The CSS Box Model and Positioning

PGCertInfoTech
Programming with Web Technologies

THE UNIVERSITY OF
AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

Auckland
ICT Graduate School

CSS Box Model

- Every element in HTML is created in a box
- The browser than places this box appropriately on the page
- A trick for revealing boxes in a page
  - Open the Chrome Developer Tools
  - Load any page
  - Select the <html> element file in the Elements tab
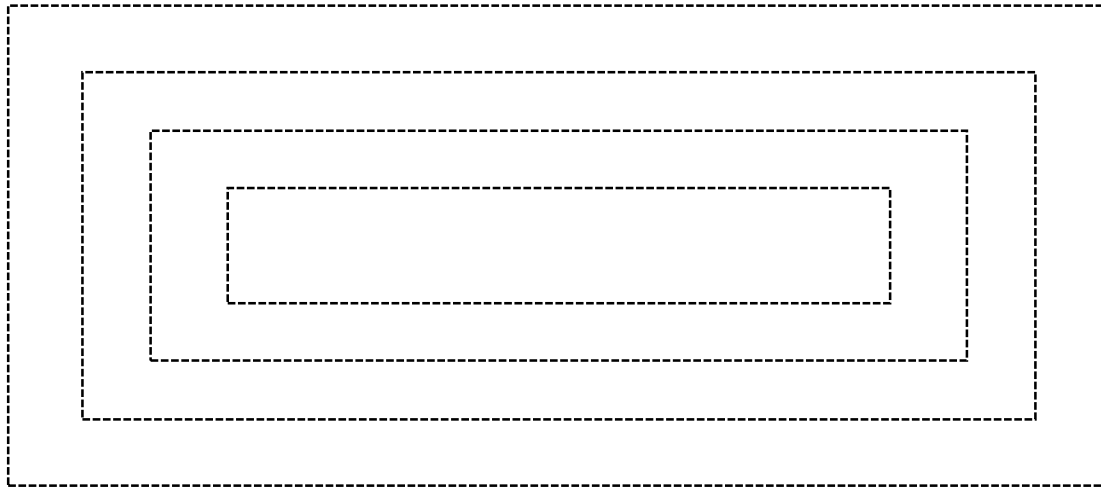 - Click the + button to add a new rule

CSS Box Model

```
*{
    border: 1px solid black;
}
```

- * means 'all elements'
- Sets the border to be a black line
- Doing this through a web browsers Developer Tools temporarily changes the CSS that is being applied
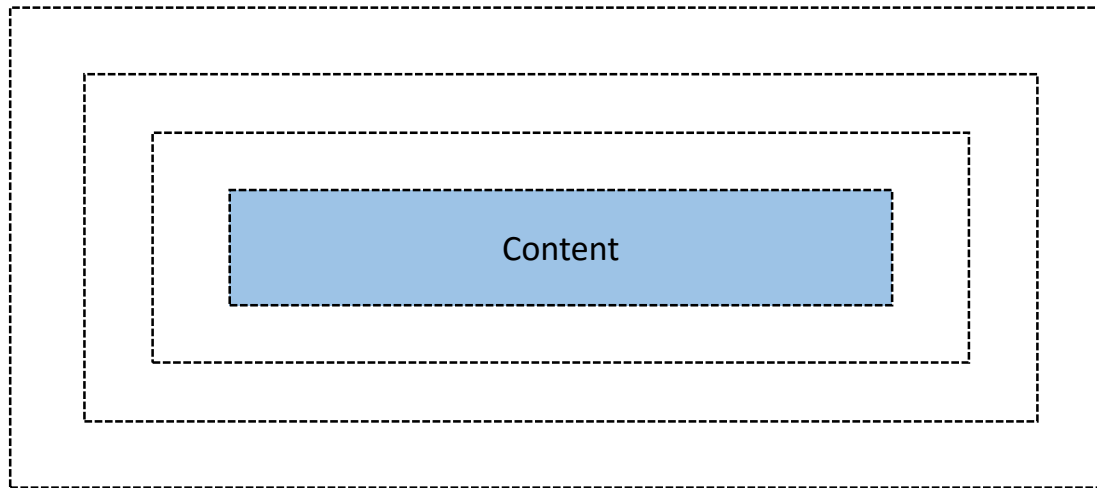- It does not change the CSS file itself

