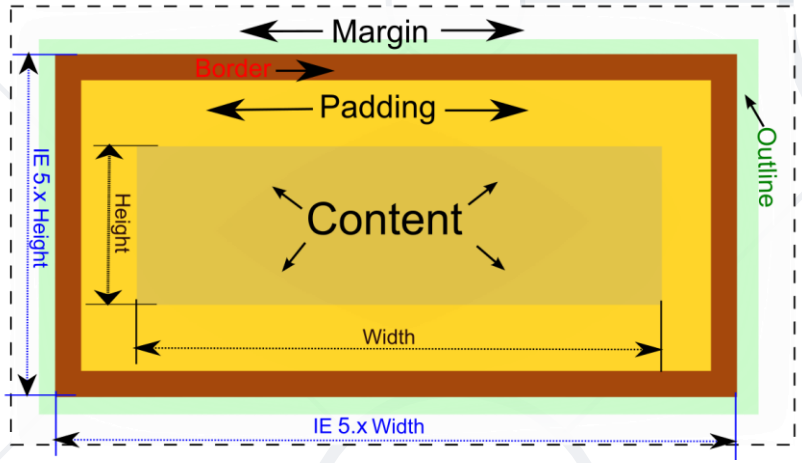
CSS Box Model and Position



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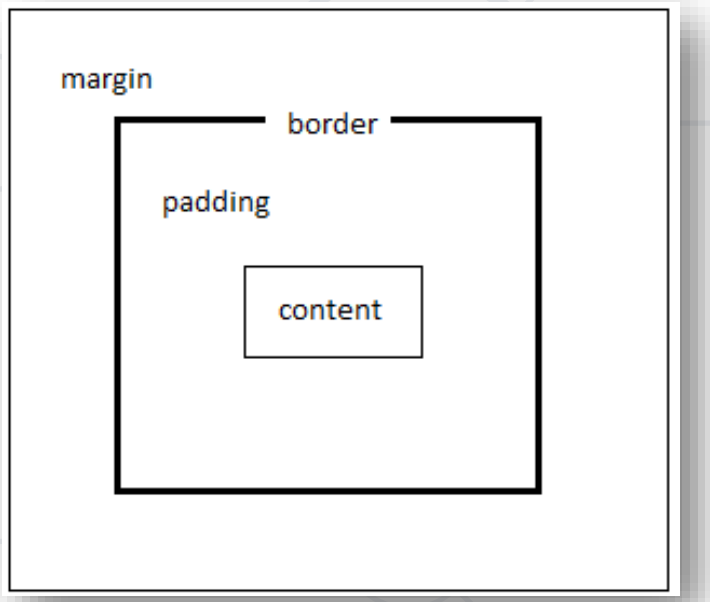
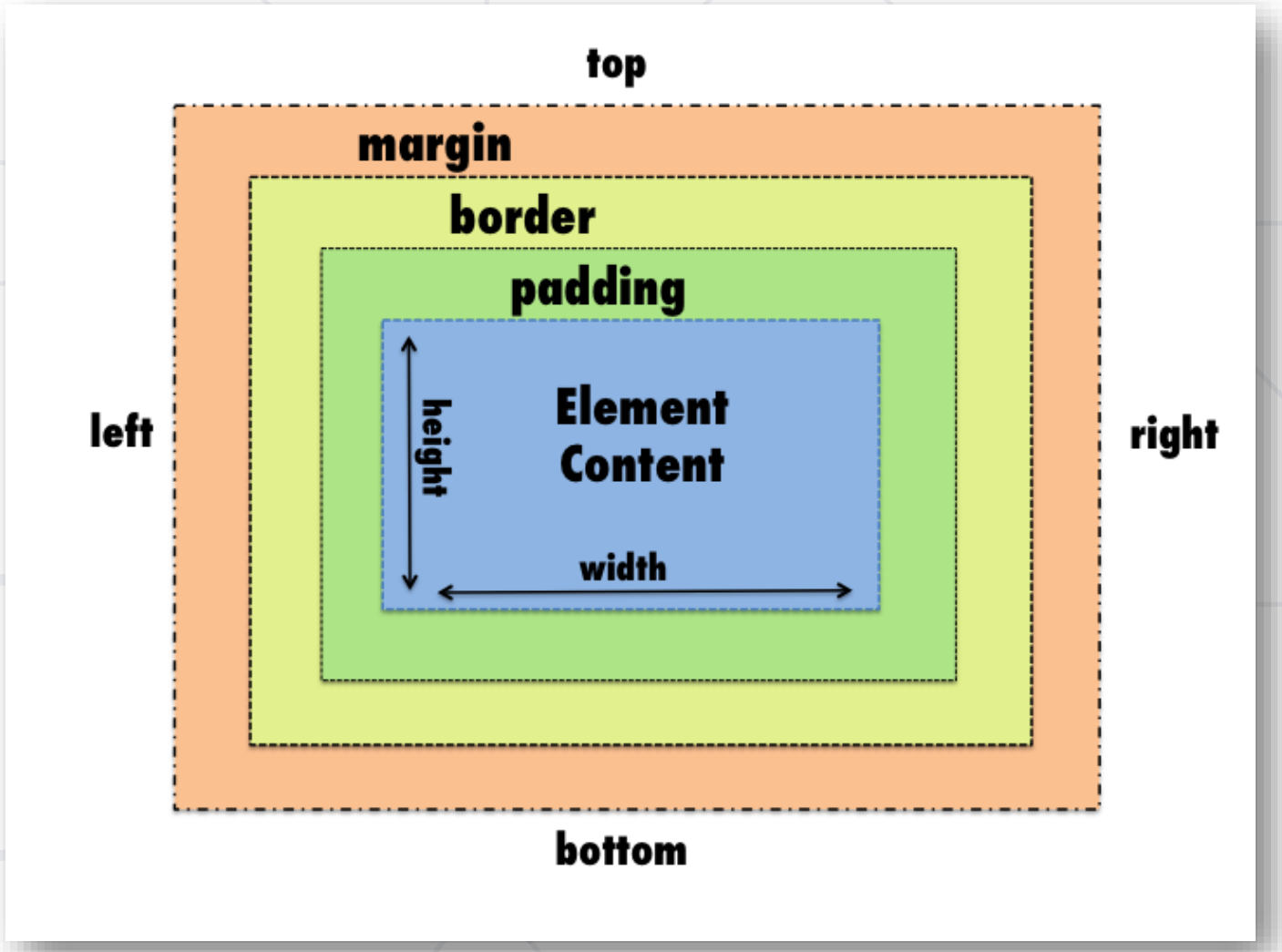
What is Box Model?

CSS Basic Box Model

- When laying out a document, the browser's rendering engine represents **each element** as a **rectangular box** according to the standard CSS basic box model
- CSS determines the **size**, **position**, and **properties** (color, background, border size, etc.) of these boxes
- *Reference Documentation*

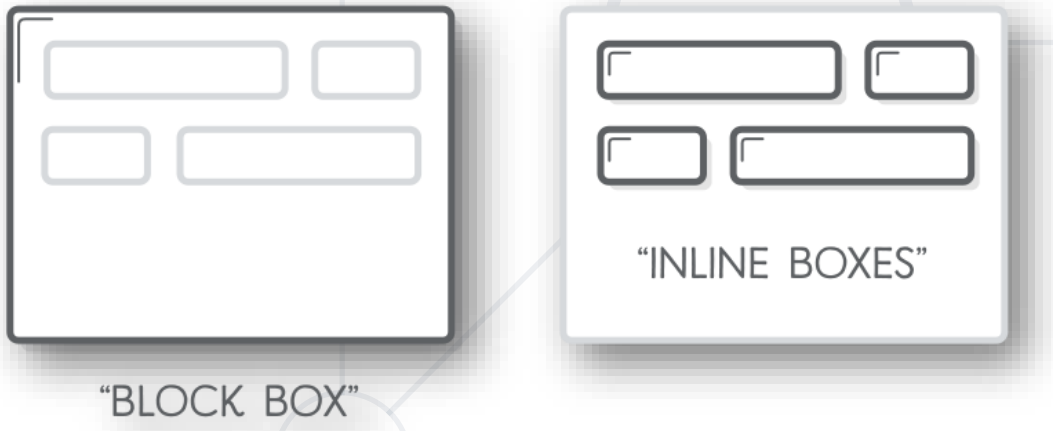


Box Model – CSS Properties



Display

- The display CSS property defines the display type of an element, which consists of the two basic qualities of **how an element generates boxes** — the **outer** display type defining how the **box participates in flow layout** , and the **inner** display type defining **how the children of the box are laid out**



Display - block

- HTML elements historically were categorized as either "block-level" elements or "inline" elements. By default, a block-level element **occupies the entire space** of its parent element (container), thereby creating a "block"

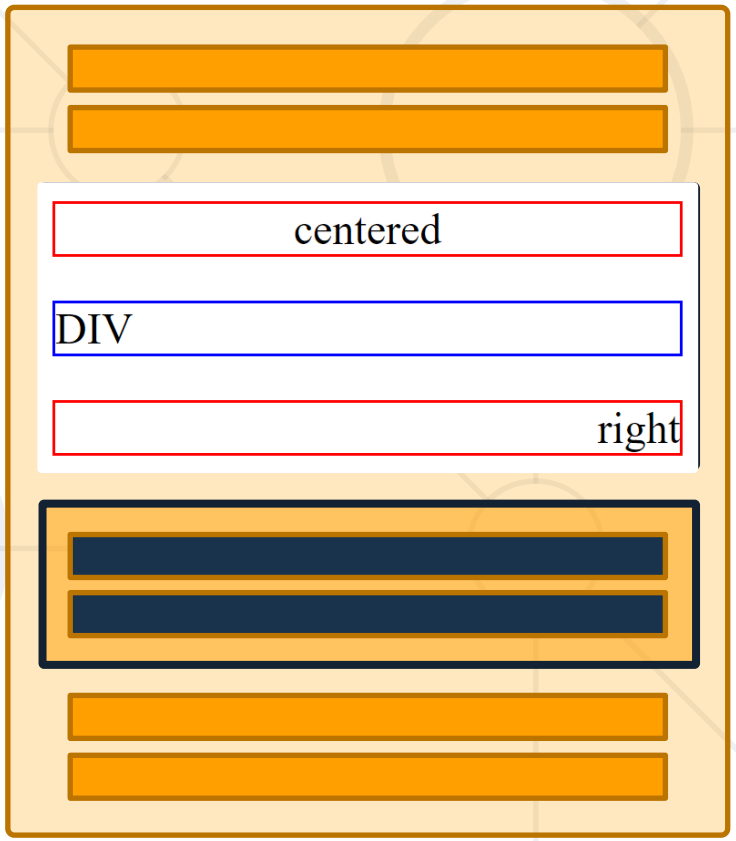
```
.box {
  display: block;
}
```

- Browsers typically display the block-level element with a **newline** both **before** and **after** the element. You can visualize them as a stack of boxes
- `main`, `header` , `article` , `section` , `fieldset` , `nav` , `ul` , `ol` , `li` , `form` , `h1-h6` , `p` , `div`

Block Elements – Example

```
<p style="border:1px solid red;
text-align:center">centered</p>
<div style="border:1px solid
blue">DIV</div>
<p style="border:1px solid red;
text-align:right">right</p>
```

display: block



Display - inline

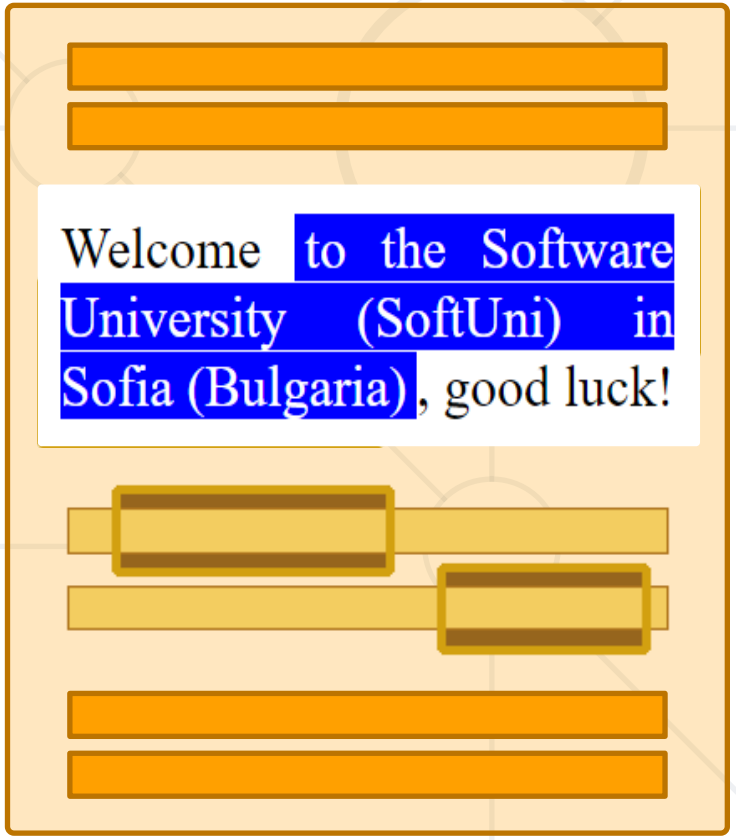
- Inline elements are those which only occupy the space bounded by the tags defining the element, instead of breaking the flow of the content.
- Inline element: **don't start** on a new line. They appear on the same line as the content and tags beside them
- `a`, `label`, `map`, `span`, `strong`, `em`, `i`, `img`, `textarea`, `input`, `button`, `select`
- You can add margins and padding just on **right** and **left** sides of any inline element

```
.box {
  display: inline;
}
```

