The following sentences are examples of a pangram, a sentence that contains all of the letters of the alphabet. The quick brown fox jumped over a lazy dog. Pack my box with five dozen liquor jugs. Jackdaws love my big sphinx of quartz. The five boxing wizards jump quickly. How vexingly quick daft zebras jump! Bright vixens jump; dozy fowl quack. Forsaking monastic tradition, twelve jovial friars gave up their



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vocation for a questionable existence on the flying trapeze.

`text-align:`

Check

[Show answer](#)

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3)

Due: July 4, 1776

`text-align:`

Check

[Show answer](#)

PARTICIPATION ACTIVITY

4.5.3: Text properties.



Given the HTML below, select the correct text property and value to display the rendered browser text.

```
<style>
p {
    ....
}
</style>

<p>Knowledge comes, but wisdom lingers. - Lord Tennyson</p>
```

1)

Knowledge comes, but wisdom
lingers. - Lord Tennyson



- `text-decoration:`
overline
- `text-decoration:`
underline
- `text-transform:`
underline

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2)

Knowledge Comes, But Wisdom
Lingers. - Lord Tennyson



- `text-transform: uppercase`
- `text-decoration: capitalize`

- `text-transform: capitalize`

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3)

Knowledge comes,
but wisdom lingers. -
Lord Tennyson

- `text-indent: 20px`
- `text-indent: -20px`
- `text-indent: true`

CHALLENGE ACTIVITY

4.5.1: Font and text properties.

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Start

For the `<p>` tag, set font-family to monospace, and set font-style to italic. **SHOW EXPECTED**

CSS **HTML**

```
1 p {  
2     /* Your solution goes here */  
3 }  
4  
5 }
```

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[Check](#)[Next](#)

Exploring further:

- [CSS Fonts](#) from W3Schools
- [CSS Text](#) from W3Schools
- [CSS Web Fonts](#) from W3Schools
- [What's the best font size for the web?](#) by Robert Mohns

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4.6 Box model

Box model components

HTML elements take up space on the web page. The **box model** describes the size of each element as a series of nested boxes. The box model is important to understand when considering design and layout.

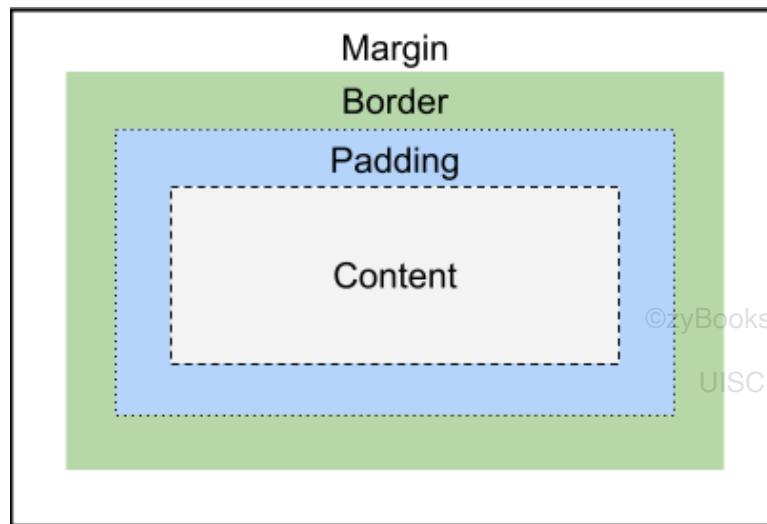
- **Content:** The innermost box contains the content of the element, such as text and images.
- **Padding:** The padding box contains the content box and adds a transparent area around the content.
- **Border:** The border box contains the padded content and adds an optionally colored area around the padding.
- **Margin:** The margin box contains all three boxes and adds a transparent area around the border.

Figure 4.6.1: Box model with labeled boxes.

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The CSS properties that control the padding, border, and margin are:

- The **padding** property specifies the padding thickness. Ex: `padding: 5px;` creates a 5 pixel padding around the content.
- The **border** property specifies the border's thickness, style, and color. Ex: `border: 2px solid blue;` creates a solid blue border that is 2 pixels thick.
- The **margin** property specifies the margin thickness. Ex: `margin: 10px;` creates a 10 pixel margin.

The content, padding, margin, and border boxes are rendered according to the following rules:

- The content is displayed with a background according to the element's background color.
- The padding is transparent and will be displayed using the same color as the element's background.
- The border can be either colored or transparent. If transparent, the border will be displayed with the same color as the padding.
- The margin is transparent and will be displayed using the background color of the parent element.

PARTICIPATION ACTIVITY

4.6.1: Box model displayed.

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Animation content:

A block of CSS is shown:

```
div { background-color: blue; }  
  
#content {  
    padding: 5px;
```

```
border: 5px solid black;  
margin: 5px;  
}
```

A block of HTML is also shown:

```
<div>Before</div>  
<div id="content">Content</div>  
<div>After</div>
```

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Together the HTML and CSS displays three div elements on a screen. The first element is shown in a blue box across the top of the screen and has the text "Before". The second is shown under the first element with a 5 pixel transparent margin that surrounds the 5 pixel black border. Inside the border there is a 5 pixel padding that surrounds the div content, which has the text "Content". Both the padding and the div element have the background color blue. The third div element is displayed under the second div element. The third div is shown as a blue box spanning across the screen with the text "After".