CSS box model

The box for each individual element has this structure

CSS box model

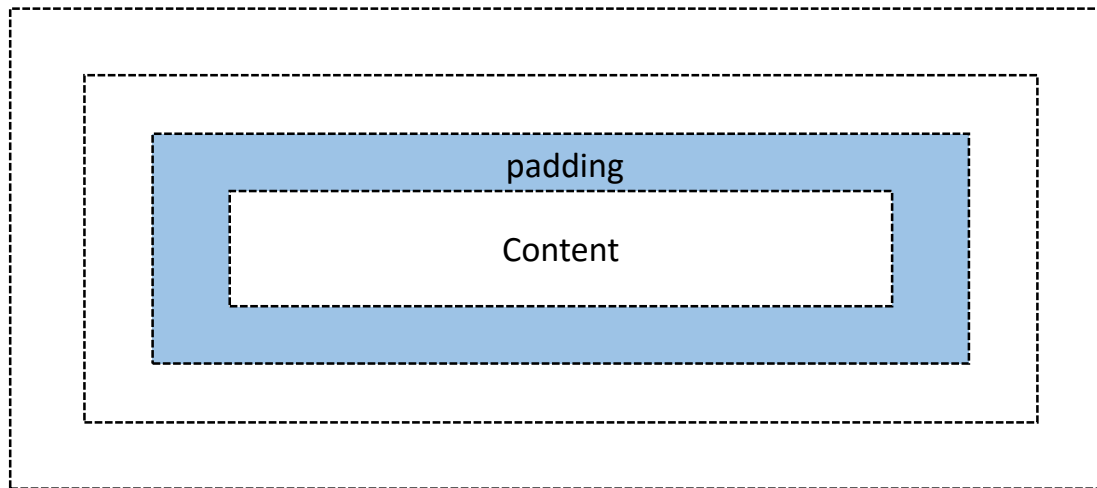The box for each individual element has this structure
- content will be text, image, input control etc.

Content

CSS box model

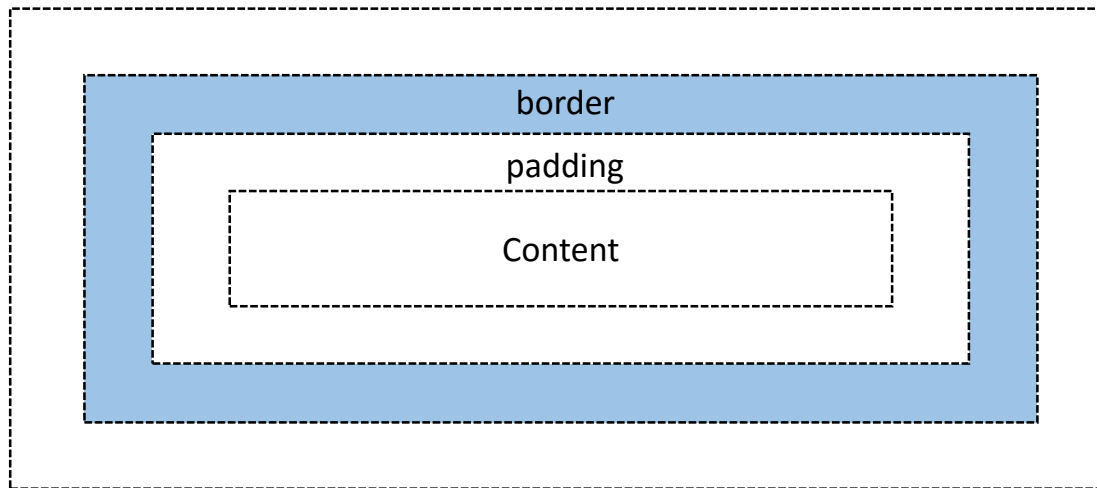The box for each individual element has this structure

