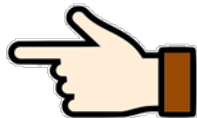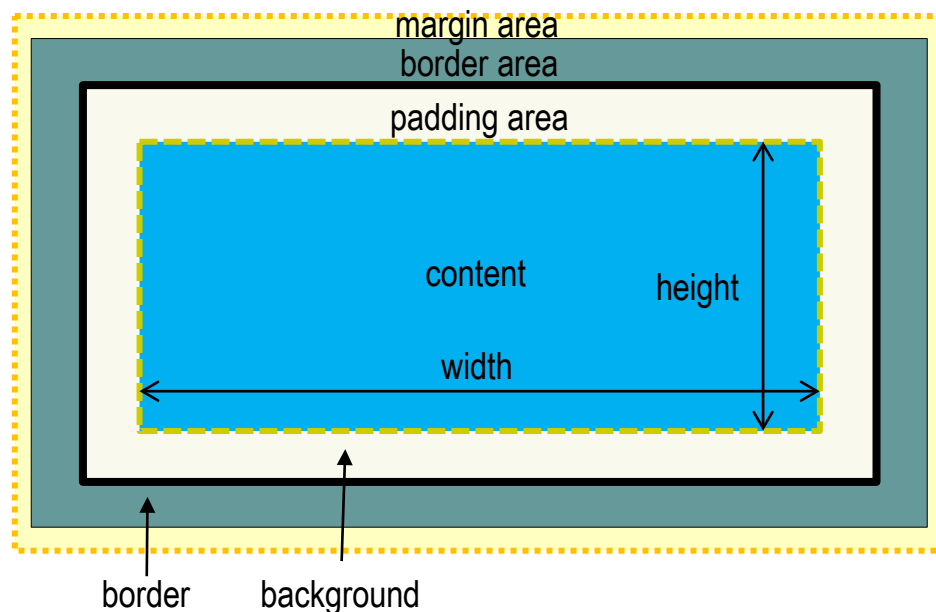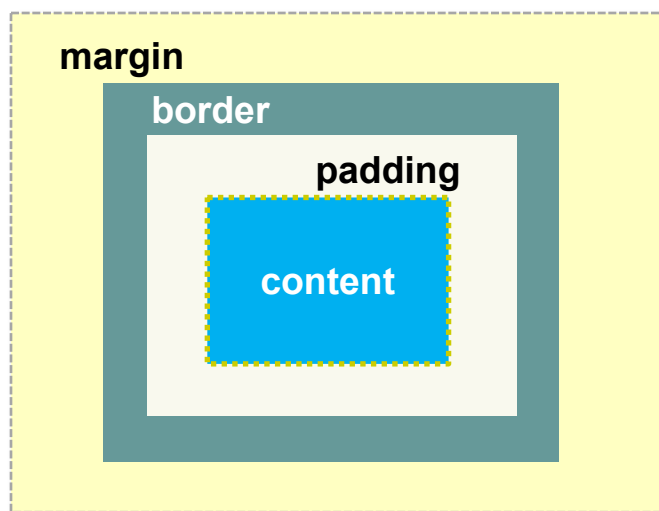# Roadmap

- **Formatting Elements**

- **Box**

- **Layout**

Box Model (1/2)

- **In CSS, the term "box model" is used when talking about design and layout.**

- **The CSS box model is essentially a box that wraps around every HTML element. It consists of: margins, borders, padding, and the actual content.**

Box Model (2/2)

- **The actual full width of the box is the value of width + padding + border, excluding margin.**
- **If you want to set the width to 100px in a box with a border thickness of 2px and padding of 5px, you need to set the width of content to 86px.**
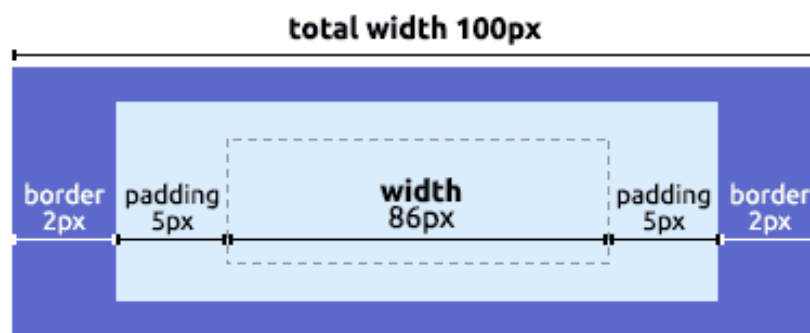
2px(left-border) + **5px(left-padding)** + 86px(content) + **5px(right-padding)** + **2px(right-border)**

= { **2px(border)** + **5px(padding)** }***2** + 86px(content) = 100px

Example

- What is the width of div tag?