Animation captions:

1. The box model describes the space each HTML element takes as a box. Each div element is displayed with a blue background, and each box is highlighted with a light blue outline.
2. Padding surrounds the content element with transparent space, which is displayed using the element's background color.
3. The border surrounds the content and padding and is colored black.
4. The margin surrounds the border with transparent space and separates the element from other elements.

PARTICIPATION
ACTIVITY

4.6.2: Choose the correct display color.



Given the HTML and CSS below, choose which color each box will be displayed.

```
<style>  
div {  
    background: white;  
    border: 2px solid blue;  
}  
span {  
    background: yellow;  
    border: 1px solid black;  
    padding: 2px;  
    margin: 2px;  
}  
</style>  
  
<div>This is a <span>test</span> of the emergency broadcast system.</div>
```

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Mouse: Drag/drop. Refresh the page if unable to drag and drop.

black

yellow

white

blue

span element's padding

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span element's border

span's margin

div's border

Reset

Box sizing

The `padding` and `margin` properties may have from 1 to 4 values:

- One value - Specifies uniform thickness around the box. Ex: `margin: 20px;` specifies 20px margin thickness around the box.
- Two values - Specifies top and bottom, right and left thickness. Ex: `margin: 10px 20px;` specifies 10px top and bottom margins and 20px right and left margins.
- Three values - Specifies top, right and left, and bottom thickness. Ex: `margin: 10px 30px 20px;` specifies 10px top margin, 30px right and left margins, and 20px bottom margin.
- Four values - Specifies top, right, bottom, and left thickness. Ex: `margin: 10px 30px 20px 40px;` specifies 10px top margin, 30px right margin, 20px bottom margin, and 40px left margin.

Example 4.6.1: Example with non-uniform margin and padding thickness.

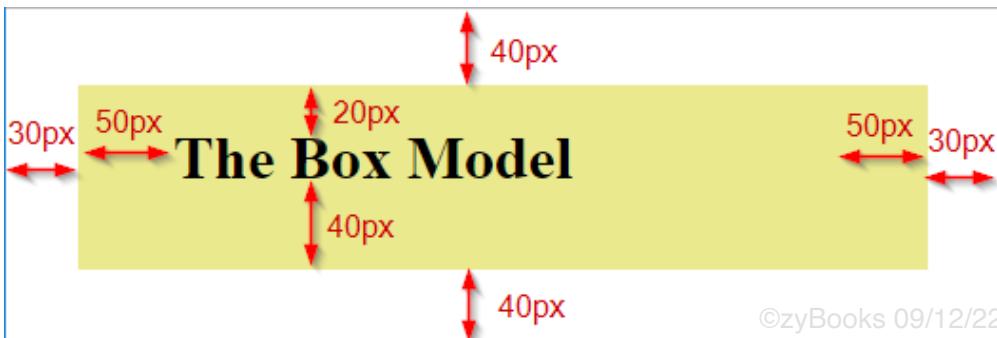
```
<style>
h1 {
    margin: 40px 30px;
    padding: 20px 50px 40px;
    background-color: khaki;
}
</style>

<h1>The Box Model</h1>
```

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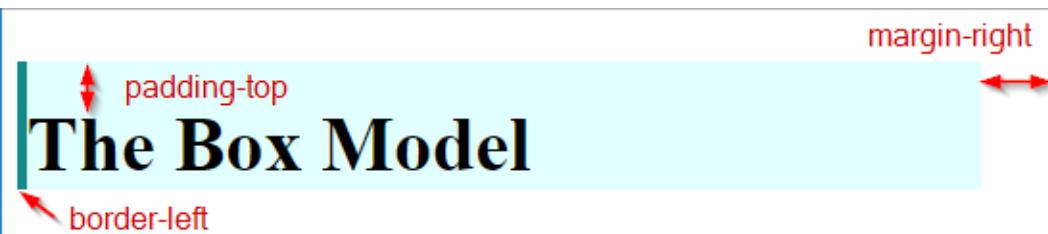
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The `padding`, `border`, and `margin` CSS properties can apply only to one side by adding a `-top`, `-left`, `-bottom`, or `-right` suffix to the CSS property. Ex: `padding-top: 5px;` specifies 5 pixels of padding above the content.

Example 4.6.2: Example specifying one side of the box.

```
<style>
h1 {
    border-left: 5px solid darkcyan;
    margin-right: 30px;
    padding-top: 20px;
    background-color: lightcyan;
}
</style>

<h1>The Box Model</h1>
```



PARTICIPATION
ACTIVITY

4.6.3: Box model properties.

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- 1) What CSS declaration sets the margin to have a uniform space of 20 pixels?



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- 2) What CSS declaration changes the top and bottom padding to be 20 pixels and right and left to be 30 pixels?

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[Check](#)[Show answer](#)

- 3) What CSS declaration changes the right padding to be 10 pixels wide?

[Check](#)[Show answer](#)

Content width and height

A block element's content spans the width of the enclosing parent element by default, but the content size can be changed with the **width** and **height** CSS properties:

- The **width** property specifies the content's width. Ex: `width: 20px;` makes the content 20px wide.
- The **height** property specifies the content's height. Ex: `height: 30px;` makes the content 30px high.

Example 4.6.3: Example using width and height properties.

Two `<div>` elements have the same **width** and **height** property values. However, the second `<div>` appears larger because of the additional padding.