Inline Elements – Example

```
<p style="text-align:justify"> Welcome
<span style="color:white;
background:blue; padding-right:3px;
padding-left:3px;">
to the Software University (SoftUni)
in Sofia (Bulgaria)</span>, good
luck!</p>
```

display: inline



Display – inline-block

- Gives us the ability to use vertical padding and margin on inline elements as well as adding width and height
- One common use for using inline-block is for creating navigation links horizontally

```
.box {
  display: inline-block;
}
```

Inline-Block Elements – Example

```
<div style="text-align:justify;">
   <div style="display:inline-block;
   background:green">green</div>
   <div style="display:inline-block;
   background:red">red block</div>
   …
</div>
```

display: inline-block

Width

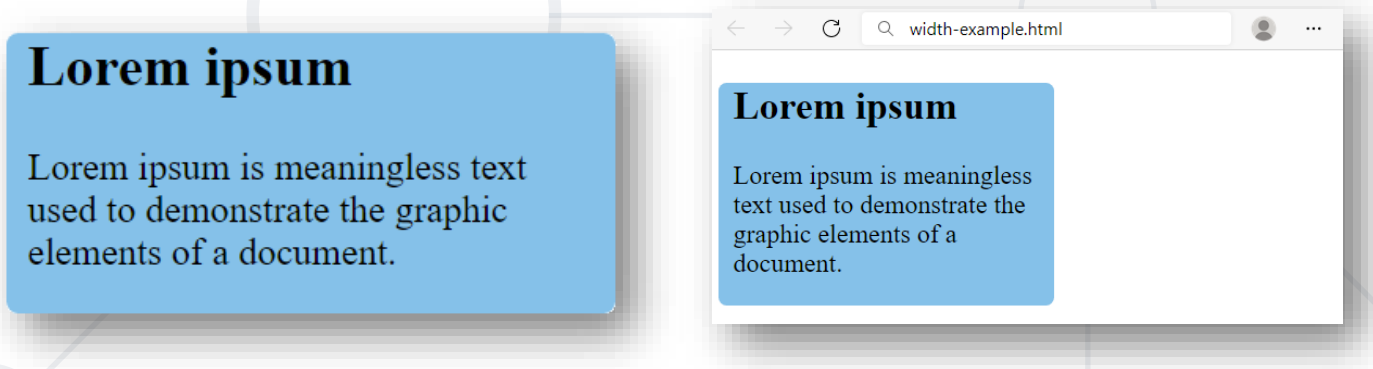
- **Defines the width of the element**
- The **width CSS property** sets an element's width. By default, it sets the width of the content area, but if box-sizing is set to border-box, it sets the width of the border
- *Example*

- **pixels / em / rem**
- Fixed width

```
article {
  width: 240px;
  background: #8ce;
}
```

- **percentages**
- Relative to container's width

```
article {
  width: 50%;
  background: #8ce;
}
```

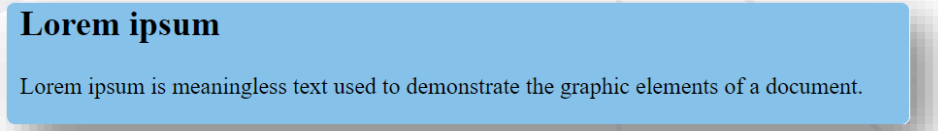


Width

- **Default width of block elements**
  - If you don't declare a width, and the box has static or relative positioning, the width will remain 100% in width and the padding and border will push inwards instead of outward. But if you explicitly set the width of the box to be 100%, the padding will push the box outward as normal

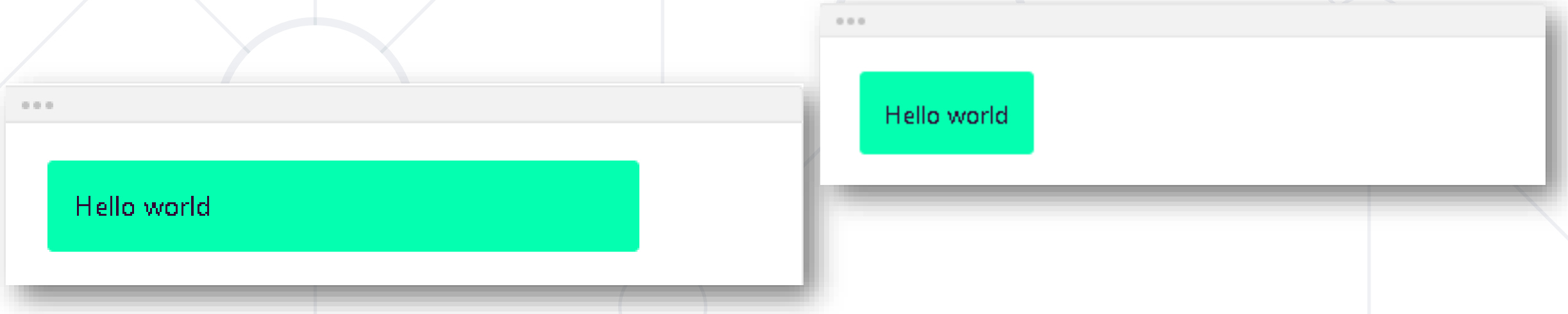
- `auto` (default)
- Auto-calculated width

```
article {
  width: auto;
  background: #8ce;
}
```



Min-width

- Min-width - defines the **minimum** width the element
  - `min-width: 300px;` - if the **minimum** width is **larger** than the element's **actual** width, the min width will be applied
- If the **minimum** width is **smaller** than the element's **actual** width, the min width has **no effect** - `min-width: 5px;`



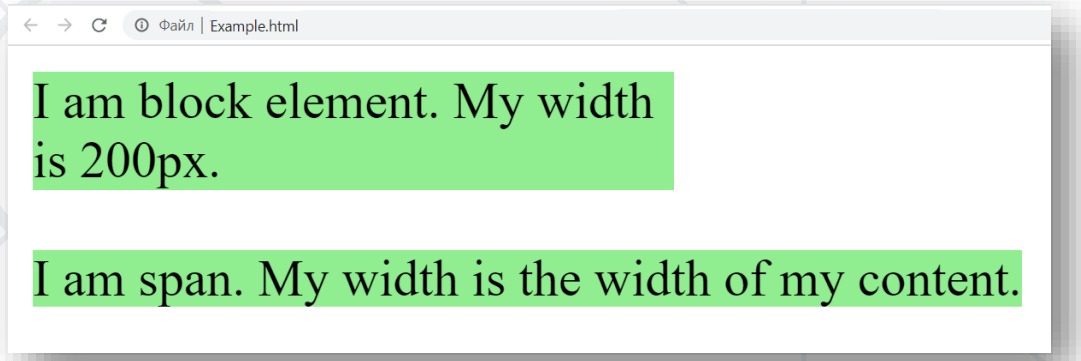
Max-width

- Max-width - defines the **maximum** width the element can be
  - `max-width: none;` - the element has **no limit** in terms of width
  - `max-width: 150px;`
  - `max-width: 2000px;` - you can use numeric values like **pixels**, **(r)em**, **percentages**...
- If the **maximum** width is **larger** than the element's **actual** width, the max width has **no effect**

Width – Example

```
<body>
    <div>
        I am block element. My width is 200px.
    </div>
    <span>I am span. My width is the width of my content.</span>
</body>
```

```
div, span {
    width: 200px;
    background-color: lightgreen;
}
```



Height

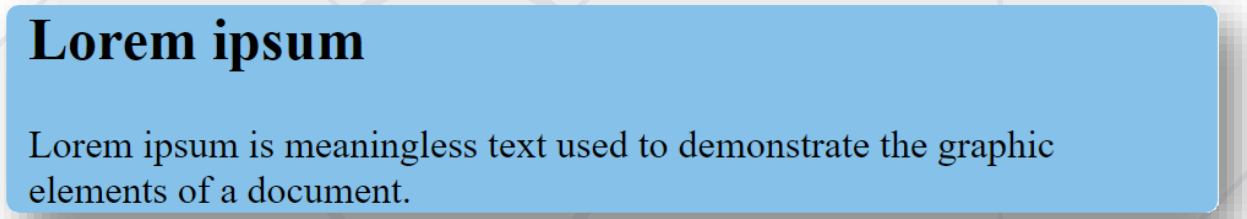
- The height CSS property specifies the height of an element. By default, the property defines the height of the content area. If box-sizing is set to border-box, however, it instead determines the height of the border area.
- *Example*

```
.box {
    height: 150px;
}
```

Height

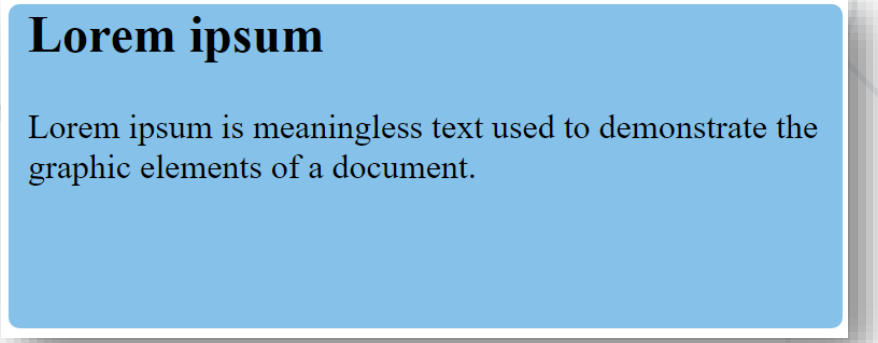
- auto (default)
- Auto-calculated height

```
article {
  height: auto;
  background: #8ce;
}
```



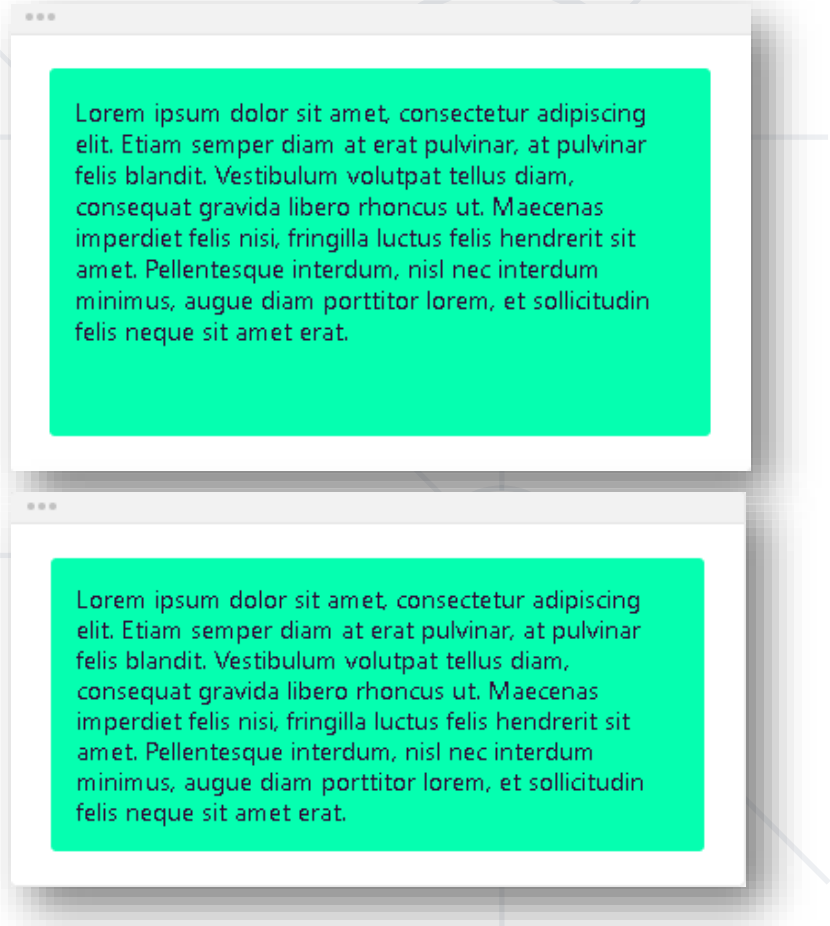
- numeric values like px / pt / em / rem / %

```
article {
  height: 100px;
  background: #8ce;
}
```