= 320px(width)+10px(left padding)+10px(right padding)+5px(left border) +5px(right border)

= 350px

- What is the width of img tag?

= 340px(width)+5px(left border) +5px(right border) = 350px

Understanding CSS Box Model

The CSS3 box model consists of content, padding, border and margin.

```
1  <html>
2    <head>  <title>Box Model</title>
3      <style>
4        img{width : 340px; height : 260px; border : 5px solid green;}
5        div {width : 320px; padding : 10px; border : 5px solid blue; margin : 0;}
6      </style>
7    </head>
8    <body>
9      <h2>Understanding CSS Box Model</h2>
10     <img src="flower1.jpg">
11     <div>
12       The CSS3 box model consists of content, padding, border and margin.
13     </div>
14   </body>
15  </html>
```

save after editing ex5-4.html.

Width & Height Properties

● **Sets the width and height of an element**

Value	Description	
auto	Default value. The browser calculates the width	
length	Defines the width in px, em etc.	**width: 10em**
%	Defines the width in percent of the containing block	

```
p.ex { height: 100px; width: 50%; }
```
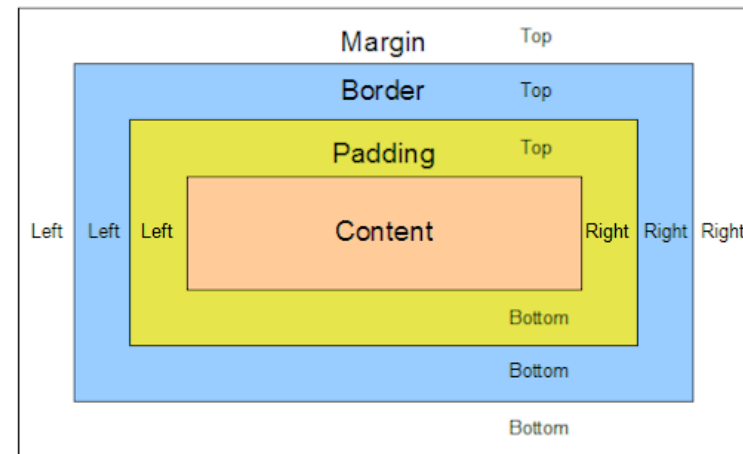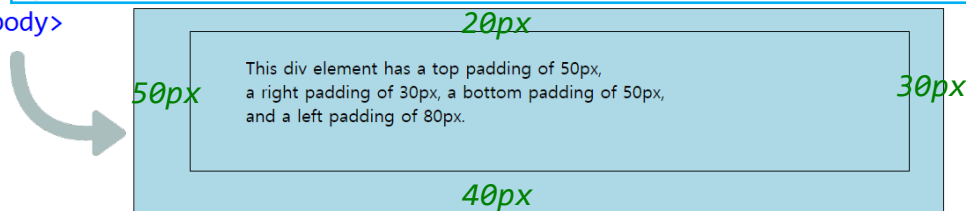

padding area

content

height

width
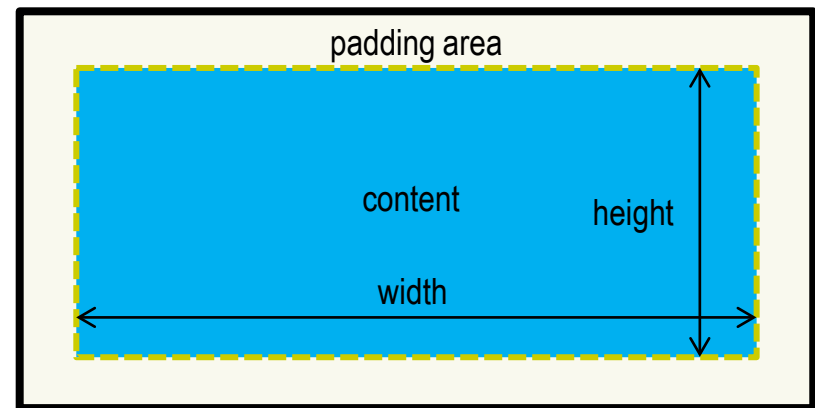
Padding Property (1/2)

● **Sets all the padding properties in one declaration**

Property	Description
padding-top	Sets the top padding (space) of an element, e.g., 20px
padding-right	Sets the right padding (space) of an element
padding-bottom	Sets the bottom padding (space) of an element
padding-left	Sets the left padding (space) of an element

```
1  <style>
2    div { border: 1px solid black;
3          background-color: lightblue;
4          padding: 20px 30px 40px 50px; }
5  </style>
6  <body>
7    <div>
8      <div>This div element has a top padding of 50px, <br>
9        a right padding of 30px, a bottom padding of 50px, <br>
10       and a left padding of 80px.</div>
11   </div>
12 </body>
```

20px

This div element has a top padding of 50px,
a right padding of 30px, a bottom padding of 50px,
and a left padding of 80px.