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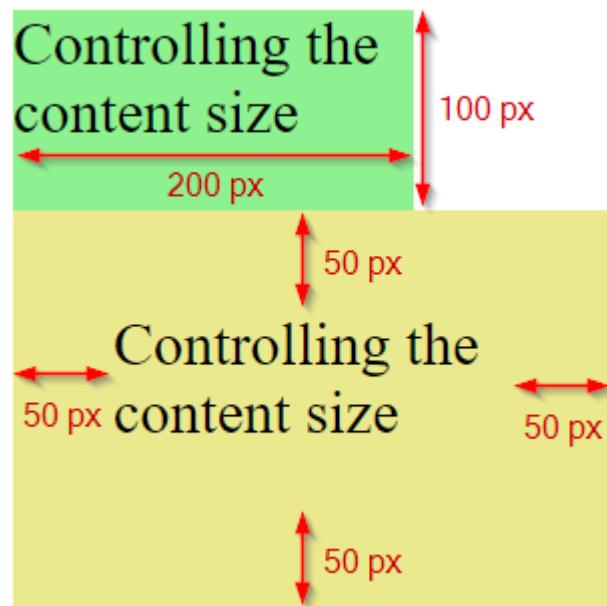
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```
<style>
#nopadding {
    width: 200px;
    height: 100px;
    background-color: lightgreen;
    font-size: 30px;
}

#padding {
    padding: 50px;
    width: 200px;
    height: 100px;
    background-color: khaki;
    font-size: 30px;
}
</style>

<div id="nopadding">Controlling the content size</div>
<div id="padding">Controlling the content size</div>
```

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A common error is to use `width` or `height` on inline elements. An inline element like `` has a width and height that is equal to the size of the element's content. The width and height cannot be changed unless the inline element's `display` property is changed to `inline-block`.

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Example 4.6.4: Example using width and height properties on an inline element.

```

<style>
#span1 {
    width: 80px; /* Ignored */
    height: 40px; /* Ignored */
    background-color: lightgreen;
}

#span2 {
    display: inline-block;
    width: 80px;
    height: 40px;
    background-color: khaki;
}
</style>

<p>
    <span id="span1">Span 1</span> and <span id="span2">Span
2</span>
</p>

```

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Span 1 and Span 2

PARTICIPATION ACTIVITY

4.6.4: Compute the size.



- 1) What is the total `<div>` width?

```

<style>
div {
    width: 200px;
    padding: 10px;
    border: 2px solid green;
    margin: 5px;
}
</style>

<div>How wide am I?</div>

```

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pixels

Check

Show answer

- 2) What is the total `<div>` height?



```
<style>
div {
    height: 100px;
    margin: 10px 5px;
}
</style>

<div>How tall am I?</div>
```

pixels

Check

[Show answer](#)

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- 3) What is the total <div> width?

```
<style>
div {
    width: 100px;
    margin-left: 10px;
    margin-right: 15px;
    padding: 2px 5px 10px
20px;
}
</style>

<div>How wide am I?</div>
```

pixels

Check

[Show answer](#)



- 4) The default content width is 115px. What is the total width?