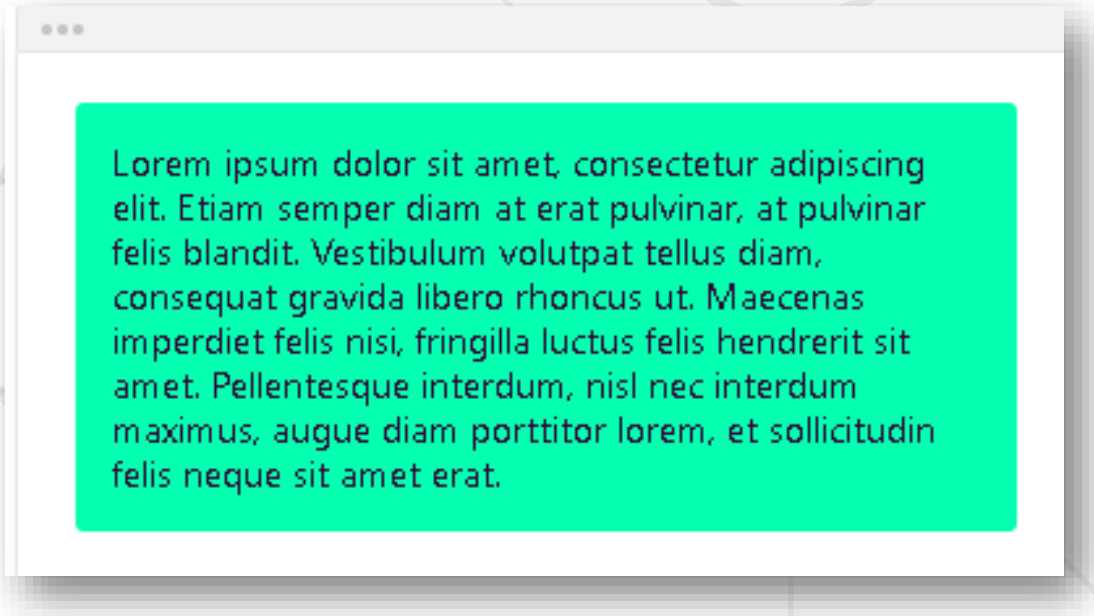
Min-height

- **Min-height** - defines the minimum height the element
  - `min-height: 200px;` - if the **minimum** height is **larger** than the element's **actual** height, the min height will be applied
  - `min-height: 5px;` - if the **minimum** height is **smaller** than the element's **actual** height, the min height has **no effect**

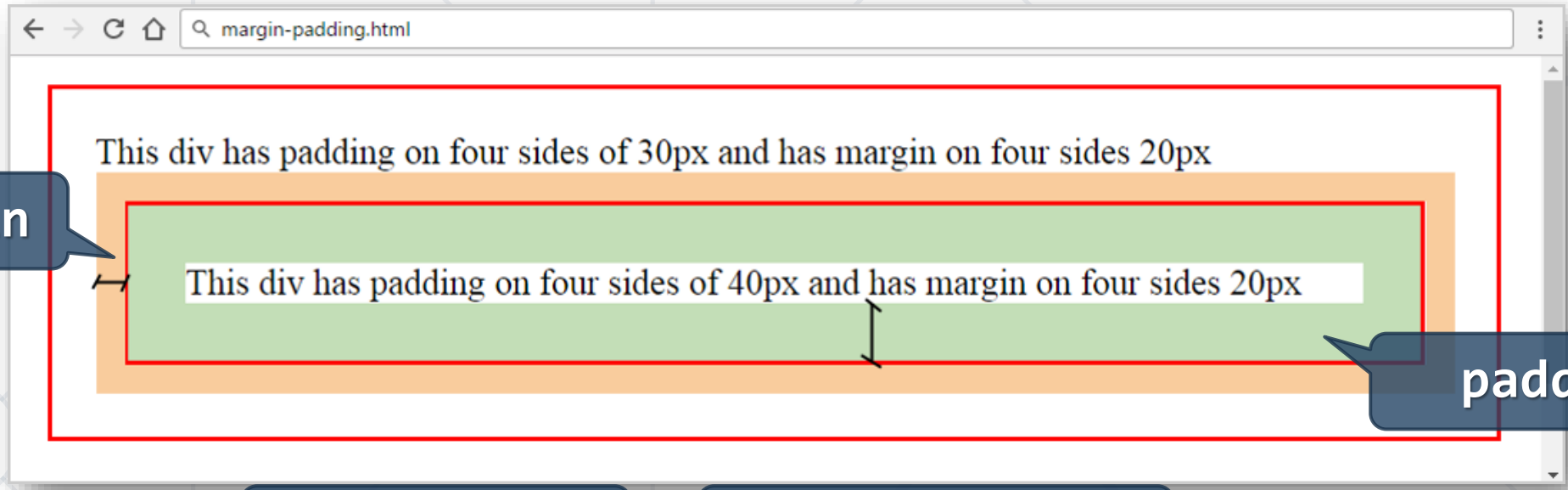


Max-height

- **Max-height** - defines the maximum height the element can be
  - `max-height: none;` - the element has **no limit** in terms of height
  - `max-height: 2000px;` - if the **maximum** height is **larger** than the element's **actual** height, the max height has **no effect**



Margins and Paddings




```
div {
    margin: 20px 20px 20px 20px;
    padding: 30px 30px 30px 30px;
}
```

margin-top

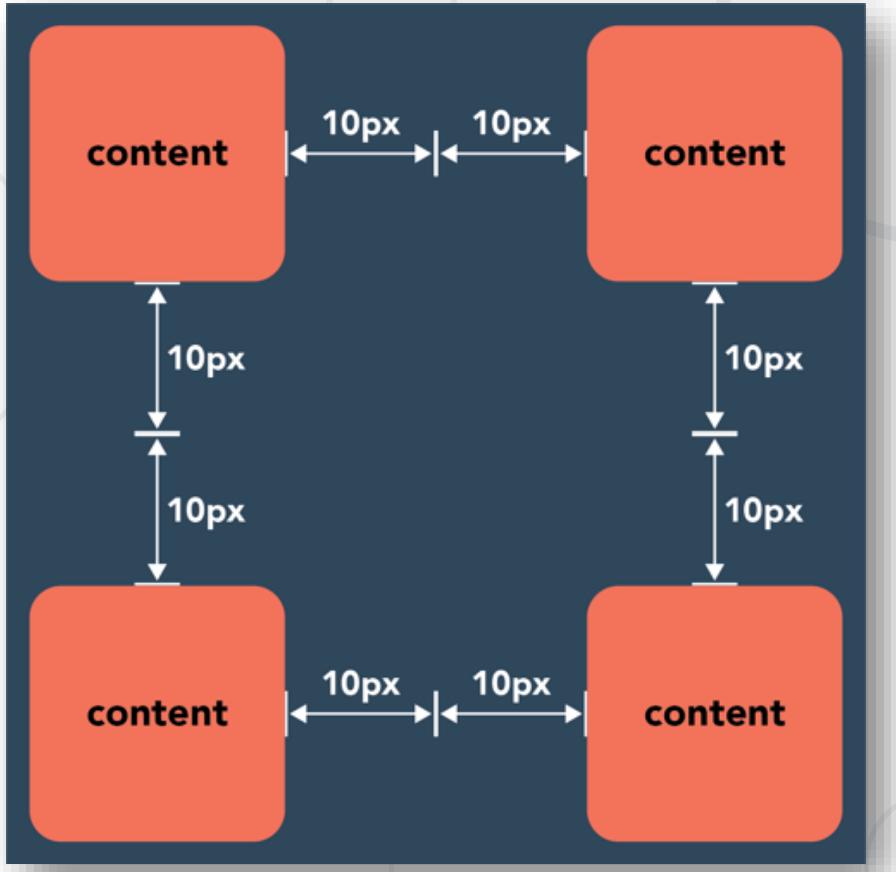
margin-bottom

margin-left

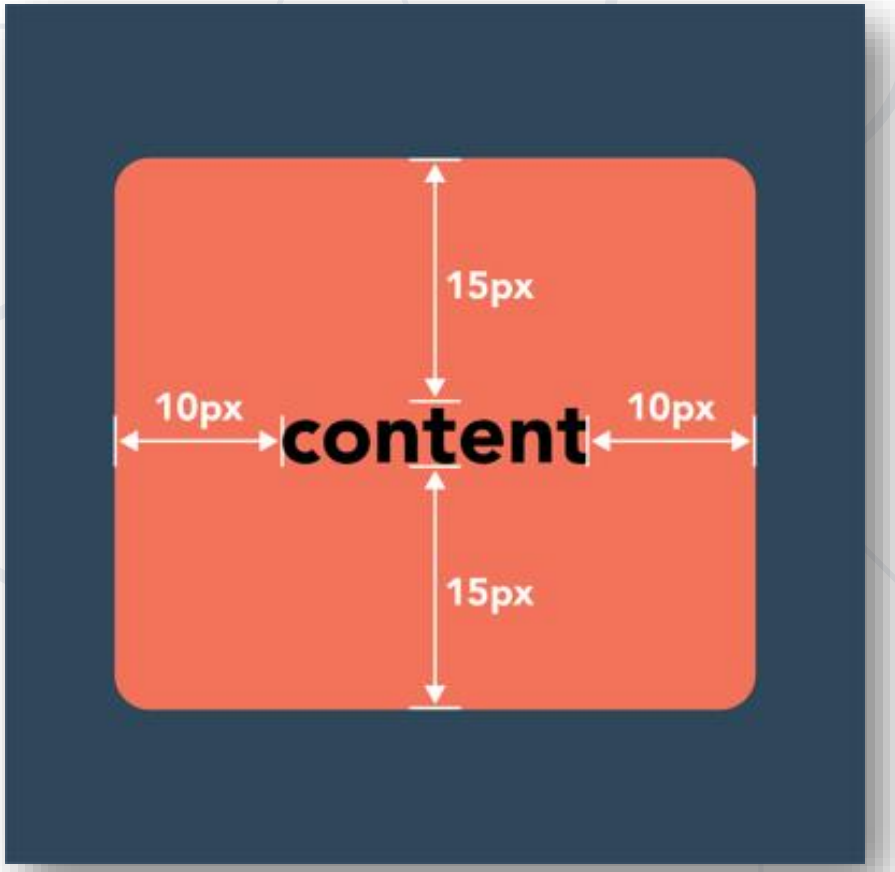
margin-right

Margins and Paddings

- **Margin** – defines the space **outside** the element



- **Padding** – defines the space **inside** the element



Margin

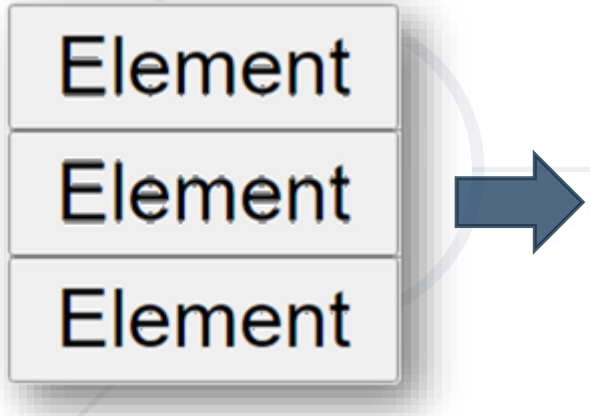
- The margin CSS property sets the margin area on all four sides of an element. It is a shorthand for margin-top, margin-right, margin-bottom, and margin-left
- *Example*

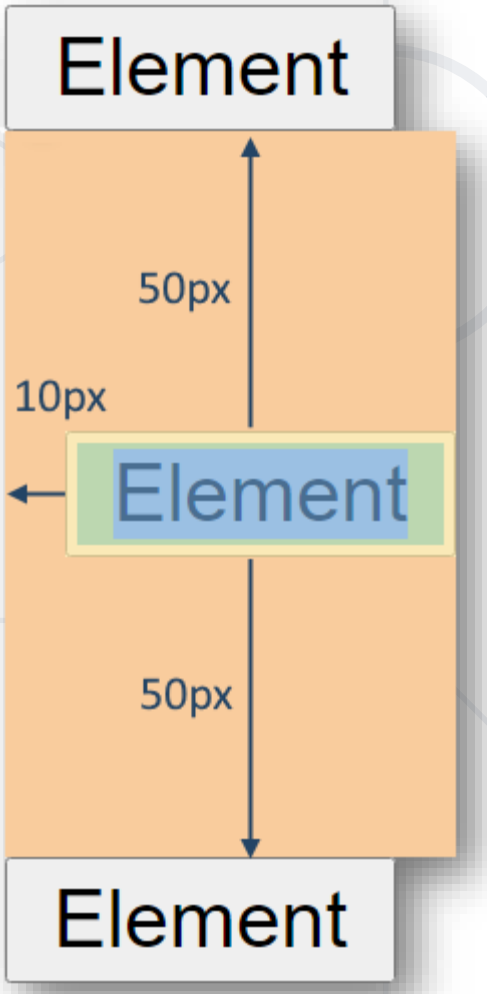
```
.box {
  margin: 50px;
}
```

Margin

```
<button class="first">Element</button>
<button class="second">Element</button>
<button class="third">Element</button>
```

```
button {
  display: block;
}

button.second {
  margin-top: 50px;
  margin-left: 10px;
  margin-bottom: 50px;
  margin-right: 0;
}
```