50px   *30px*

40px

Margin
Top

Border
Top

Padding
Top

Left Left Left   Content   Right Right Right

Bottom

Bottom

Bottom

```
div{
    padding-top:      20px;
    padding-right:    30px;
    padding-bottom:   40px;
    padding-left:     50px;
}
```

```
div{ padding: 20px 30px 40px 50px; }
```

Padding Property (2/2)

- **Shortened properties of padding**

```
div { padding: 5px   10px   15px   20px; }
              ↓      ↓      ↓      ↓
             top   right  bottom  left
```
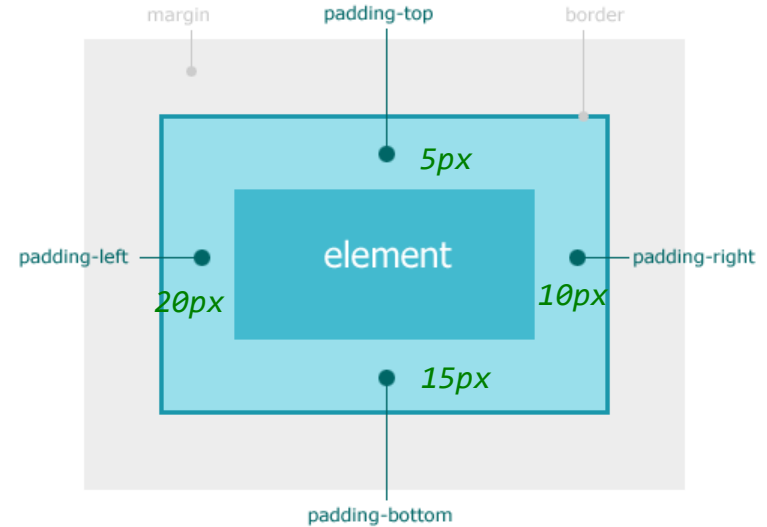
```
div { padding: 5px      10px; }
              ↓         ↓
         top & bottom  right & left
```

```
div { padding: 10px; }
              ↓
       top & right & bottom & left
```

padding-left

20px

element

padding-right

5px

10px

15px

padding-bottom

Margin Property (1/2)

● **Sets all the margin properties in one declaration**

Property	Description
margin-top	Sets the top margin of an element, e.g., 20px
margin-right	Sets the right margin of an element
margin-bottom	Sets the bottom margin of an element
margin-left	Sets the left margin of an element

margin-top

margin-left

Content

padding

border

margin-bottom
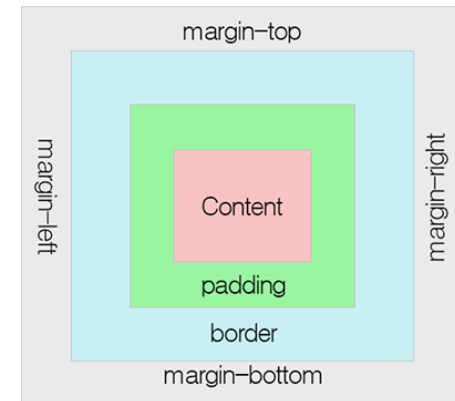
margin-right

```
1  <style>
2      div { border: 1px solid black;
3            margin: 20px 60px 20px 60px;
4            background-color: lightblue; }
5  </style>
6  <body>
7      <div>
8          <div>This div element has a top margin of 20px, <br>
9              a right margin of 60px, a bottom margin of 20px,<br>
10             and a left margin of 60px.</div>
11     </div>
12 </body>
```

20px

60px

This div element has a top margin of 20px,
a right margin of 60px, a bottom margin of 20px,
and a left margin of 60px.
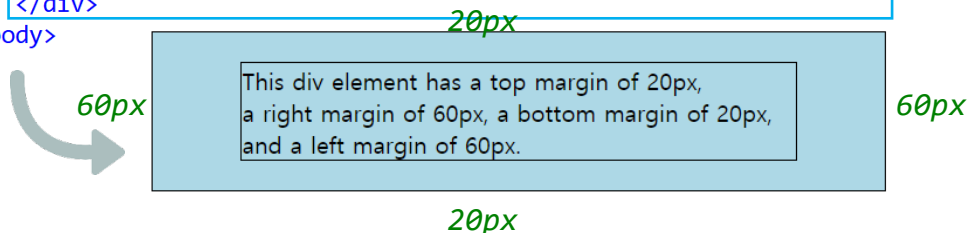
60px

20px

```
div{
    margin-top:      20px;
    margin-right:    60px;
    margin-bottom:   20px;
    margin-left:     60px;
}
```

```
div{ margin: 20px 60px 20px 60px; }
```