```
<style>
strong {
    width: 200px;
    margin: 5px;
}
</style>

<strong>How wide am I?
</strong>
```

pixels

Check

[Show answer](#)

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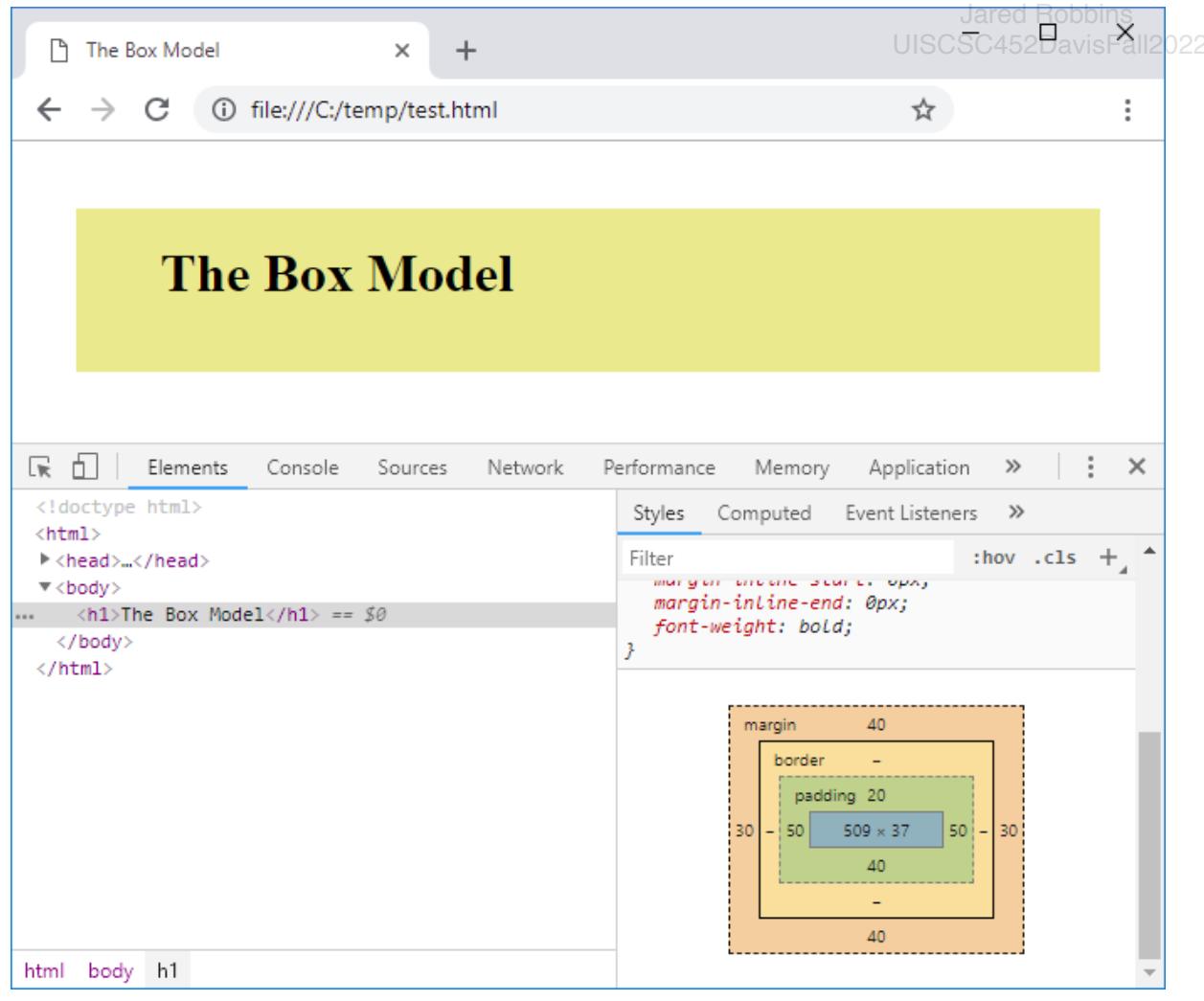
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Chrome DevTools

The Chrome DevTools display the margin, border, padding, and content sizes for all elements. The screenshot below shows the size of the `<h1>` element with the content (509 x 37 pixels) at the center.

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Border styles

The `border` property combines the border width, style, and color. Each CSS property may also be specified separately:

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- The **`border-width`** property specifies the border's width. Ex: `border-width: 5px;` specifies a border that is 5px thick.
- The **`border-style`** property specifies the border's style. Ex: `border-style: dashed;` specifies a border that is dashed.

- The **border-color** property specifies the border's color. Ex: `border-color: green;` specifies a border that is green.

Table 4.6.1: Common border styles.

Style	CSS example	Displayed example
solid	<code>border: 2px solid black;</code>	
dashed	<code>border: 2px dashed red;</code>	
dotted	<code>border: 2px dotted blue;</code>	
none	<code>border: 2px none green;</code>	
double	<code>border: 5px double gray;</code>	
groove	<code>border: 5px groove orange;</code>	
ridge	<code>border: 5px ridge pink;</code>	
inset	<code>border: 5px inset brown;</code>	
outset	<code>border: 5px outset yellow;</code>	

PARTICIPATION ACTIVITY

4.6.5: Modify the padding, border, and margin.



Modify the CSS declarations for the `` and `<p>` tags to meet each requirement below:

- Padding on the span: 5 pixels left, and 5 pixels right.
- Border on the span: 2 pixels solid black above (use `-top` suffix), and 4 pixels solid gray below (use `-bottom`).
- Border on the paragraph: 10 pixels, light green, ridge style (use `border-style`, `border-color`, and `border-width`).
- Margin on the paragraph: uniform 5 pixels around.