Padding

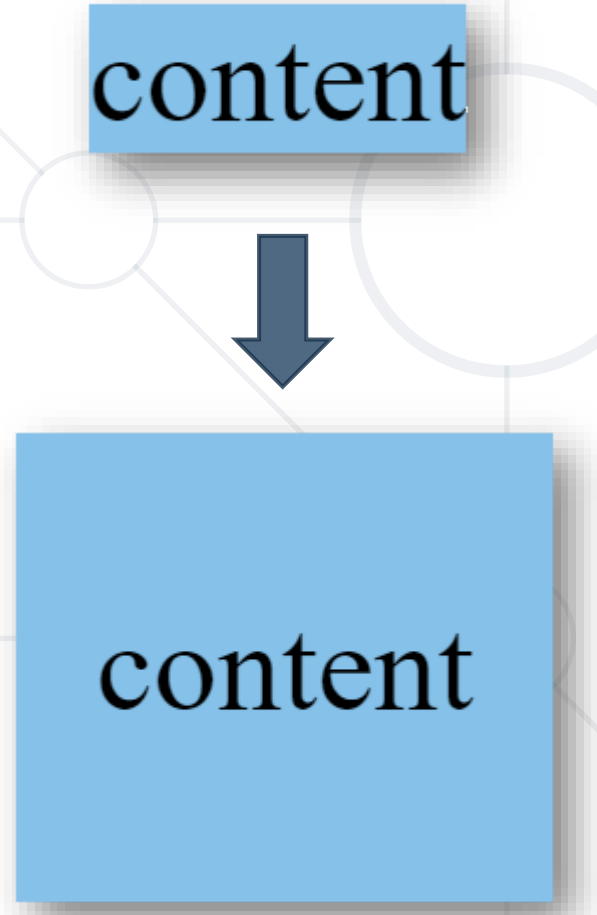
- The padding CSS property sets the padding area on all four sides of an element. It is a shorthand for padding-top, padding-right, padding-bottom, and padding-left
- *Example*

```
.box {
  padding: 50px;
}
```

Padding

```
<div>content</div>
```

```
div {
  background-color: #85c1e9;
  display: inline-block;
  text-align: center;

  padding-top: 20px;
  padding-left: 10px;
  padding-bottom: 20px;
  padding-right: 10px;
}
```



Shorthand Margin / Padding

- Shorthand margin rules:

```
button.second {
  margin: 10px 20px 10px 20px;
}
```

top, right, bottom, left

```
button.second {
  margin: 20px 10px;
}
```

top & bottom, left & right

- Shorthand padding rules:

```
div {
  padding: 5px 10px 8px 15px;
}
```

```
li {
  padding: 5x 10px;
}
```

Border

- The border CSS property sets an element's border. It's a shorthand for border-width, border-style, and border-color
- *Example*

```
.box {
  border: 10px solid #000;
}
```

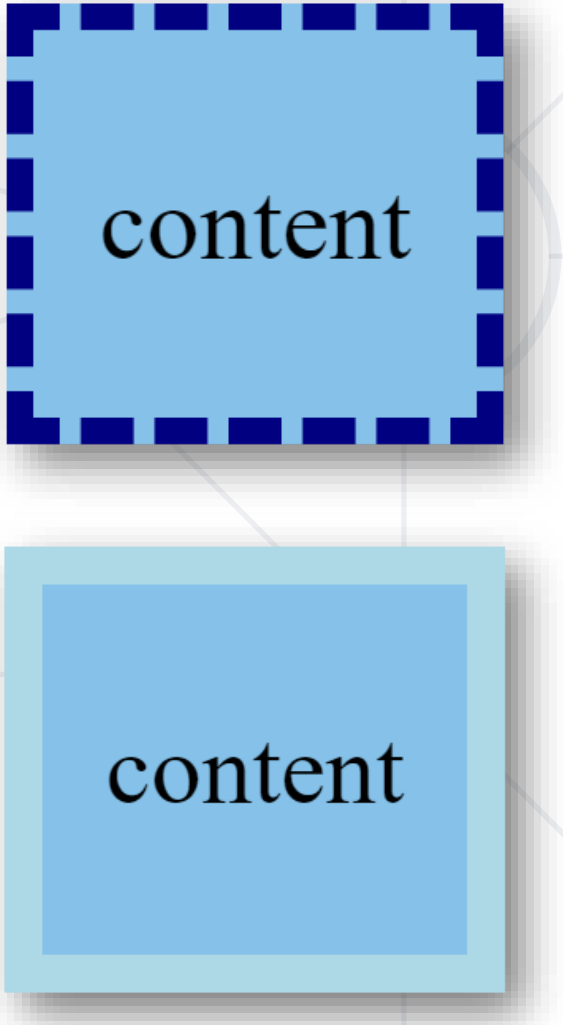
Border

- **Border** – define the style of the borders:
  - **width** (e. g. **1px** / **2px** / **3px**)
  - **style** (e. g. **solid** / **dashed** / **dotted**)
  - **color** (e. g. **blue** / **#eee**)

width style color

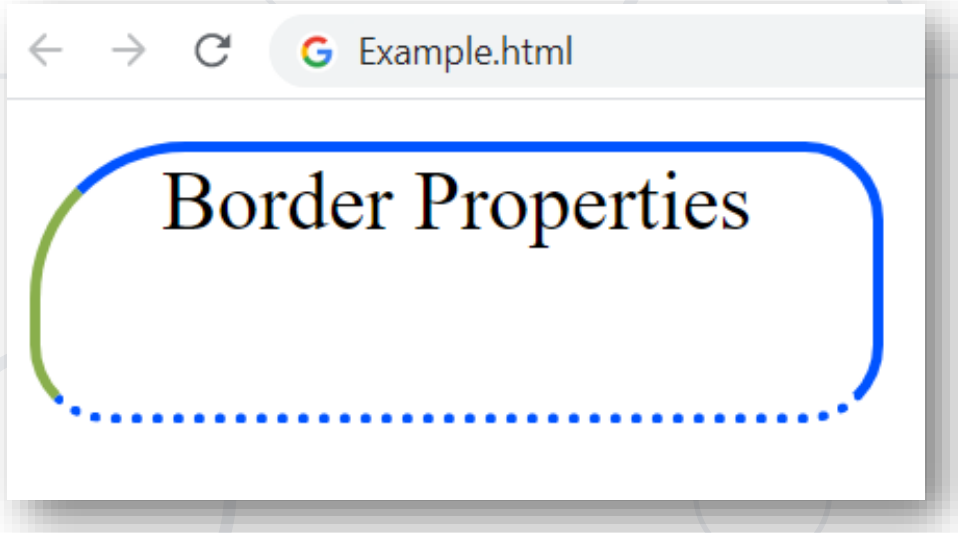
```
border: 4px dashed navy;
```

```
border: 6px solid lightblue;
```

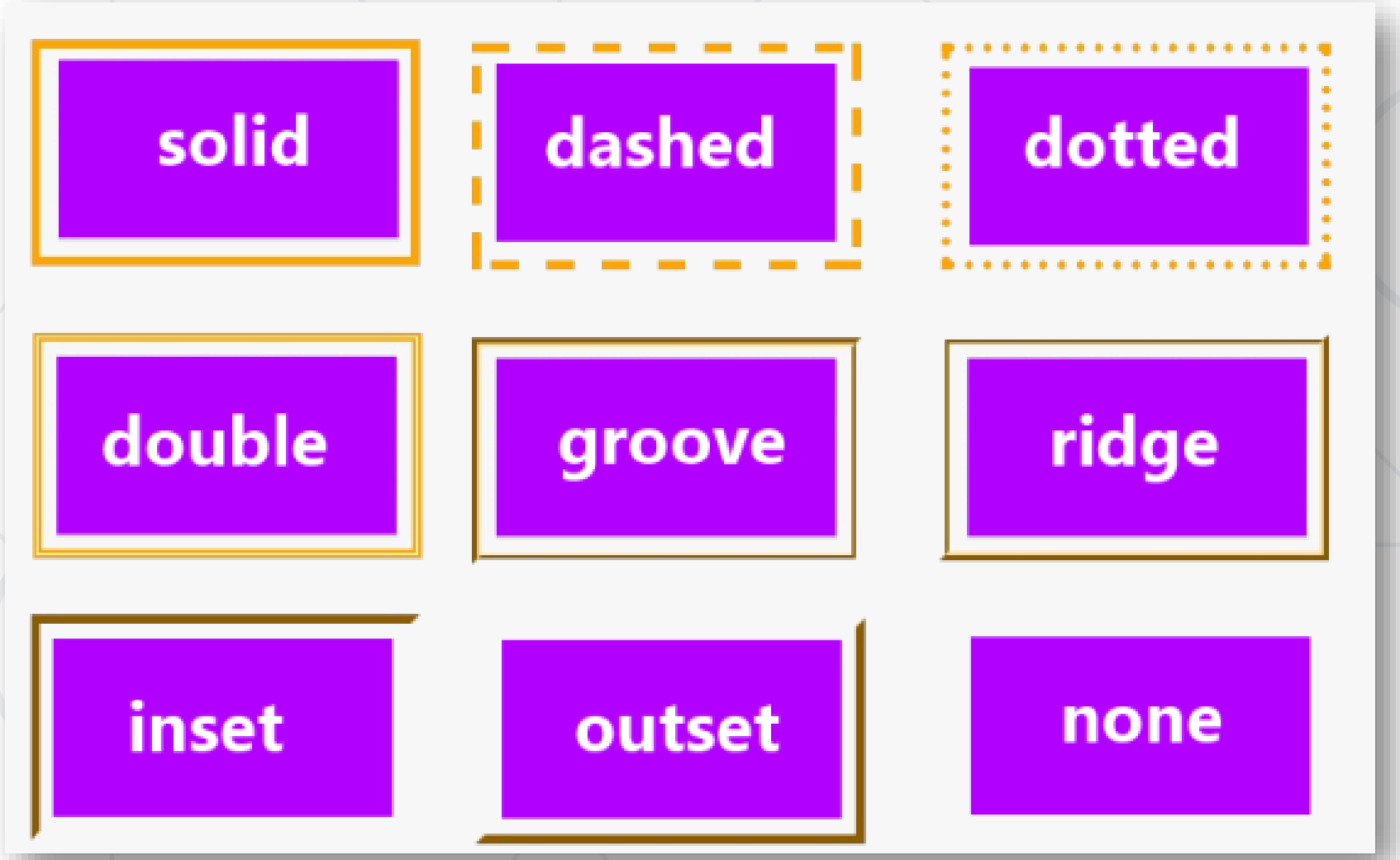


Border Properties

```
div {
  width: 160px;
  height: 50px;
  border-width: 2px;
  border-style: solid;
  border-color: #0053ff;
  border-radius: 15px;
  border-top-left-radius: 30px;
  border-bottom-style: dotted;
  border-left-color: #89af4c;
  text-align: center;
}
```



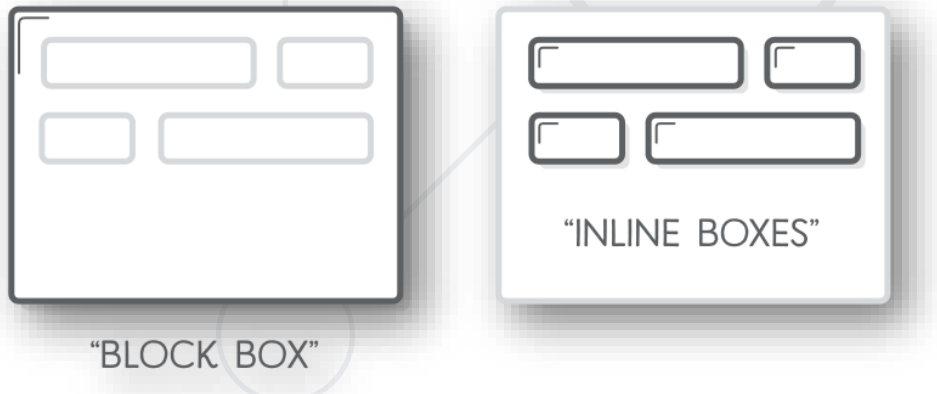
CSS Borders



The CSS Box Model

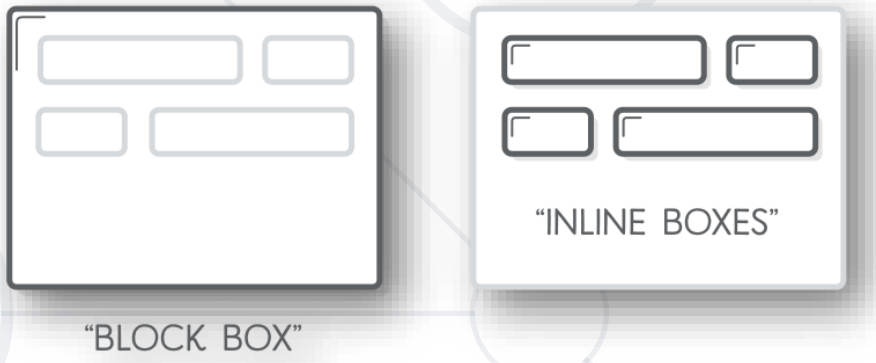
Block and Inline Boxes

- In CSS we have several types of boxes that generally fit into the categories of block boxes and inline boxes. The type refers to how the box behaves in terms of page flow and in relation to other boxes on the page. Boxes have an **inner display type** and **an outer display type**
- In general, you can set various values for the display type using the ***display*** property, which can have various values