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Margin Property (2/2)

● **Shortened properties of padding**

div { margin: 5px   10px   15px   20px; }
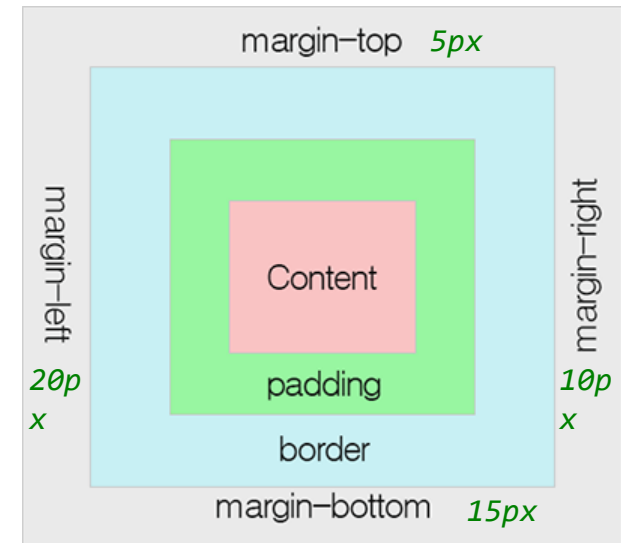
top   right   bottom   left

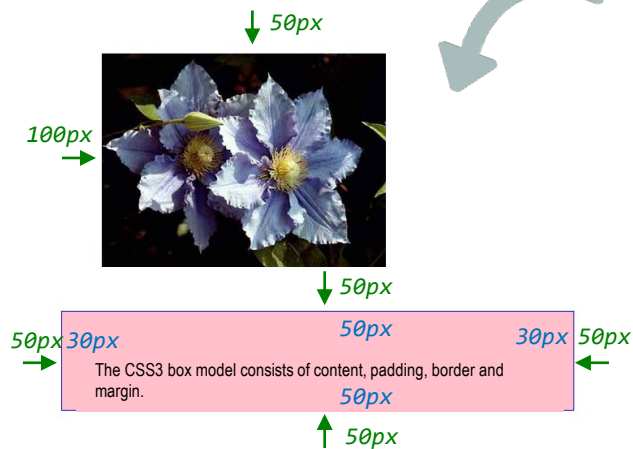div { margin: 5px   10px; }

top & bottom   right & left

div { margin: 10px; }

top & right & bottom & left

margin-top   *5px*

margin-left
20px

Content

padding

border

margin-right
10px

margin-bottom   *15px*

Example: Padding & Margin

Understanding CSS Box Model

↓ *50px*

100px →

↓ *50px*

50px

50px *30px*   *30px* *50px*

The CSS3 box model consists of content, padding, border and margin.

50px

↑ *50px*

```
1  <html>
2    <head> <title>padding & margin example</title>
3      <style>
4        img{margin-top : 50px; margin-left : 100px;}
5        div {background-color : pink; border : 5px solid blue;
6            padding : 50px 30px; margin : 50px;}
7      </style>
8    </head>
9    <body>
10     <h2>Understanding CSS Box Model</h2>
11     <img src="flower1.jpg">
12     <div>
13       The CSS3 box model consists of content, padding, border and margin.
14     </div>
15   </body>
16 </html>
```

save after editing ex5-5.html.

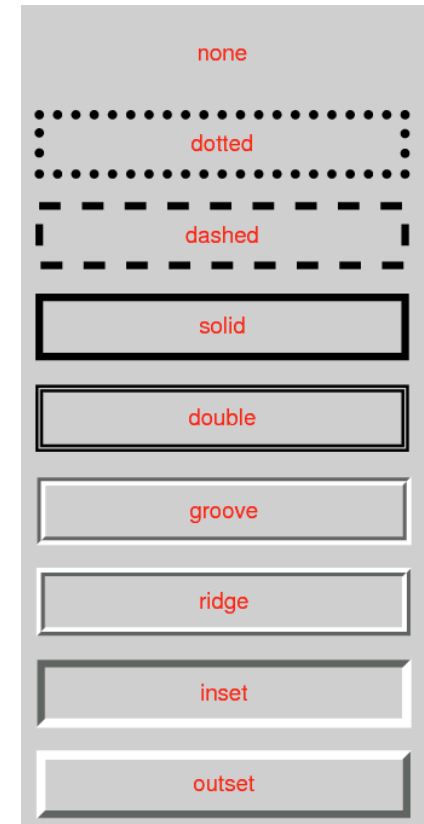# Border Property (1/3)

● **Sets all the border properties in one declaration**

● **The border property is a shorthand property for:**

  ○ border-width

  ○ border-style (required)

  ○ border-color

  ○ If border-color is omitted, the color applied will be the color of the text.