```
1 <p>
2   The typical filler text is the <span>Lorem Ipsum</span>.
3   According to lipsum.com, this text has been standard dummy text since
4 </p>
```

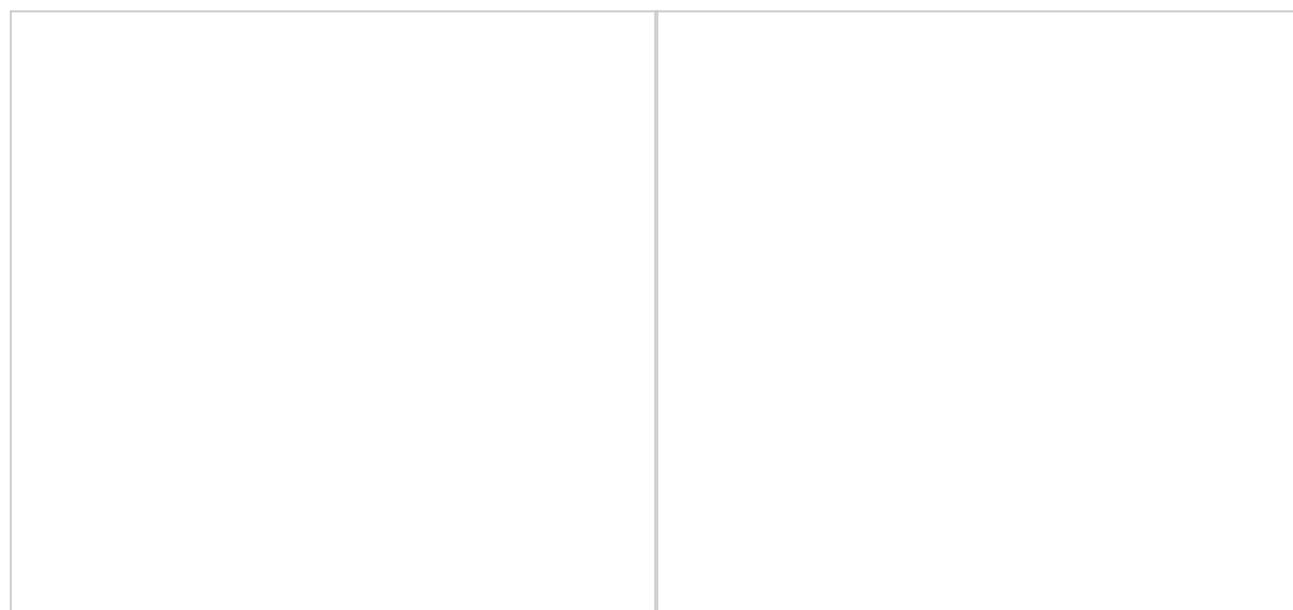
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Render webpage

Reset code

Your webpage

Expected webpage

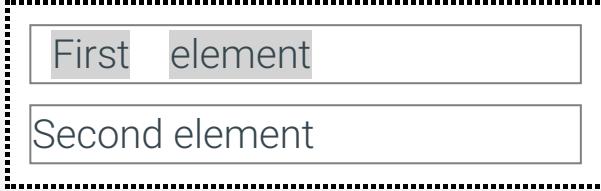


Margin collapsing and horizontal centering

Vertical margins of two elements can sometimes combine or collapse into a single vertical space. Horizontal margins never collapse. Ex: Adjoining margins of two vertically stacked block elements collapse. The resulting margin size equals the top element's bottom margin or the bottom element's top margin, whichever is larger.

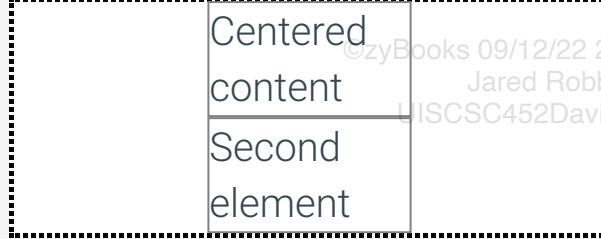
Example 4.6.5: Collapsed margins.

The following HTML demonstrates a collapsed margin. The vertical space between the inner div elements is collapsed to 10 pixels, while the horizontal space between the span elements is 20 pixels.

HTML and CSS	Rendered web page
<pre data-bbox="159 329 616 1051"> <style> .outer { border: 2px dotted black; } .inner { margin: 10px; border: 1px solid gray; } span { margin: 10px; background: lightgray; } </style> <div class="outer"> <div class="inner"> First element </div> <div class="inner"> Second element </div> </div></pre>	<p>©zyBooks 09/12/22 23:11 1361418 Jared Robbins UISCSC452DavisFall2022</p> 

When an element has the `margin` property set to `auto`, the browser will compute the left and right margins to use up the remaining width of the parent element. The `auto` margin value is useful for horizontally centering an element in the parent element. A common error is to use `margin: auto` on elements that do not have the width specified or have `display: inline`, such as span elements.

Example 4.6.6: Horizontal centering.

HTML and CSS	Rendered web page
	

```
<style>
  .outer {
    border: 2px dotted black;
  }
  .inner {
    margin: auto;
    width: 100px;
    border: 1px solid gray;
  }
</style>
<div class="outer">
  <div class="inner">
    Centered content
  </div>
  <div class="inner">
    Second element
  </div>
</div>
```

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PARTICIPATION ACTIVITY**4.6.6: Margins.**

- 1) If two elements are stacked on top of each other and both have **margin:20px**, the total margin between the two elements is 40px.

- True
- False

- 2) If two elements are horizontally adjacent to each other and both have **margin:20px**, the total margin between the two elements is 40px.

- True
- False

- 3) The text is horizontally centered in the web browser.



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```
<body>
  <div style="width:300px;
margin:auto;">Some text</div>
</body>
```

- True
 False

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**CHALLENGE ACTIVITY****4.6.1: Box model.**

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Start

For the `` tag, set the border all around to be 4 pixels, double, and red.

SHOW EXPECTED**CSS****HTML**

```
1 span {
2
3   /* Your solution goes here */
4
5 }
```

1

2

3

4

5

Check**Next**

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Exploring further:

- **Box model** from W3 Consortium.
- **Collapsing margins** from W3 Consortium.

- Computing widths and margins from W3 Consortium.

4.7 Example: Styled band web page

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Page colors

This section adds CSS to the example band web page from an earlier section. The band web page displays information about the fictional band *Reach Out*. Several global CSS variables define the page's primary colors that are used in various CSS rules to set the page's background color and font colors.

Colors applied to the band web page.

band.html is the band's web page, and styles.css is an external stylesheet that applies colors to the web page.

Images from [Wikimedia.org](#)

[band.html](#) [styles.css](#)

```
1 <!DOCTYPE html>
2 <html lang="en">
3   <head>
4     <meta charset="UTF-8">
5     <title>Reach Out</title>
6     <link rel="stylesheet" href="styles.css">
7   </head>
8   <body>
9     <!-- Heading and band photo -->
10    <h1>Reach Out</h1>
11    
12
13    <!-- Section links -->
14    <p>
15      <a href="#members">Members</a> &ampnbsp
```

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PARTICIPATION ACTIVITY

4.7.1: Page colors.



- 1) The CSS variable `--bg-color` defines the page's background color.



- True
- False

- 2) The font color is white throughout the entire web page.