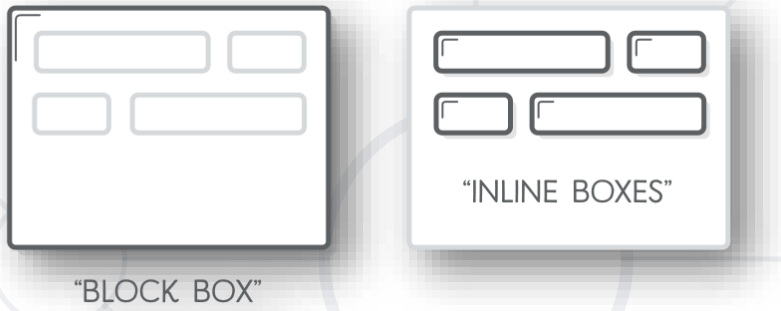
Outer Display Type - Block

- If a box has an outer display type of **block**, then:
  - The box will break onto a new line
  - The **width** and **height** properties are respected
  - **Padding**, **margin** and **border** will cause other elements to be pushed away from the box
  - If **width** is not specified, the box will extend in the **inline** direction to fill the space available in its container
  - Some HTML elements, such as **<h1>** and **<p>**, use **block** as their outer display type by default



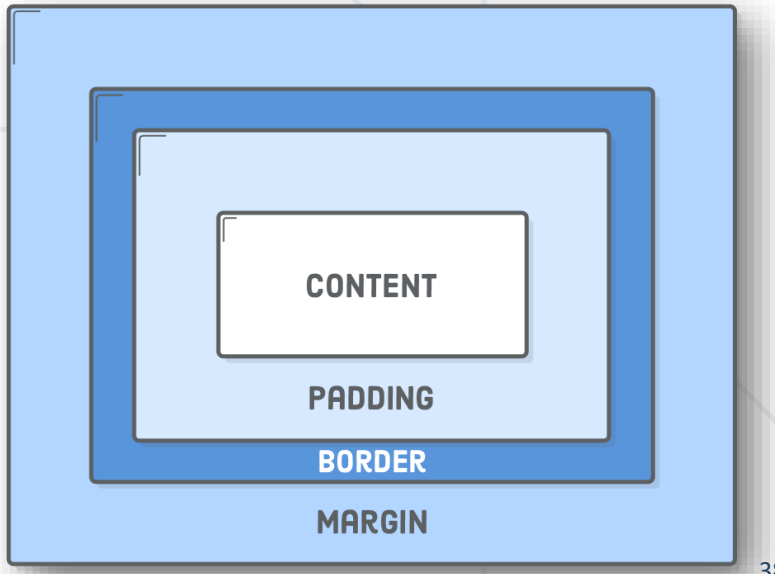
Outer Display Type - Inline

- If a box has an outer display type of **inline**, then:
  - The box will not break onto a new line
  - The **width** and **height** properties will not apply
  - **Top** and **bottom padding**, **margins**, and **borders** will apply but will not cause other **inline** boxes to move away from the box
  - **Left** and **right padding**, **margins**, and **borders** will apply and will cause other **inline** boxes to move away from the box
  - Some HTML elements, such as **<a>**, ****, **** and **** use inline as their outer display type by default



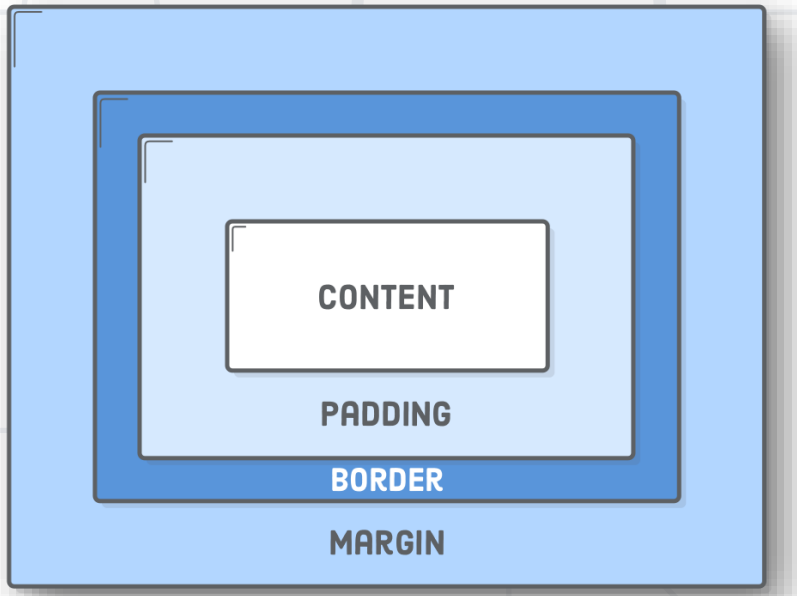
What is the CSS Box Model?

- The CSS box model defines how the different parts of a box — margin, border, padding, and content — work together to create a box that you can see on a page. Inline boxes use just some of the behavior defined in the box model
- To add complexity, there is a standard and an alternate box model. By default, browsers use the standard box model



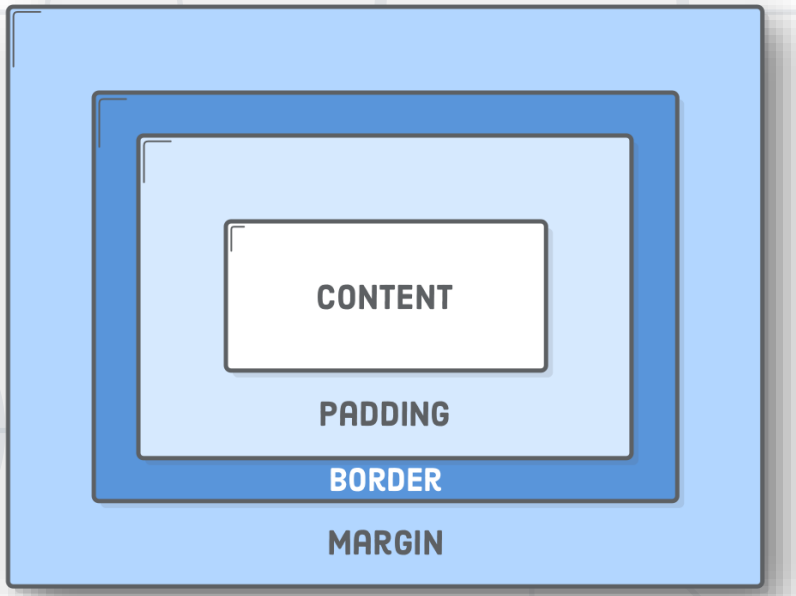
Parts of a Box

- Making up a block box in CSS we have the:
  - **Content box**: The area where your content is displayed; size it using properties like inline-size and block-size or width and height
  - **Padding box**: The padding sits around the content as white space; size it using padding and related properties

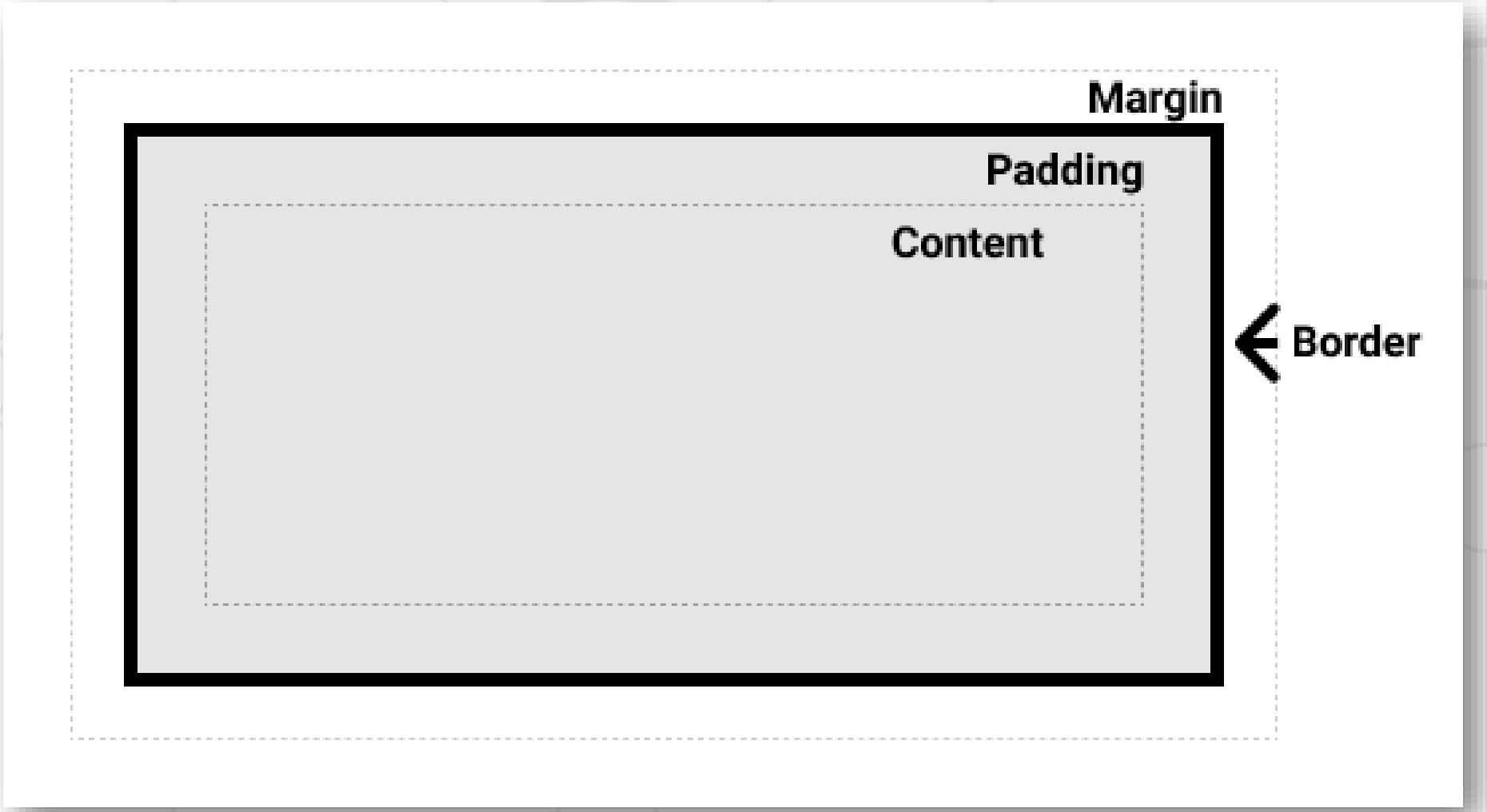


Parts of a Box

- Making up a block box in CSS we have the:
  - **Border box**: The border box wraps the content and any padding; size it using border and related properties
  - **Margin box**: The margin is the outermost layer, wrapping the content, padding, and border as whitespace between this box and other elements; size it using margin and related properties

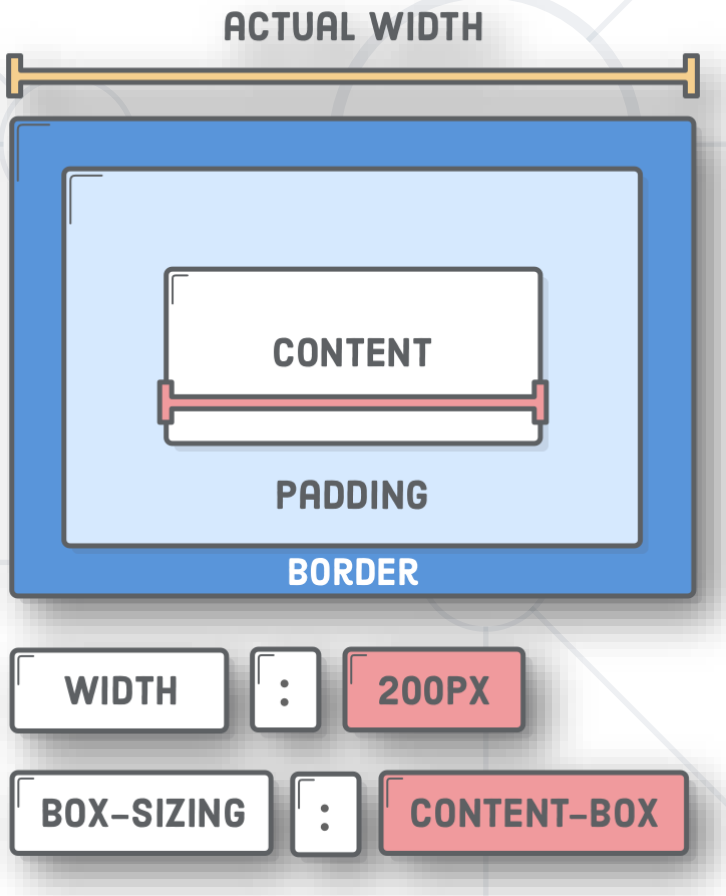


What is the CSS Box Model?