Border Property (2/3)

● **Property values**

Value / Property	Description
border-width	Specifies the width of the border, e.g., medium, thin, 10px
border-style	Specifies the style of the border e.g., none, solid, dotted, dashed, double, groove, ridge, insert, outset
border-color	Specifies the color of the border, e.g., red, #ff0000

✓ border-style property value

dotted

dashed

solid

double

groove

ridge

inset

outset

```
1  <style>
2      p { border: 5px solid red; }
3  </style>
4  <p>Some text</p>
```

Some text

```
p { border-left: 6px solid red;
    background-color: lightgrey; }
```

Some text

```
p { border-bottom: 6px solid red;
    background-color: lightgrey; }
```

Some text

Border Property (3/3)

● **May set a different value for each border**

```
1 <style>
2     p.one { border-top: 1px solid gray;
3             border-bottom: 2px dotted red; }
4 </style>
5 <p class="one">Some text</p>
```

Some text

```
p.one{
    border-top-width:     thin;
    border-right-width:   medium;
    border-bottom-width:  thick;
    border-left-width:    10px;
}
```

```
p.one{ border-width: thin medium thick 10px; }
```

```
1 <style>
2     p.one { border-style: solid;
3             border-width: thin medium thick 10px; }
4 </style>
5 <p class="one">Some text</p>
```

thin

10px   Some text   medium

thick

Example

```html
1  <!DOCTYPE html>
2  <html>
3  <head>
4      <meta charset="utf-8">
5      <title>border 속성</title>
6      <style>
7          img { width:100px;
8                height:150px; }
9          .one { border-width:2px;
10                border-style:solid;
11                border-color:darkorange;}
12         .two { border-width:5px;
13                border-style:dotted;
14                border-color:darkgreen;}
15      </style>
16  </head>
17  <body>
18      <div class="one">
19          <img src="larva.jpg">
20      </div>
21      <div class="two">
22          <img src="larva.jpg">
23      </div>
24  </body>
25  </html>
```

(After editing ex5-6.html, save it as ex5-6-1.html)

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Border Multi Property (1/3)

● **Border properties can use top, right, bottom, and left to specify border properties only in the desired direction**

```
div { border-top-width : 3px;
        border-top-style : dotted;
        border-top-color : red;   }
```

```
div { border-top : 3px dotted red;   }
```

```
1 <style>
2     div { border-top : 3px dotted red;     }
3 </style>
4
5 <div>Some Text</div>
```

Some Text

Border Multi Property (2/3)

● **Border properties can also be assigned different border properties in four directions**

```
div { border-width: 3px    2px    1px    2px; }
```
top   right   bottom   left
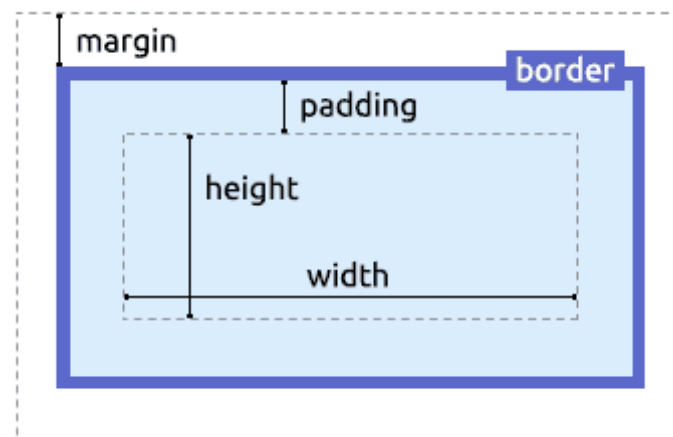
```
div {border-width :   3px      2px; }
```
top & bottom   right & left

```
div {border-width : 2px; }
```
top & right & bottom & left

```
1  <style>
2      div { border-style: solid; border-color: green;
3          border-width: 1px 5px 2px 5px; }
4  </style>
5
6  <div>Some Text</div>
```

margin

border

padding

height

width

1px

5px Some Text *5px*

2px

Border Multi Property (3/3)

● **Border-width, border-style, border-color properties are tied to specify shortened properties border**

```css
div { border-width : 3px;
        border-style : dotted;
        border-color : red;    }
```

⬇

```css
div { border : 3px dotted red;  }
```

```html
1 <style>
2     div { border : 3px dotted red; }
3 </style>
4
5 <div>Some Text</div>
```

Some Text

Exercise 5-1

.one{border-top: 5px dashed purple;
      border-bottom: 7px double green;
      margin: 5px}

.two{border-width: 2px 5px 10px 5px;
      border-color: gold;
      border-style: solid;
      margin: 5px;}