- True
- False

- 3) The links are white but change to purple when the mouse hovers over a link.



- True
- False

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Styling the text

Various font and text styles are added to the CSS in the figure below to give the text a more distinctive look. The page font is modified, the page header and navigation links are horizontally centered, and some styling is applied to the navigation links.

Figure 4.7.1: CSS text and font properties.

```
body {  
    color: var(--font-color);  
    background-color: var(--bg-color);  
    font-family: Arial, sans-serif;  
}  
  
h1 {  
    color: var(--header-color);  
    font-size: 3rem;  
    font-style: italic;  
    font-variant: small-caps;  
    text-align: center;  
}  
  
h2 {  
    color: var(--header-color);  
    font-size: 2.5rem;  
    font-variant: small-caps;  
}  
  
.nav {  
    text-align: center;  
}  
  
.nav a {  
    text-decoration: none;  
    text-transform: lowercase;  
    font-weight: bold;  
    font-size: larger;  
}
```

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Font and text styles.

Images from [Wikimedia.org](#)

[band.html](#) [styles.css](#)

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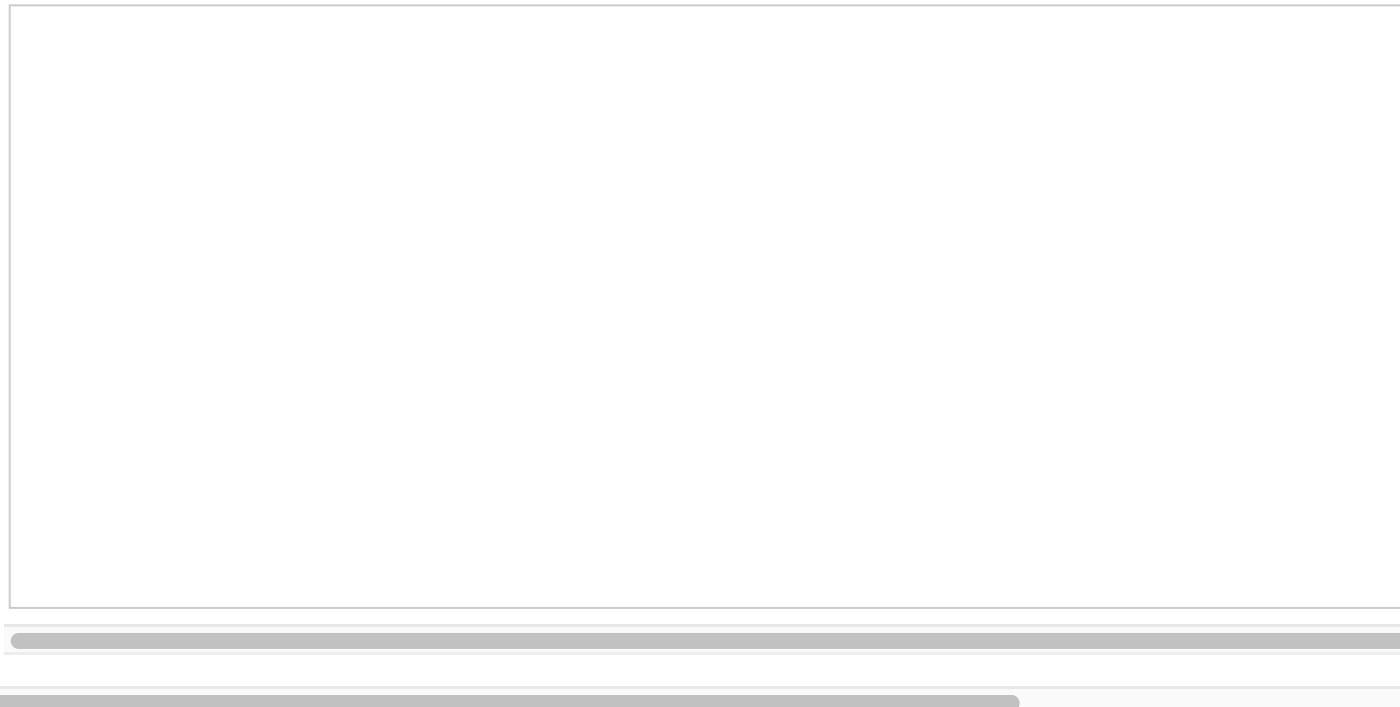
```
1 <!DOCTYPE html>
2 <html lang="en">
3   <head>
4     <meta charset="UTF-8">
5     <title>Reach Out</title>
6     <link rel="stylesheet" href="styles.css">
7   </head>
8   <body>
9     <!-- Heading and band photo -->
10    <h1>Reach Out</h1>
11    
14    <p class="nav">
15      <a href="#members">Members</a> &ampnbsp
```

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4.7.2: Font and text styles.

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- 1) What is the font used throughout the page?

- Times New Roman
- Arial
- Serif





- 2) What CSS declaration causes the `<h1>` header to align horizontally centered?

- `text-align: center;`
- `align: center;`
- `text-align: middle;`

- 3) What was added to the `<p>` tag surrounding the navigation links so the links are centered, lowercase, bold, and not underlined?

- `<p id="nav">`
- `<p type="nav">`
- `<p class="nav">`

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Relocating the band member list

The unordered list under each band member looks better if positioned to the right of each member's photo. The CSS in the figure below floats the images and lists left, causing each list to float next to the member's photo.