The Standard CSS Box Model

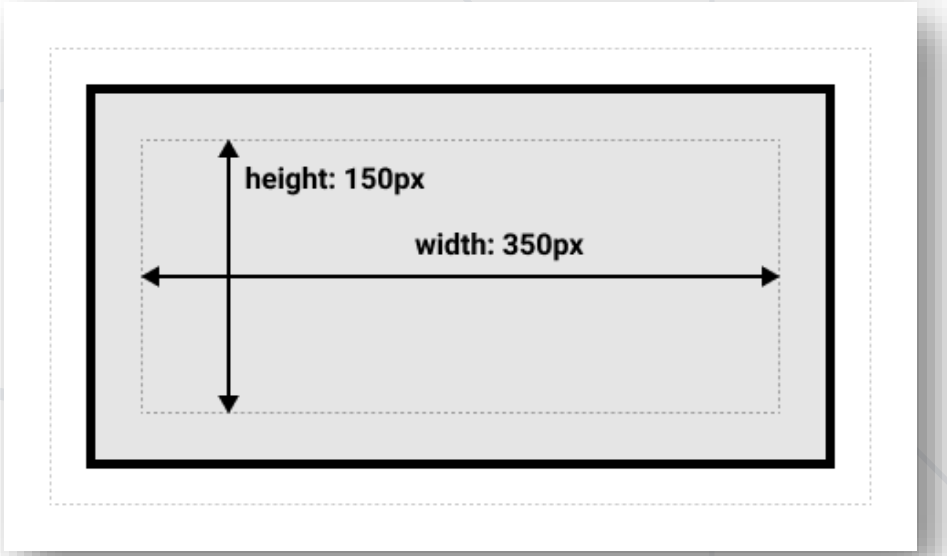
- In the standard box model, if you give a box an **inline-size** and a **block-size** (or width and a height) **attributes**, this defines the **inline-size** and **block-size** (width and height in horizontal languages) of the **content box**
- Any padding and border is then added to those dimensions to get the **total size** taken up by the box



The Standard CSS Box Model

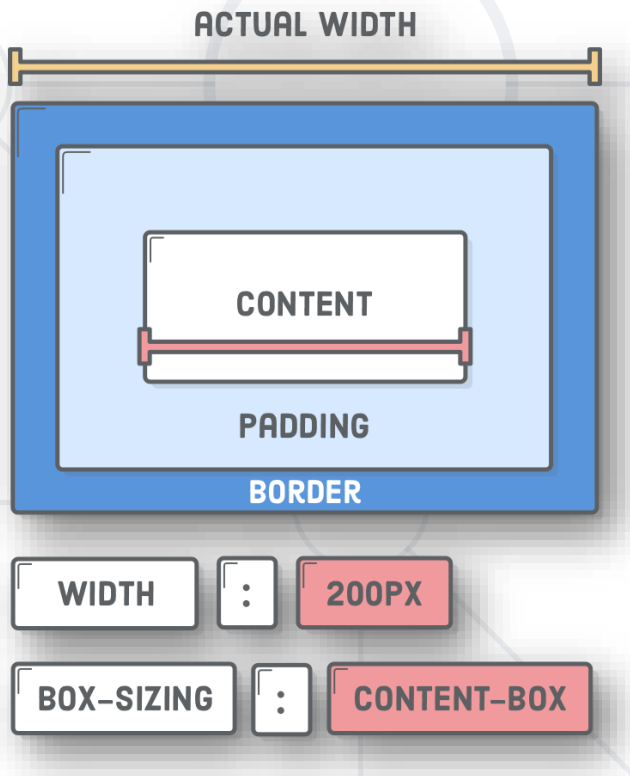
- If we assume that a box has the following CSS:
- The actual space taken up by the box will be 410px wide (350 + 25 + 25 + 5 + 5) and 210px high (150 + 25 + 25 + 5 + 5)

```
.box {
  width: 350px;
  height: 150px;
  margin: 10px;
  padding: 25px;
  border: 5px solid black;
}
```



The Alternative CSS Box Model

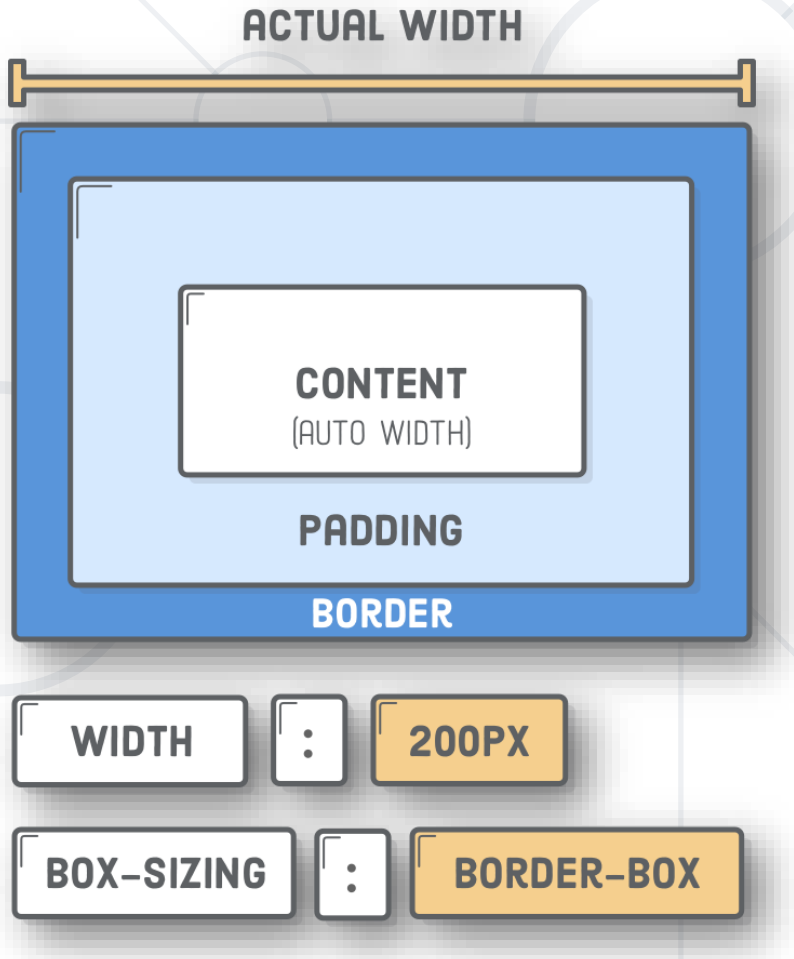
- In the alternative box model, any **width** is the **width of the visible box** on the page
- The **content area width** is that **width minus** the **width** for the **padding** and **border** (see image below)
- No need to add up the border and padding to get the real size of the box



The Alternative CSS Box Model

- To turn on the alternative model for an element use:

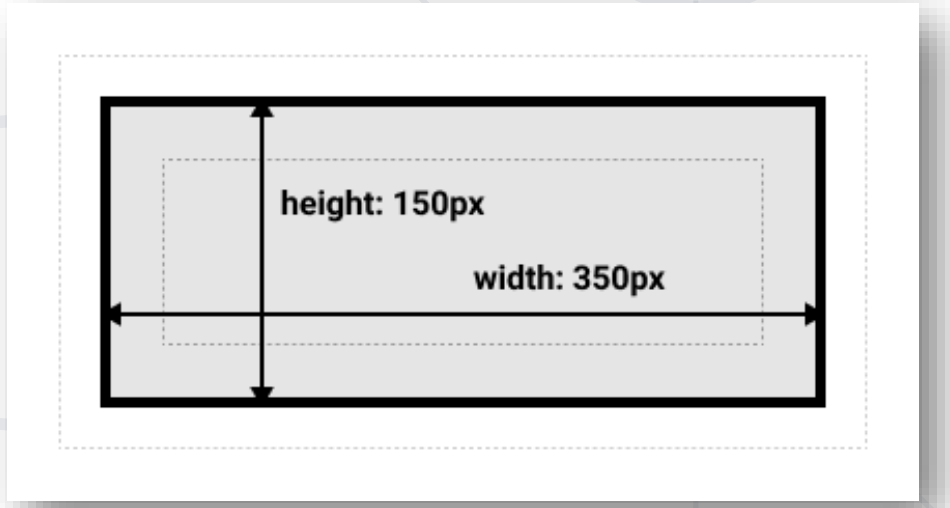
```
.box {
  box-sizing: border-box;
}
```



The Alternative CSS Box Model

- If we assume the box has the same CSS as above:
- Now, the actual space taken up by the box will be 350px in the inline direction and 150px in the block direction

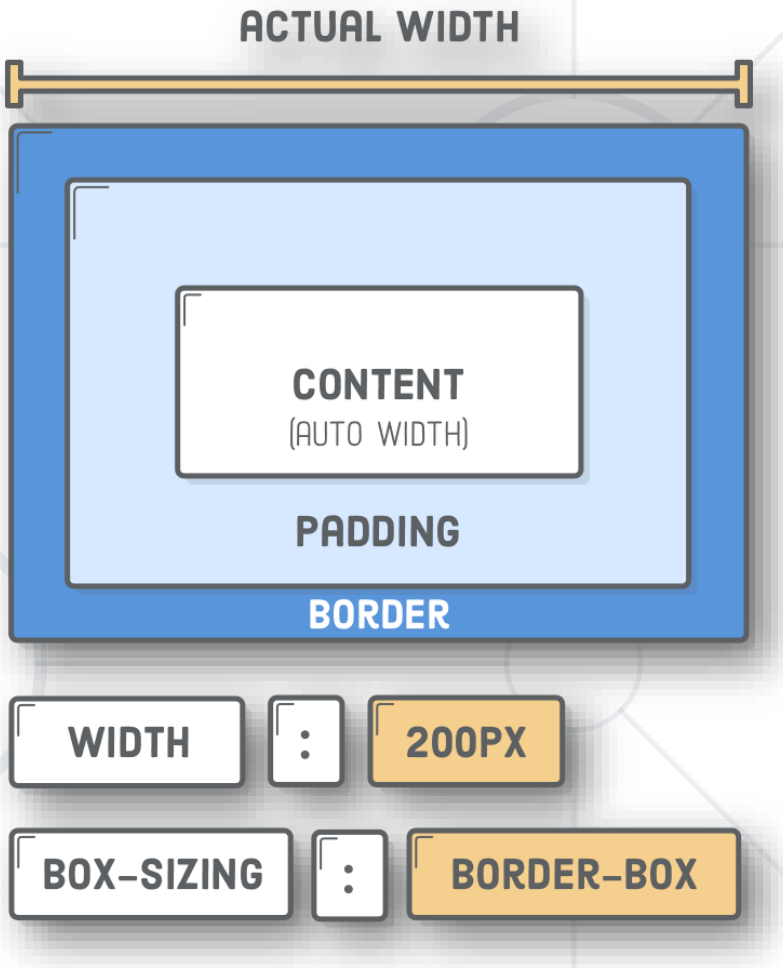
```
.box {
  width: 350px;
  height: 150px;
  margin: 10px;
  padding: 25px;
  border: 5px solid black;
}
```



Universal Box Sizing with Inheritance

Software University

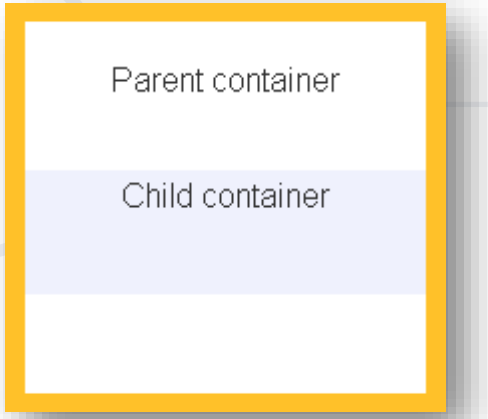
```
html {
  box-sizing: border-box;
}

*, *:before, *:after {
  box-sizing: inherit;
}
```