.three{border-width: 5px 2px;
      border-color: magenta;
      border-style: solid;}

(After editing ex5-6-1.html, save it as **exercise5-1.html**)

Solution

```
1  <!DOCTYPE html>
2  <html>
3  <head>
4      <meta charset="utf-8">
5      <title>border 속성</title>
6      <style>
7          img{width: 150px; height: 200px;}
8          .one{border-top: 5px dashed purple;
9              border-bottom: 7px double green;
10             margin: 5px}
11         .two{border-width: 2px 5px 10px 5px;
12             border-color: gold;
13             border-style: solid;
14             margin: 5px;}
15         .three{border-width: 5px 2px;
16             border-color: magenta;
17             border-style: solid;}
18     </style>
19  </head>
```

```
20  <body>
21      <div class="one">
22          <img src="larva.jpg">
23      </div>
24      <div class="two">
25          <img src="larva.jpg">
26      </div>   <div class="three">
27          <img src="larva.jpg">
28      </div>
29  </body>
30  </html>
```
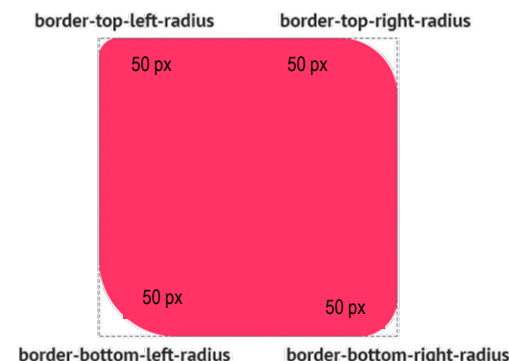
(After editing ex5-6-1.html, save it as exercise5-1.html)

Border-Radius Property (1/3)

- **The border-radius property in CSS is used to round the corners of the outer border edges of an element.**

- **This property can contain one, two, three, or four values.**

  ○ Four values - border-radius: 15px 50px 30px 5px; (first value applies to top-left corner, second value applies to top-right corner, third value applies to bottom-right corner, and fourth value applies to bottom-left corner).

  ○ Three values - border-radius: 15px 50px 30px; (first value applies to top-left corner, second value applies to top-right and bottom-left corners, and third value applies to bottom-right corner).

  ○ Two values - border-radius: 15px 50px; (first value applies to top-left and bottom-right corners, and the second value applies to top-right and bottom-left corners).

  ○ One value - border-radius: 15px; (the value applies to all four corners, which are rounded equally).

Border-Radius Property (2/3)

● **border-radius : Can round the edges of the border**

```
div { border-radius : 50px;  }
```

border-top-left-radius   border-top-right-radius

50 px   50 px

50 px   50 px

border-bottom-left-radius   border-bottom-right-radius
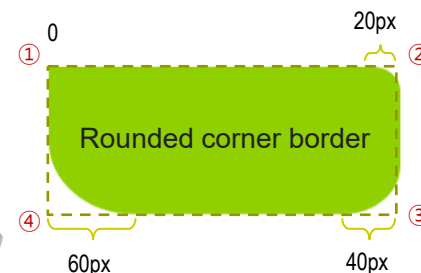
● **All border-radius properties can be set differently**

```
div { border-radius : 0px 20px 40px 60px;  }
```

```
1  <style>
2      div { width:300px; height:100px;
3          border-style: solid;  text-align:center;
4          color:white; background-color:green;
5          border-radius : 0px 20px 40px 60px; }
6  </style>
7
8  <div>
9      <br><br>
10     <strong>Rounded corner border</strong>
11 </div>
```
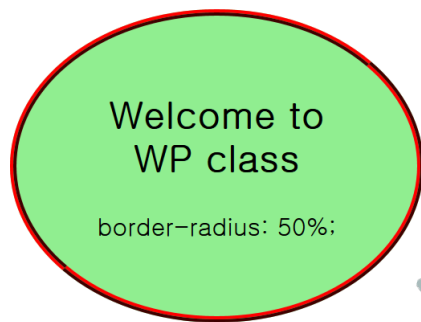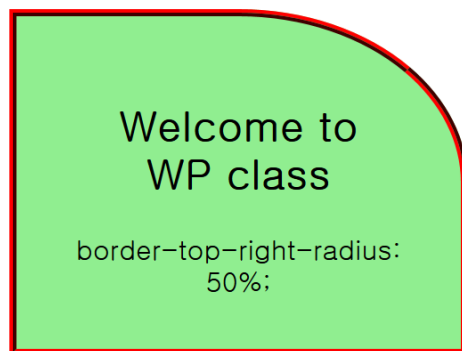
0   20px

①   ②

Rounded corner border

④   ③

60px   40px

• Apply radius in clockwise order from ① to ④

• If ④ and ③ are omitted, the symmetric structure of the same radius as ② and ①

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Border-Radius Property (3/3)

