

## Chapter 6 — The CSS Box Model: Borders, Margin, and Padding

In Chapter 3, Phrasing and Flow HTML tags are used to define the meaning of the text. They also have a default way they are displayed. Flow elements usually form "building blocks" that stack upon one another and dictate height, and phrasing elements sit right next to each other and dictate width. Throughout this chapter we will be discussing what each of these elements mean within CSS. Keep in mind as you read that phrasing elements are always contained within flow elements and come flow elements are valid inside of other flow elements.

### *Learning Outcomes for this Chapter*

Upon completion of the reading of this chapter and assignments found at the end, a student should be able to:

- explain the relationship between content, border, margin, and padding in the CSS box model,
- recall and use the most common CSS dimensional units,
- set a margin and padding to an element,
- add a border to an element,
- use the descendant combinator in a style sheet to select specific elements,
- use display to change a phrasing element to display like a flow or an inline flow element,
- use text-align style to change the alignment of text elements.

### *The CSS Box Model*

The CSS Box Model refers to how an HTML element's structure is displayed on a webpage.<sup>79 80</sup> Imagine that each HTML element is contained within a box inside of a box inside of a box inside of a box. These "boxes" dictate not only the height and width of the element, but how far away it is from other elements or the edge of the page. The four boxes that hold an element (starting from the inside box) are:

- Content — This is the default box and contains the content of your HTML element. The height and width of your content will be determined here.
- Padding — The next layer wraps around the element's content and determines how far the background color extends past it.
- Border — If you choose to specify a border, this box will wrap around the content and padding box.

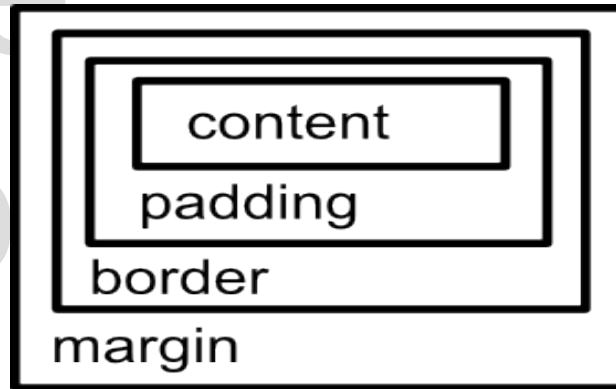
---

79 [http://www.w3schools.com/css/css\\_boxmodel.asp](http://www.w3schools.com/css/css_boxmodel.asp)

80 <http://www.w3.org/TR/CSS2/box.html>



- **Margin** — The Margin is made up of a transparent background and will determine how far your element is spaced from other elements or edges.



*Illustration 18: CSS Box Model*

Keep in mind that aside from the content box, all the other boxes are optional. You can choose to have padding and a margin without a border, however the order will always remain the same, with the padding coming after the content and the margin being last.

## **Using Style to Adjust the Box**

### **Content**

The width and height styles are used to determine the size of flow elements and phrasing elements that have been replaced with media or images. After the height or width style you must define a size in CSS units.

### **Common CSS Units**

**px** — Pixels

The size of a single dot on the screen. This is the smallest unit of measure.

**pt** — Point

Approximately 1/72 of an inch.

**%** — Percent

Percent of the containing tag's size



**em** — Size of Capital M

This represents the size of the capital letter M. Usually this is one of the widest letter in a font

**ex** — Size of Lower x

This represents the size of a lower case x. In most fonts this represents the average size of a letter.

In addition to the CSS dimensions listed above there are many others you may use in your pages. These include: in, cm, mm, and more.<sup>81</sup>

Point and pixel dimensions may cause problems, as screen sizes can vary greatly between users and devices. Percentages, however, are very effective when dividing up a screen. For example, lets say you have a section in your HTML document that you want to span exactly half of your webpage. This can be done easily in CSS, and is written as such:

```
section {  
  width: 50%;  
}
```

For phrasing elements containing text the height and width CSS attributes are often ignored because of the behavior of "inline" elements as they build flow. This may be changed by adding the style **display: inline-block;** or **display: block;** to the elements. This will be discussed in detail later in this chapter.

## Padding

Padding surrounds the content of an element and contains the same background color. Padding is used to create a buffer between the edge of your content and the end of the background color, and creates a nice, professional effect that is easy on a user's eyes.