- padding is the space inside the element, between the content and the border

CSS box model

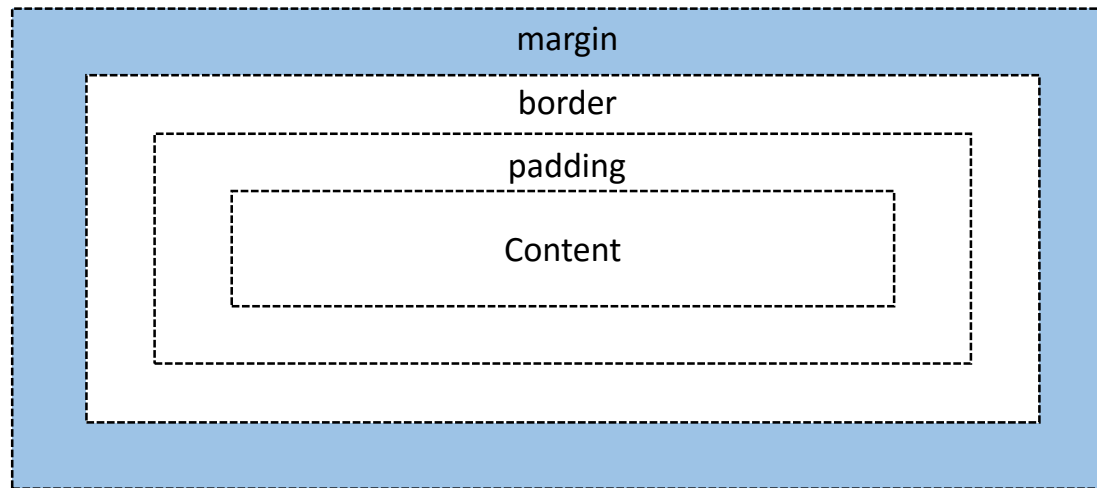The box for each individual element has this structure
- border surrounds the content and padding

CSS box model
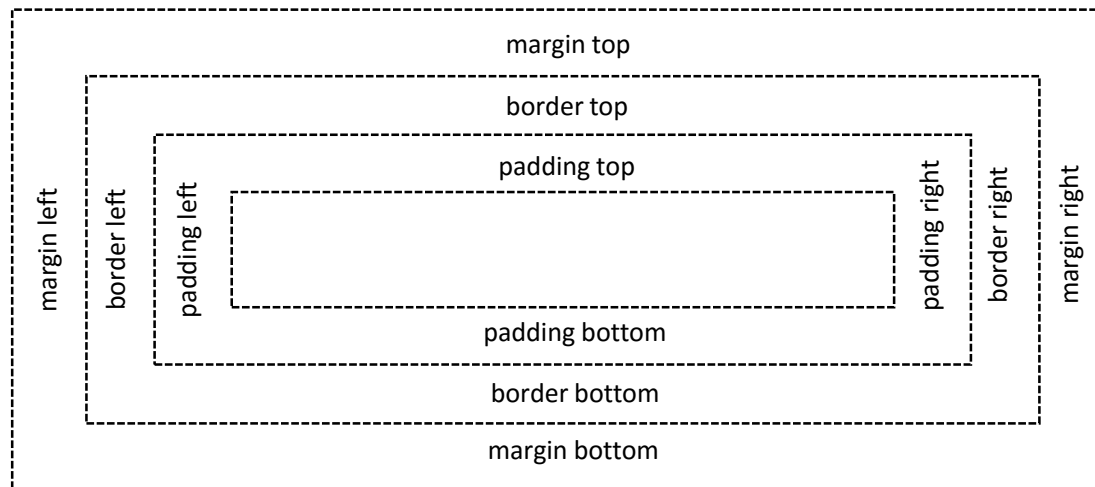
The box for each individual element has this structure
- margin is outside the border and is **always transparent**

CSS box model

The width of padding, border and margin can have
- Separate values for top, left, bottom, right
- A single value that is applied to all sides