Figure 4.7.2: CSS to float unordered lists next to member images.

```
.band-member {  
    float: left;  
    clear: both;  
}  
  
#members ul {  
    float: left;  
}  
  
#members {  
    display: inline-block;  
}
```

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Float alternatives

Developers frequently use the CSS flexbox or grid layout instead of floats for putting HTML elements next to each other. Flexbox and grid layout are covered elsewhere in

this material.

Updated Members section.

Images from [Wikimedia.org](#)

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band.html styles.css SCSC452DavisFall2022

```
1 <!DOCTYPE html>
2 <html lang="en">
3   <head>
4     <meta charset="UTF-8">
5     <title>Reach Out</title>
6     <link rel="stylesheet" href="styles.css">
7   </head>
8   <body>
9     <!-- Heading and band photo -->
10    <h1>Reach Out</h1>
11    
14    <p class="nav">
15      <a href="#members">Members</a> &ampnbsp
```

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PARTICIPATION ACTIVITY**4.7.3: Rules that handle floating.**

Mouse: Drag/drop. Refresh the page if unable to drag and drop.

```
.band-member {  
    float: left;  
    clear: both;  
}
```

```
#members {  
    display: inline-block;  
}
```

```
#members ul {  
    float: left;  
}
```

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Rule that floats the images left.

Makes each unordered list float left.

Places all floating elements inside the Members section.

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Spacing

The margin and padding properties are used in the figure below to provide more space between the navigation links, below the band members' photos, and around the table items. The class selector `.center` can horizontally center any element within the element's container and may be applied to the large image at the top of the page to horizontally center the image.

Figure 4.7.3: CSS to add spacing.

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```
section {  
    margin-top: 50px;  
    margin-left: 20px;  
}  
  
#members img {  
    margin-bottom: 20px;  
}  
  
.center {  
    display: block;  
    margin-left: auto;  
    margin-right: auto;  
}  
  
.nav a {  
    text-decoration: none;  
    text-transform:  
    lowercase;  
    font-weight: bold;  
    font-size: larger;  
    margin-left: 10px;  
    margin-right: 10px;  
}  
  