Box-sizing

- Sets how the total width and height of an element is calculated
  - `content-box` - initial and default value
  - The `width` and `height` properties include the content
  - They **do NOT include** the padding, border and margin

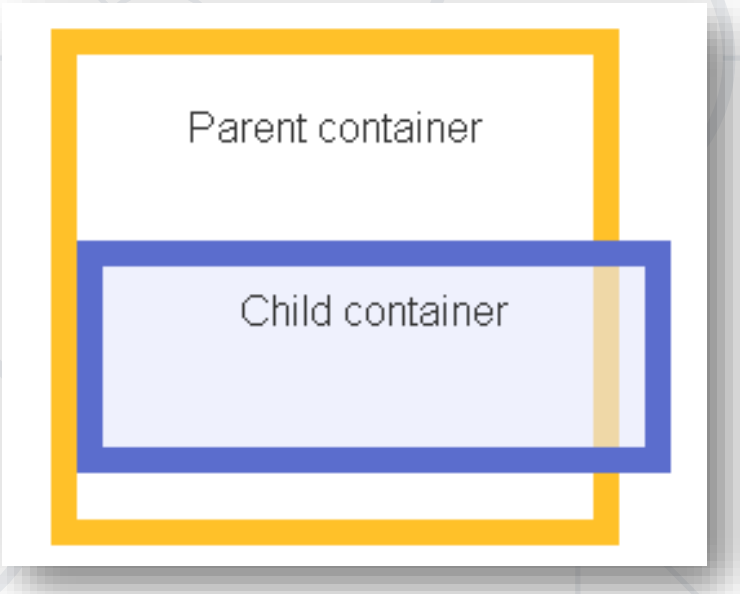
```
div {
  box-sizing: content-box;
  width: 200px;
}
```



Box-sizing

- The full width is: **200px + 2*10px + 2*5px = 230px**

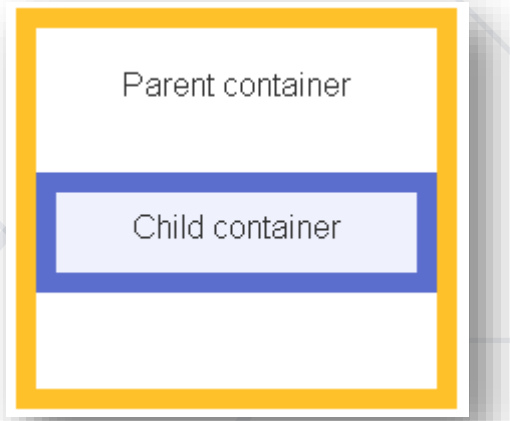
```
div {
   box-sizing: content-box;
   width: 200px;
   border: 10px solid #5b6dcd;
   padding: 5px;
}
```



Box-sizing

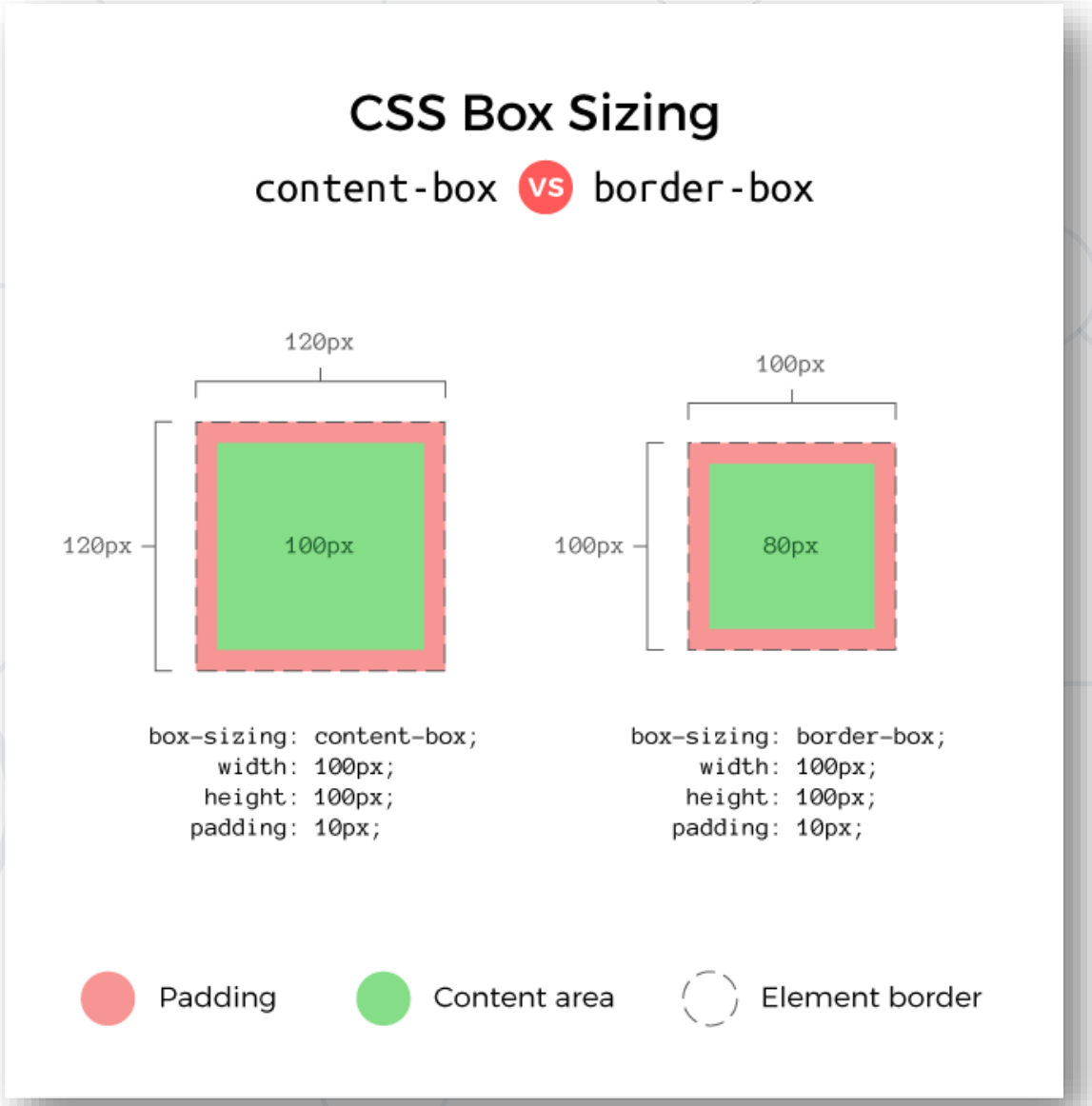
- **border-box** - the **width** and **height** of the element apply to all parts of the element: the **content**, the **padding** and the **borders**

```
box-sizing: border-box;
width: 200px;
border: 10px solid #5b6dcd;
padding: 5px;
```



- The full width is **200px**
- The content width is equal to: **200px - 2*10px - 2*5px = 170px**

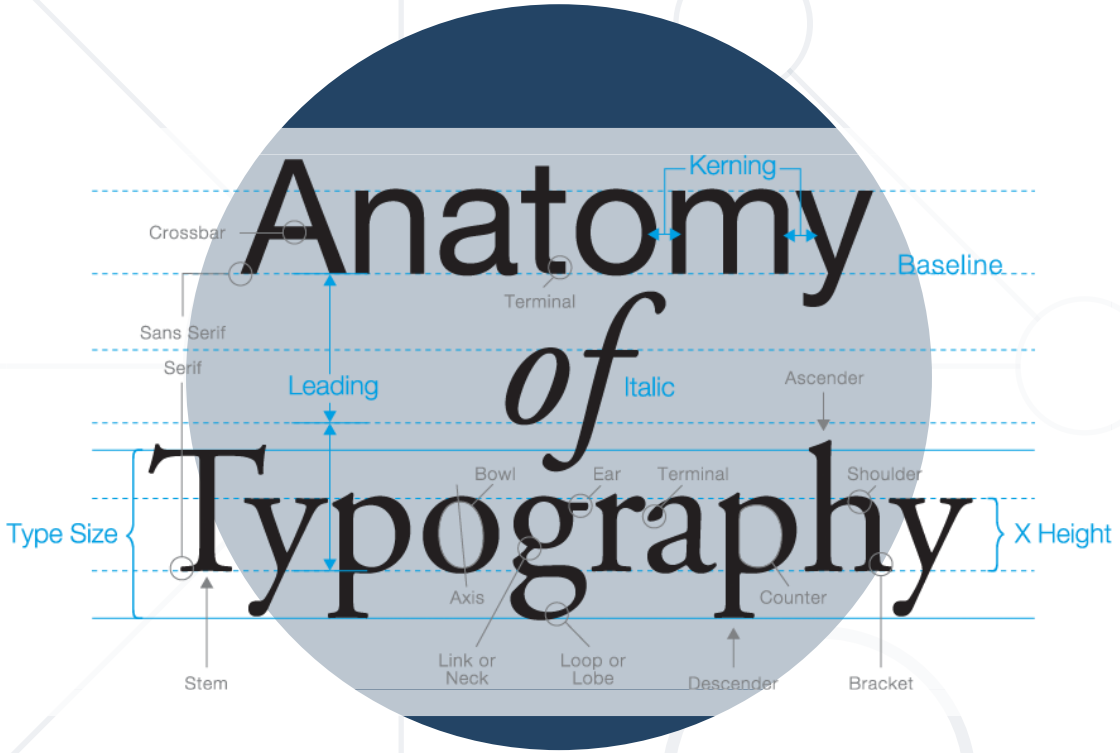
Content-box vs Border-box



Universal Box-sizing

- The box-sizing **Reset** takes care of the box-sizing of every element by setting it to border-box using universal CSS selector
- Save your **time** and don't write the same thing **again-and-again**
- Set the "**universal box-sizing**" with inheritance:

```
html {
  box-sizing: border-box;
}

*,
*:before,
*:after {
  box-sizing: inherit;
}
```


Anatomy
of
Typography
Kerning
Crossbar
Baseline
Terminal
Sans Serif
Serif
Leading
Italic
Ascender
Bowl
Ear
Terminal
Shoulder
Type Size
X Height
Axis
Counter
Link or
Neck
Loop or
Lobe
Descender
Stem
Bracket

Typography

Styling Text

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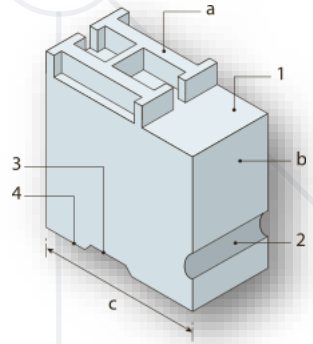
- Choosing a comfortable **measure**
  - *The **measure** is the number of characters in single line of a column of text*
  - Anything from 45 to 75 characters is widely regarded as a satisfactory length of line for a single-column page set in a serifed text face in a text size
  - The 66-character line (counting both letters and spaces) is widely regarded as ideal. For multiple column work, a better average is 40 to 50 characters

Styling Text

- Choose a basic **leading**
  - **Leading** (pronounced "ledding") is so called because, in mechanical presses, strips of lead are placed between lines of type to space the lines apart
  - Leading is achieved in css through the line-height property



Font Families

- In typography, a font family **(also known as typeface)** is a set of one or more fonts each composed of glyphs that share common design features
- Each font of a typeface has a specific weight, style, condensation, width, slant, italicization, ornamentation, and designer or foundry

Font

- A computer font (or font) is implemented as a digital data file containing a set of graphically related glyphs, characters, or symbols such as dingbats
- Although the term font first referred to a set of movable metal type pieces in one style and size, since the 1990s it is generally used to refer to a set of digital shapes in a single style, scalable to different sizes