CSS box model: an element

- CSS rule for an image with id *img1*
  - background colour (green) of the element is used for the padding area
  - a single value for *padding* makes it 20 pixels wide on all sides
  - configure the *border* to be a solid black line 20 pixels wide on all sides
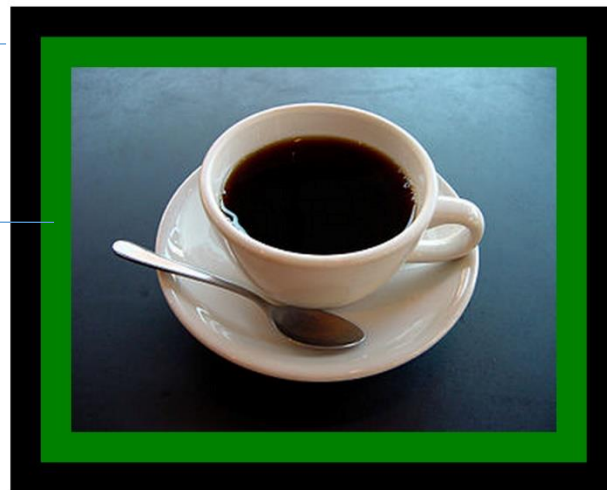 - a single *margin* value makes it 20 pixels wide on all sides

```
#img1 {
    background-color : green;
    padding          : 20px;
    border-color     : black;
    border-width     : 20px;
    border-style     : solid;
    margin           : 20px;
}
```

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border
black, solid, 20px each side

padding
green, 20px each side

margin
transparent, 20px each side

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CSS box model: an element

- Individual top, right, bottom, left values

```css
#img2 {
    background-color      : green;
    padding               : 20px;
    padding-left          : 70px;
    padding-right         : 40px;
    border-color          : black;
    border-left-width     : 0px;
    border-top-width      : 20px;
    border-bottom-width   : 10px;
    border-right-width    : 50px;
    border-style          : solid;
    margin-top            : 10px;
    margin-left           : 30px;
    margin-right          : 80px;
    margin-bottom         : 60px;
}
```

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```
#img3 {
    background-color : green;
    padding          : 20px 40px 20px 70px;
    border-color     : black;
    border-width     : 20px 50px 10px 0px;
    border-style     : solid;
    margin           : 10px 80px 60px 30px;
}
```

auctor, ac tempus sapien dignissim. Curabitur tincidunt metus in augue accumsan ullamcorper.   Class
aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos. Curabitur vehicula tincidunt euismod. Cras feugiat mi at nisi semper, eu mollis quam porttitor. Aliquam erat volutpat. Suspendisse vitae leo in justo fermentum egestas. Sed ut urna maximus, maximus urna at, ultrices lectus. Maecenas ullamcorper, nunc sit amet pharetra aliquet, augue nunc hendrerit diam, vel tempor nisl turpis dapibus erat. Nam bibendum, nulla eleifend ultricies volutpat, mauris augue aliquet nulla, sit amet bibendum sem tellus sed erat. Donec euismod nisi vitae sem euismod, at tempor ipsum tincidunt. Sed scelerisque, elit ut ornare venenatis, nisi metus egestas arcu, a mattis risus erat ut augue. Nunc placerat convallis mauris eu convallis. Sed aliquam sapien quis lectus facilisis, eu porttitor est semper.

CSS Units

- CSS has many different units for expressing lengths

- **Relative**
    - px   depends upon the resolution of the viewing device (normally a screen)
    - em   relative to the font-size of the element (2em means 2 times the size of

         the current font)
    - ex   x-height, simple way to think about it is relative to the size of a lower

         case **x** in the font being used

- **Absolute** (assuming you know output device characteristics) in inches
    - in   inches
    - cm   centimetres
    - mm   millimetres
    - pt   points 1/72 (0.01389) of an inch
    - pc   picas 12 points = 1/6th of an inch

CSS Positioning

- We've configured the space that an element's box uses, but not **where** that box will appear

- Elements are placed in the page layout using these schemes
  - normal flow
  - positioning
  - floats

- and using the key properties
  - position
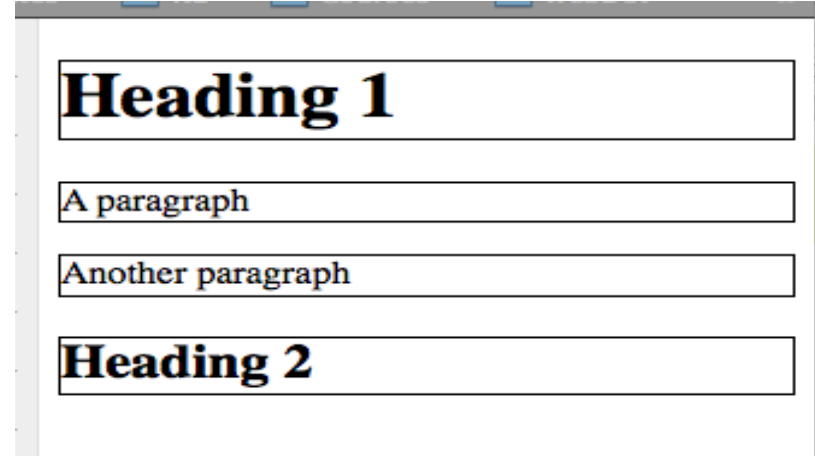 - float

CSS Positioning: normal flow

- **Normal flow** lays out boxes in 2 ways

  - block formatting
    - vertical layout
    - boxes placed one after the other top to bottom
    - distance between them depends on margin
    - left edge of each box touches left edge of its parent

  - inline formatting
    - horizontal layout
    - boxes placed one after the other left to right
    - separated by margins, padding, borders
    - may be vertically aligned by their tops, bottoms or text baseline

CSS Positioning: normal flow

- **Normal flow**
  - **block** formatting – default within the body (for example)