There are a multitude of different ways to specify padding in CSS. If you only want padding on one side of your content, you can use any of these properties:

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

---

81 <http://www.w3.org/TR/css3-values/#lengths>



If you would like to add padding to more than one side of your content, it is generally more effective to use the short-hand version of the property. There are four values that can be entered into one command, and they always follow the same pattern: top, right, bottom, left, or TRBL (TRouBLE). This pattern is the same for the margin and border property, and should always be kept in mind. Here are some examples of the short-hand padding property:

- `padding: 1px;` — This will add 1 pixel to each side of the element.
- `padding: 1px 2px;` — This will add 1 pixel to the top and bottom of the element and 2 pixels to the right and left.
- `padding: 1px 2px 3px;` — This will add 1 pixel to the top, 2 pixels to the right, and 3 pixels to the bottom.
- `padding: 1px 2px 3px 1px;` — This will add 1 pixel to the top, 2 pixels to the right, 3 pixels to the bottom, and 1 pixel to the left.

## Border

A border resides outside of the padding box and surrounds and separates your element from others on a webpage. Just like any other HTML element, a border can have width, color, and style applied to it. Similar to padding, a border can reside on all four sides, just one, or anything in-between, and each side can be unique.

Writing a basic border property appears as:

- `border: width style color;`

Different sides of a border can be specified similarly to padding, and are written as:

- `border-top: width style color;`
- `border-bottom: width style color;`
- `border-right: width style color;`
- `border-left: width style color;`

There are many styles of borders that can be specified simply by writing the name in the property. Here is a list of commonly used border styles. Keep in mind that only one style can be selected per side:

- **none**: This will display no border. Writing a border style of "none" is useful for writing @media commands, which will be discussed in later chapters.
- **hidden**: This will display a border that is invisible to the user.
- **dotted**: This style will create a dotted line around your content.



- **solid**: A basic, solid border.
- **groove**: This will create an "indented" border that appears to be three-dimensional.
- **ridge**: This border is similar to groove, but is raised rather than indented.
- **inset**: Similar to groove, however the entire content will be indented rather than just the border.
- **outset**: Similar to ridge, however the entire content will be raised rather than just the border.

## Margin

Writing the margin property functions exactly the same as writing the padding property, except for centering. Margin can be used to center flow elements on a web-page by using these easy properties:

- **margin-left: auto;** and **margin-right: auto;**

Using these properties in CSS will automatically find the center of a webpage and line your element up with equal space on the right and left sides.<sup>82</sup>

## CSS Descendant Combinator

The following example is the same HTML code we used in a previous chapter except that the CSS has been modified to adjust the box model of most elements. This new CSS file also introduces the use of the descendant combinator.<sup>83</sup> You will notice the rule **"#mainmenu a"** and that it contains a space. This compound selector looks for all **<a>** tags that are a descendant of the tag with the **id** of **#mainmenu**. It does not get applied to other **<a>** tags in the document.

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="utf-8">
    <title>Boxes</title>
    <link href="sample.css" rel="stylesheet" type="text/css">
  </head>
  <body>
    <header id="mainmenu">
      <h1>Sample Page with External CSS</h1>
      <nav>
```

82 <http://www.w3.org/Style/Examples/007/center.en.html>

83 [https://developer.mozilla.org/en-US/docs/Web/CSS/Descendant\\_combinator](https://developer.mozilla.org/en-US/docs/Web/CSS/Descendant_combinator)



```
<p><a href="http://www.yahoo.com">Yahoo</a>
<a href="http://www.google.com">Google</a>
<a href="http://www.ubuntu.com">Ubuntu</a></p>
</nav>
</header>
<section id="centersection">
  <h2>Center Section</h2>
  <p>This is a <em class="bright">paragraph</em> with special
  <em class="dull">text</em> that is bright and dull.</p>
</section>
<footer>
  <p><small class="dull">&copy; 2015 The SYW2L Project
  <a href="http://www.syw2l.org">http://www.syw2l.org</a>
  - All external links are provided only as an illustration
  of what can be done. The author and publisher of this
  material assume no responsibility for the content of the
  external sites.</small></p>
</footer>
</body>
</html>
```