td {  
    padding: 10px;  
}
```

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Spacing in various places.

Images from [Wikimedia.org](#)

[band.html](#) [styles.css](#)

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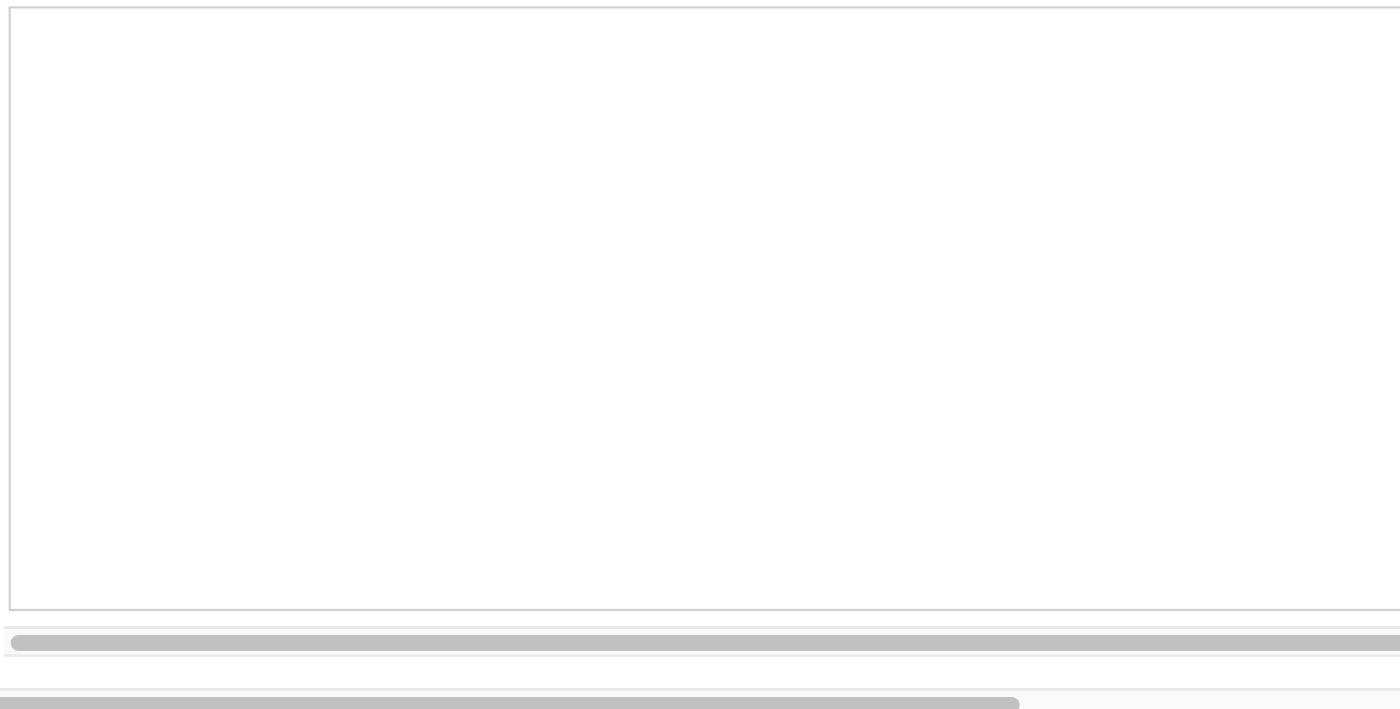
```
1 <!DOCTYPE html>
2 <html lang="en">
3   <head>
4     <meta charset="UTF-8">
5     <title>Reach Out</title>
6     <link rel="stylesheet" href="styles.css">
7   </head>
8   <body>
9     <!-- Heading and band photo -->
10    <h1>Reach Out</h1>
11    
13
14    <!-- Section links -->
15    <p class="nav">
16
```

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PARTICIPATION ACTIVITY

4.7.4: CSS spacing.

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- 1) How much spacing does the CSS apply between each image?

- 20px
- 10px
- 0px





2) Which CSS declaration in `.center` makes the `` element fill the browser's width?

- display: block
- margin-left: auto
- margin: center

3) Does changing the `td` rule's `padding: 10px` to `margin: 10px` change the rendering of the table?

- Yes
- No

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4.8 LAB: News article (CSS)



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4.9 LAB: Auto loan (CSS)

Create an external stylesheet so the provided HTML produces the following web page:

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Comparison of Dealer Incentives and Loan Offers

Purchase Offer 1		Purchase Offer 2	
Item	Cost	Item	Cost
Purchase price:	\$33,500	Purchase price:	\$33,500
Cash incentive/rebate:	\$0	Cash incentive/rebate:	\$500
Loan term (months):	48	Loan term (months):	48
Annual percentage rate (APR):	3.2	Annual percentage rate (APR):	4.1
Monthly payment:	\$725.33	Monthly payment:	\$746.59
Total cost:	\$34,815.62	Total cost:	\$35,836.15

The following style rules should be added to styles.css:

- The default fonts (in order of priority) should be Roboto, Helvetica, and sans-serif
- The heading "Comparison of Dealer Incentives and Loan Offers" should be 16px font using color #444444 and have centered text
- Define a container class whose contents is centered, has a 5 pixel margin, and defines a font size of 13px
- Each offer is defined in a `<div>` tag with the class `offer`. Define the `offer` class such that:
 - Each offer is displayed inline-block, with a fixed width of 400 pixels, a 4 pixel margin, and centered text
 - Each offer has a 1 pixel solid border using color #cccccc with a radius of 1 pixel
 - Each offer uses a shadow defined as:
 - `box-shadow: 0px 2px 2px #dddddd, 0px 0px 5px #dddddd;`
- The offer title is defined in a `<div>` tag with `offerTitle` class. Define the `offerTitle` class such that:
 - The title uses 14px bold font with color #ffffff
 - The title's background is colored #00b3b3
 - The title has no margin and 15 pixels of padding
- The offer contents are defined in a `<div>` tag with class `offerContents`. Define the `offerContents` class such that:
 - Each offer contents div has 20 pixels of padding, a 2 pixel border radius for the bottom border, and background colored #fafafa
- Define CSS rules such that all tables have the following styling:

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- The table should have a width of 100%, background colored #ffffff, no border spacing, a shadow defined as:
 - box-shadow: 0px 2px 2px #dddddd, 0px 0px 5px #dddddd;
 - Header cells should use a 12px bold font with color #777777
 - Data cells should use a font lighter than normal weight with color #444444
 - Header cells should have 10 pixels of padding and no margin
 - Data cells should have 10 pixels of padding on the left and right, 20 pixels of padding on top and bottom, and no margin
 - Both header cells and data cells should left align text
 - Both header cells and data cells should have a solid bottom border of 1 pixel using color #f1f1f1
- Define a class `finalValue` that defines a bold font weight with color #2222ff

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LAB ACTIVITY

4.9.1: LAB: Auto loan (CSS)

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Downloadable files

`index.html`

and

`style.css`

[Download](#)

Upload your files below by dragging and dropping into the area or choosing a file on your hard drive.

style.css

Drag file here

or

[Choose on hard drive.](#)

[Submit for grading](#)

Coding trail of your work

[What is this?](#)

History of your effort will appear here once you begin working
on this zyLab.

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4.10 LAB: Sleep recommendation list (CSS)

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Modify the given HTML file to look like the web page below.

Sleep Duration Recommendations

- School-aged children (6-13 years) — 9-11 hours
- Teenagers (14-17 years) — 8-10 hours
- Young adults (18-25 years) — 7-9 hours
- Adults (26-64 years) — 7-9 hours
- Older adults (65+ years) — 7-8 hours

Source: [National Sleep Foundation's Sleep Duration Recommendations](#)

Add CSS rules to the embedded stylesheet so each element uses the following styles:

- `<body>` uses Arial, Helvetica, sans-serif font family, 18px font size, and #EDF4FB background color
- `<h1>` uses RGB (26, 69, 107) font color
- `` uses #296CA8 font color
- `` with "age" class uses an italic font style
- `` with "recommended" class has a yellow background color and underlined text

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LAB
ACTIVITY

4.10.1: LAB: Sleep recommendation list (CSS)

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`recommend.html`

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Upload your files below by dragging and dropping into the area or choosing a file on your hard drive.

`recommend.html`

Drag file here

or

[Choose on hard drive.](#)

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Coding trail of your work [What is this?](#)

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4.11 LAB: Best-selling video games table (CSS)



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4.12 LAB: Style the form with advanced selectors



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4.13 Test Lab



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4.14 Unit 2 Test Lab

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