```
<h1>Heading 1</h1>
<p>
    A paragraph
</p>
<p>
    Another paragraph
</p>
<h2>Heading 2</h2>
```

CSS Positioning: normal flow

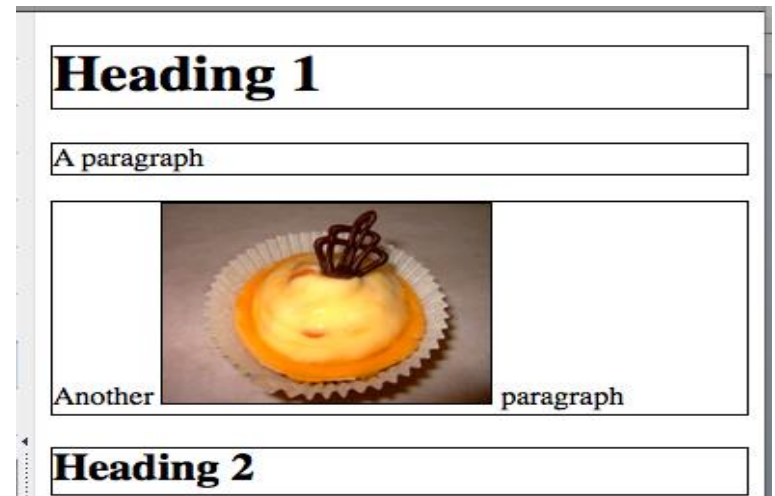**Normal flow:**

- **inline** formatting – default within paragraphs (for example)

```
<h1>Heading 1</h1>
<p>
    A paragraph
</p>
<p>
    Another
    <img src="cake.png" alt="nom nom" />
    paragraph
</p>
<h2>Heading 2</h2>
```

CSS position property

The position property of an element can have 1 of 4 values

• position: static|absolute|fixed|relative;

static	positioned using normal flow
relative	positioned relative to where it would be using normal flow by providing an offset
absolute	removed from normal flow and positioned by coordinates relative to the containing block
fixed	a constant position relative (normally) to the window i.e. not affected by scrolling

CSS position: relative

```
<p>
    Another  paragraph with an <img src="cake.png" alt="nom nom" /> inline image
</p>
<p>
    Another  paragraph with a <img class="offset-img" src="cake.png" alt="nom nom">
relatively positioned image
</p>
```