```
/* sample.css - Sample CSS Sheet for Chapter 6 */
body {
  font-family: Tahoma, Verdanda, Arial, sans-serif;
}
h1 {
  font-family: "times new roman", serif;
  color: red;
}
#mainmenu {
  background-color: grey;
  color: blue;
  border: 10px solid #8080ff;
  width: 50%;
  margin: 0px auto;
}
#mainmenu a {
  border: 3px groove #000000;
  background-color: white;
  margin: 10px;
  padding: 5px;
}
#centersection h2 {
```



```
        text-align: center;
    }

    .bright {
        background-color: yellow;
        color: orange;
        padding: 0px 10px;
    }

    .dull {
        background-color: #e0e0e0;
        color: #808080;
    }

    footer {
        border-top: 5px solid blue;
    }

    footer small {
        font-size: 80%;
    }
}
```



Illustration 19: CSS with Margins and Padding

## Display

As we discussed previously, Phrasing and Flow elements have specific structural behaviors that



effect how they are displayed on a webpage. It is possible, however, to use the display property in CSS to force these elements to behave the way that you want them to do. For instance:

- **display: block;** — This will force a Phrasing element to behave like a Flow element.
- **display: inline;** — This will force a Flow element to behave like a Phrasing element.
- **display: inline-block;** — Specifying this property will create Flow elements that can be displayed side-by-side like Phrasing elements.<sup>84</sup>

## Centering Images and Text

Text within a Flow element (like a `<p>...</p>` or `<h2>...</h2>` ) can be centered within the element using the CSS property **text-align**.

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="utf-8">
    <title>Boxes</title>
    <link href="centerimagetext.css" rel="stylesheet" type="text/css">
  </head>
  <body>
    <section>
      <h1 class="centertext">Centering Images and Text</h1>
      <p>This is a paragraph of text that is not centered. This
      is a paragraph of text that is not centered. This is a
      paragraph of text that is not centered.</p>
      <p class="centertext">This is a paragraph of text that
      is centered. This is a paragraph of text that is centered.
      This is a paragraph of text that is centered.</p>

      
      <p>A Picture of Mars from NASA.</p>
      
      <p class="centertext">A Picture of Jupiter from NASA.</p>

    </section>

    <footer>
      <p>Images of Mars and Jupiter By NASA/JPL/USGS
      [Public domain], via Wikimedia Commons.</p>
      <p><small class="dull">&copy; 2015 The SYW2L Project
```

84 [http://www.w3schools.com/cssref/pr\\_class\\_display.asp](http://www.w3schools.com/cssref/pr_class_display.asp)





```
<a href="http://www.syw2l.org">http://www.syw2l.org</a>
- All external links are provided only as an illustration
of what can be done. The author and publisher of this
material assume no responsibility
for the content of the external sites.</small></p>
</footer>
</body>
</html>
```


```
/* centerimagetext.css - Centering */
body {
    font-family: Tahoma, Verdanda, Arial, sans-serif;
}
.centertext {
    /* cener text within a block using text-align */
    text-align: center;
}
.centerimg {
    /* make the image display like a block and
    * then add margins to the sides */
    display: block;
    margin: 0px auto;
}
footer {
    font-size: x-small;
    border-top: 2px solid black;
}
```




### Centering Images and Text

This is a paragraph of text that is not centered. This is a paragraph of text that is not centered. This is a paragraph of text that is not centered.

This is a paragraph of text that is centered. This is a paragraph of text that is centered. This is a paragraph of text that is centered.



A Picture of Mars from NASA.



A Picture of Jupiter from NASA.

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*Illustration 20: Centering Images and Text*



## Advanced Topics for Exploration

### Vocabulary

- auto
- block
- border
- box model
- content
- display
- dotted
- groove
- hidden
- inline
- inline-block
- inset
- margin
- none
- outset
- padding
- ridge
- solid

### Exercises

#### Word Search

```
c i i d o i n s e t n m r
d n s e h i d d e n p a i
i l b n o e o r k g a r d
i i o b b c b o d n d g g
e n x i n o a g i t d i e
e e   s o n u r i b i n d
l - m t n t t o n l n k i
o b o s e e o o l o g n s
u l d o a n a v i c u g p
t o e l i t o e n k a d l
s c l i i - b n e s l n a
e k u d t t b o r d e r y
t i t d o t t e d e c i e
```

auto, block, border, box model, content, display, dotted,  
groove, hidden, inline, inline-block, inset, margin, none,  
outset, padding, ridge, solid



## Problems

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