● **One border-radius property can be specified.**

Welcome to
WP class

border–top–right–radius:
50%;

Welcome to
WP class

border–radius: 50%;

border-radius : 50% ❓

```
1  <head>
2      <style>
3          #left {
4              border-top-right-radius: 50%;
5              background: lightgreen;
6              padding: 50px;
7              border: 6px ridge red;
8              width: 300px;
9              height: 200px;
10             font-size: 25px;
11         }
12     </style>
13  </head>
14
15  <body>
16     <center>
17         <div id = "left">
18             <h2>Welcome to <br> WP class</h2>
19             <p>border-top-right-radius: 50%;</p>
20         </div>
21     </center>
22  </body>
```
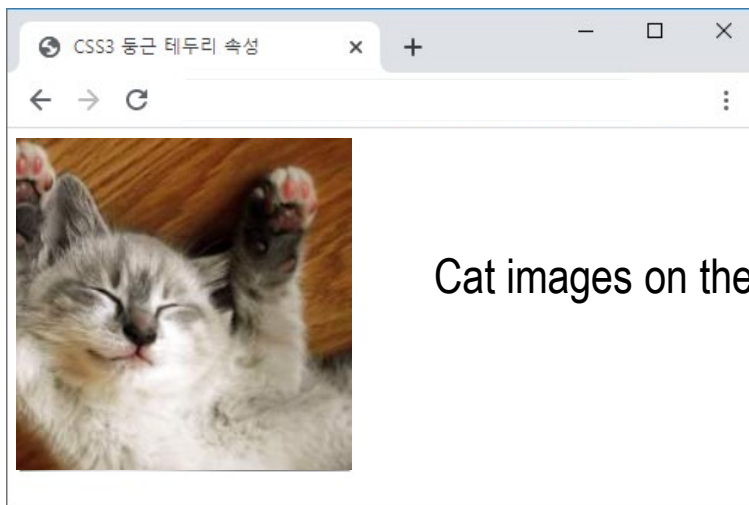
save after editing ex5-7.html.

Example: Creating 2 Rounded Borders

image url : https://placekitten.com/220/220

(ex5-8.html)

Cat images on the site may differ from the original.

(ex5-8-1.html)

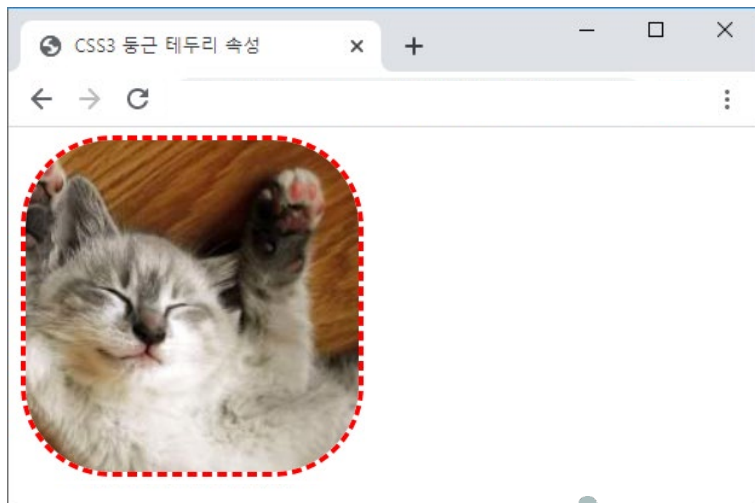(ex5-8-2.html)

img{ border: 3px dashed red;
border-radius: 60px; }

img{ border: 5px solid yellowgreen;
border-radius: 50%; }

Solution

```
1  <!DOCTYPE html>
2  <html lang="ko">
3  <head>
4      <meta charset="UTF-8">
5      <title>CSS3 둥근 테두리 속성</title>
6      <style>
7          img{ border: 3px dashed red;
8                border-radius: 60px; }
9      </style>
10  </head>
11  <body>
12      <div>
13          <img src="https://placekitten.com/220/220">
14      </div>
15  </body>
16  </html>
```
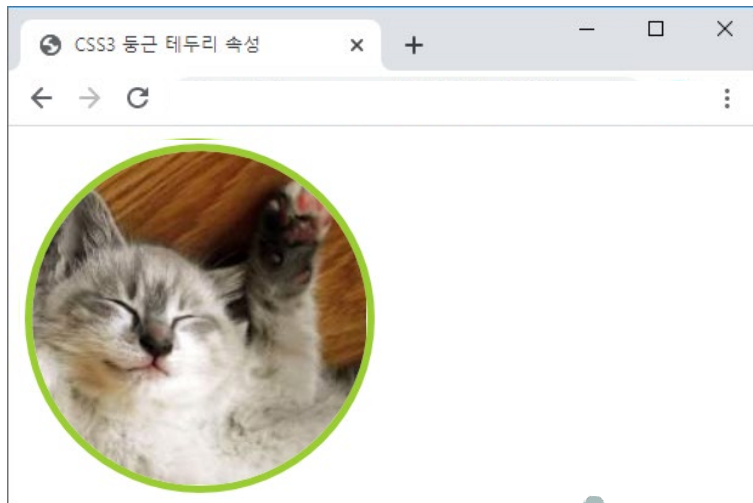
(ex5-8-1.html)