```
.offset-img {
    position     : relative;
    left        : -20px;
    top         : -20px;
    /* can also use right and bottom */
}
```


Another paragraph with an   inline image

Another paragraph with a   relatively positioned image

CSS position: absolute


```
<h1> CSS Positioning </h1>
<h2> A paragraph containing an absolutely positioned image </h2>
<p>
```

the image is not positioned at (40px, 20px) within the paragraph

this is because absolute position is within the first containing element that is **not in the normal flow**

the paragraph is in the normal flow

so the closest container for which absolute position makes sense is the body element

```
.absolute-img {
    position    : absolute;
    left        : 40px;
    top         : 20px;
}
```

CSS positioning: fixed

- Used when you want to display something on the screen which will always be at the same position and will not scroll with the rest of the document

```
<div class="fixed-top-toolbar">
    A div using fixed positioning
</div>


.fixed-top-toolbar {
    background-color    : yellow;
    position         : fixed;
    left             : 0px;
    top              : 0px;
}
```

CSS positioning: float

- **Float**ing elements are removed from the normal flow
  - they are moved to the far left or the far right of the line that they are on
  - this means that other content can flow around them

```
<p>
    Lorem ipsum dolor sit amet, consectetur adipiscing
elit. Nulla laoreet porta ornare. Aenean eu sem nec diam
mattis fermentum.

    <img style="float:left" src="cake.png" alt="nom nom">

    Cras luctus diam at dui sollicitudin rhoncus. Nam in
metus nec nunc egestas laoreet. Aenean et metus lacus.
</p>
```

A paragraph containing an image floated to the left

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nulla laoreet porta ornare. Aenean eu sem nec diam mattis fermentum. Integer lobortis tellus sit amet ligula varius ut lobortis arcu interdum. Aenean eu consequat urna. Etiam vitae elit in leo volutpat fermentum. In hac habitasse platea dictumst. Sed vitae sem nibh. Donec euismod adipiscing mi. Curabitur ut convallis urna. Cras viverra sollicitudin iaculis. Aliquam ornare velit vitae nulla imperdiet congue. Nunc viverra arcu eget sapien cursus in vulputate lacus tempor. Nulla augue ante, volutpat in ultrices ac, consequat adipiscing risus. Nulla nibh est, luctus in volutpat ac, mattis ut lacus. Suspendisse luctus accumsan congue. Vivamus quis lacus arcu. Duis sed leo nec elit cursus varius. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos. Nunc vehicula euismod nibh ac auctor. Praesent sed ante ac quam sodales lacinia. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos. Cras luctus diam at dui sollicitudin rhoncus. Nam in metus nec nunc egestas laoreet. Aenean et metus lacus.

float: left|right;

CSS positioning: float

- Improve the appearance with box model properties

```html
<img class="float-left-img"  src="cake.png" alt="nom nom">
```

```css
.float-left-img {
    float             : left;
    margin-top        : 10px;
    margin-left       : 0px;
    margin-right      : 15px;
    margin-bottom     : 10px;
    border            : 1px solid gray;
    padding           : 5px;
}
```

A paragraph containing an image floated to the left with box styling

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nulla laoreet porta ornare. Aenean eu sem nec diam mattis fermentum. Integer lobortis tellus sit amet ligula varius ut lobortis arcu interdum. Aenean eu consequat urna. Etiam vitae elit in leo volutpat fermentum. In hac habitasse platea dictumst. Sed vitae sem nibh. Donec euismod adipiscing mi. Curabitur ut convallis urna. Cras viverra sollicitudin iaculis. Aliquam ornare velit vitae nulla imperdiet congue. Nunc viverra arcu eget sapien cursus in vulputate lacus tempor. Nulla augue ante, volutpat in ultrices ac, consequat adipiscing risus. Nulla nibh est, luctus in volutpat ac, mattis ut lacus. Suspendisse luctus accumsan congue. Vivamus quis lacus arcu. Duis sed leo nec elit cursus varius. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos. Nunc vehicula euismod nibh ac auctor. Praesent sed ante ac quam sodales lacinia. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos. Cras luctus diam at dui sollicitudin rhoncus. Nam in metus nec nunc egestas laoreet. Aenean et metus lacus.