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Solution

```
1  <!DOCTYPE html>
2  <html lang="ko">
3  <head>
4      <meta charset="UTF-8">
5      <title>CSS3 둥근 테두리 속성</title>
6      <style>
7          img{ border: 5px solid yellowgreen;
8                border-radius: 50%; }
9      </style>
10 </head>
11 <body>
12     <div>
13          <img src="https://placekitten.com/220/220">
14     </div>
15 </body>
16 </html>
```

(ex5-8-2.html)

Exercise 5-2

.one{border-radius:50px;}

.two{border-radius:0px 20px 40px 60px;}

.three{border-radius:0px 30px;}

.four{border-radius:30px;   border:5px dotted red;}

(After editing ex5-6-1.html, save it as exercise5-2.html)

Solution

```html
1  <html>
2    <head>  <title>border-radius exercise</title>
3      <style>
4        img {width : 150px; height : 200px;}
5        .one {border-radius : 50px;}
6        .two {border-radius : 0px 20px 40px 60px;}
7        .three {border-radius : 0px 30px;}
8        .four {border-radius : 30px; border : 5px dotted red;}
9      </style>
10   </head>
11   <body>
12     <img src="larva.jpg" class="one">  <img src="larva.jpg" class="two">
13     <img src="larva.jpg" class="three"> <img src="larva.jpg" class="four">
14   </body>
15  </html>
```

(After editing ex5-6-1.html, save it as exercise5-2.html)

Exercise 5-3

● **Create the following web page using <div> tags**

 ○ Outer box (id="div1") has properties:

   – **width=10cm, border=solid, background=silver, padding=10px(top), 5px(left)**

 ○ Inner box (id="div2") has properties:

   – **border=dotted red, background=#20a020, padding=20px(t), 30px(r), 40px(b), 50px(l), margin=20px(t), 30px(r), 20px(b), 10px(l)**
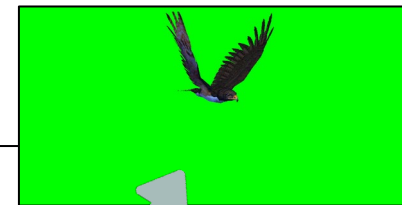
 ○ Set the font property:

   – **italic, bold, 20pt, times**
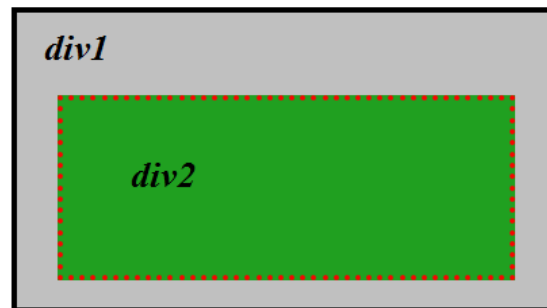
save it as exercise5-3.html

Background Property

- **Sets all the background properties in one declaration**

> **body** { background: *#00ff00 url("eagle.gif") center no-repeat fixed*; }

Value / Property	Description
background-color :	Specifies the background color to be used
background-image :	Specifies one or more background images to be used
background-position :	Specifies the position of the background Images e.g., left top,left center,left bottom,right top,right center,right bottom,center top,center center,center bottom
background-size :	Specifies the size of the background images, e.g., 100px 100px
background-repeat :	Specifies how to repeat the background images e.g., no-repeat, repeat(default, repeat-x, repeat-y)
background-attachment :	Specifies whether the background images are fixed or scrolls with the rest of the page e.g., scroll | fixed | local | initial | inherit

Background-Repeat Property

● The background-repeat property sets if/how a background image will be repeated.

● By default, a background-image is repeated both vertically and horizontally.

●Tip: The background image is placed according to the background-position property. If no background-position is specified, the image is always placed at the element's top left corner.

● Property values

Value	Description
repeat	The background image is repeated both vertically and horizontally. The last image will be clipped if it does not fit. This is default
repeat-x	The background image is repeated only horizontally
repeat-y	The background image is repeated only vertically
no-repeat	The background-image is not repeated. The image will only be shown once

repeat

repeat-x

repeat-y

no-repeat