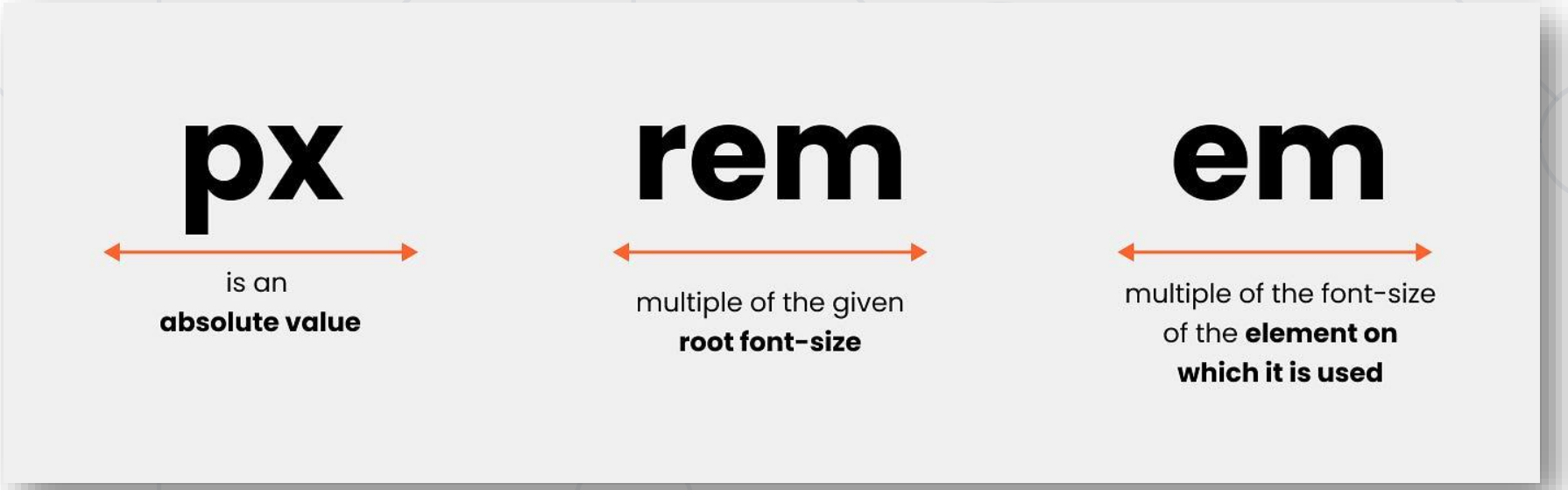
Generic Font Families

- serif
- sans-serif
- monospace
- cursive
- fantasy

CSS Units - EM & REM

Software University

- An explanation of EMs
  - Ems are so-called because they are thought to approximate the size of an uppercase letter M, although 1em is significantly larger than this



CSS Units - EM & REM

Software University

- Bringhurst describes the EM thus:
  - *The em is a sliding measure. One em is a distance equal to the type size*
  - *In 6-point type, an em is 6 points; in 12 point type an em is 12 points and in 60 point type an em is 60 points*
  - *Thus, a one em space is proportionately same in any size*

Web Fonts

Software University

- A technique to refer to and automatically download remote fonts was first specified in the CSS2 specification, which introduced the '**@font-face**' construct

```
@font-face {
  font-family: "Trickster";
  src:
    local("Trickster"),
    url("trickster-COLRv1.otf") format("opentype") tech(color-COLRv1),
    url("trickster-outline.otf") format("opentype"),
    url("trickster-outline.woff") format("woff");
}
```

Web Fonts

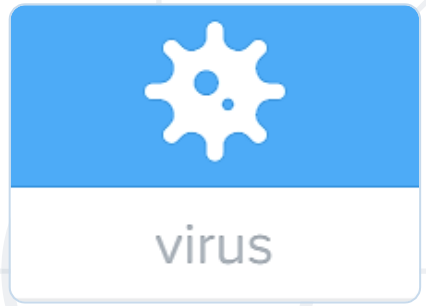
- At the time, fetching font files from the web was controversial because fonts meant to be used only for certain web pages could also be downloaded and installed in breach of the font license

Web Fonts - WOFF

- In 2010, the WOFF compression method for TrueType and OpenType fonts was submitted to W3C by the Mozilla Foundation, Opera Software and Microsoft, and browsers have since added support

Font Awesome

- **Font Awesome** provides vector icons, emojis, etc.
  - Add the following link inside **<head>**
  - Or import Font Awesome in the **CSS** file
  - Choose an icon → copy the **<i>** element → paste it in your HTML file

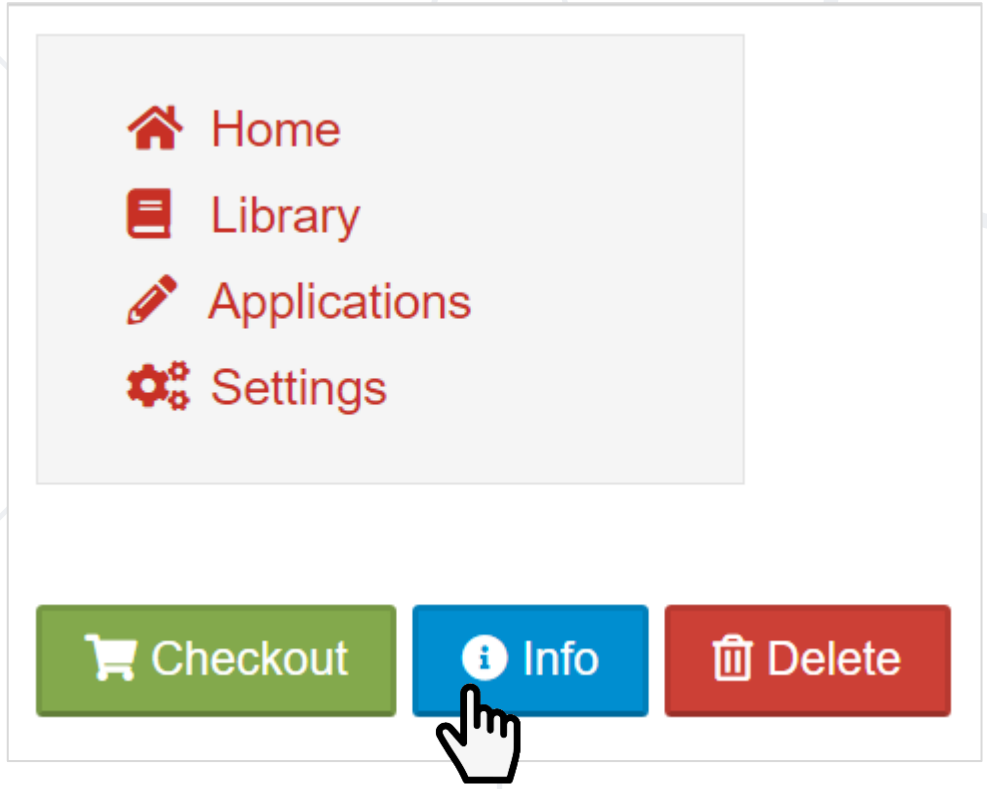



```
<head>
  <link rel="stylesheet"
href="https://use.fontawesome.com/releases/v5.10.2/css/all.css">
</head>
<body>
  <a href="#"><i class="fa fa-home fa-fw"></i>Home</a>
</body>
```

```
@import 'https://use.fontawesome.com/releases/v5.10.2/css/all.css';
```

Font Awesome Icons – Exercise

- Using **HTML**, **CSS** and **Font Awesome icons** create a **navigation menu** and **buttons** like the following:



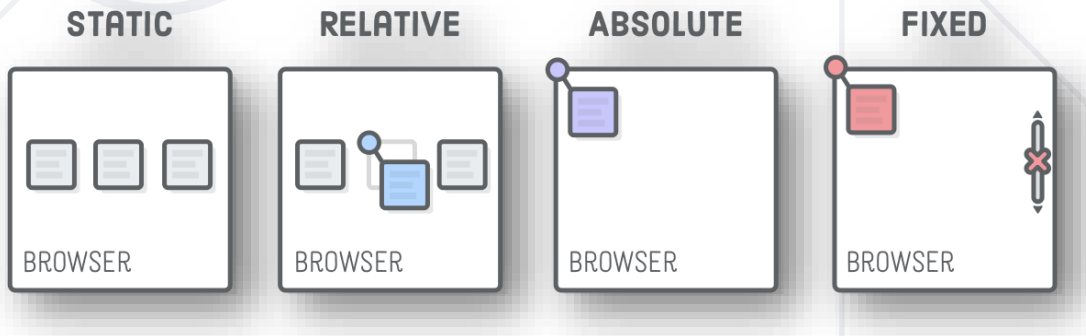
- Hints:

```
<i class="fas fa-home"></i>
<i class="fas fa-book"></i>
<i class="fas fa-pencil-alt"></i>
<i class="fas fa-cogs"></i>
<i class="fas fa-shopping-cart"></i>
<i class="fas fa-info-circle"></i>
<i class="far fa-trash-alt"></i>
```

Position

Position

- The position property specifies the type of positioning method used for an element (**static**, **relative**, **fixed**, **absolute** or **sticky**)
- Elements are then positioned using the **top**, **bottom**, **left**, and **right** properties
- However, these properties will not work unless the position property is set first
- They also work differently depending on the position value
- *Reference Documentation*

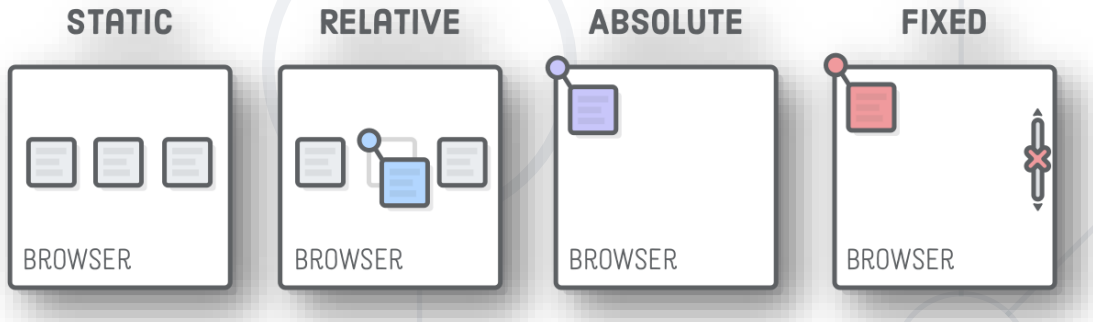


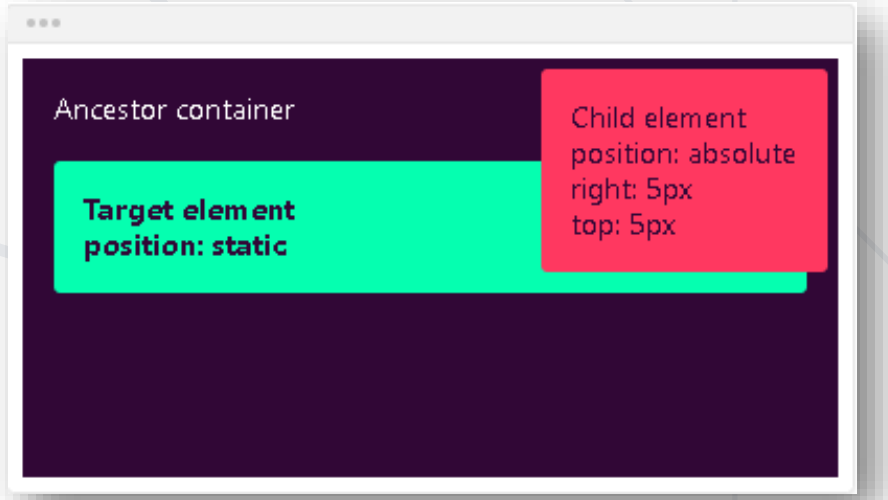
Position Static

- Static - the **default** state of every element
  - Puts the element into its **normal position** in the document layout flow

```
div {
  position: static;
}
```

- It will **NOT** react to the following properties: `top`, `bottom`, `left`, `right`, `z-index`



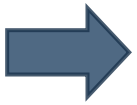


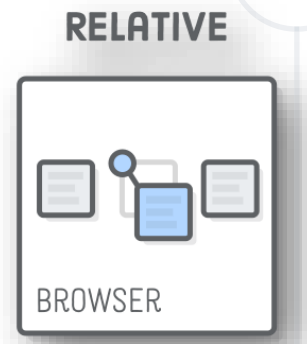
Position Relative

- It looks like static positioning, but once the positioned element has taken its place, you can then modify its final position with the **positional properties**

```
<img src="cup.jpg">
<img class="new" src="new.png">
```

```
img.new {
  position: relative;
  top: -200px;
  right: 150px;
}
```

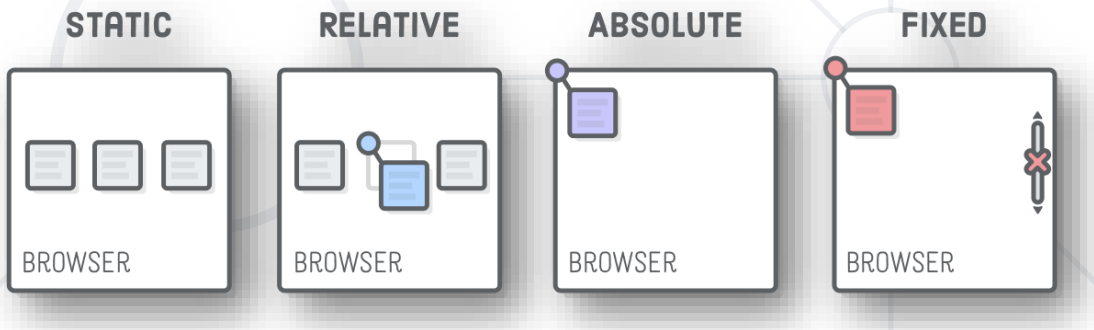




Position Absolute

- This way we have to position the element based on a two dimentional coordinate system. We can use left, top, bottom, right to place the element exactly where we want

```
.box {
  position: absolute;
}
```

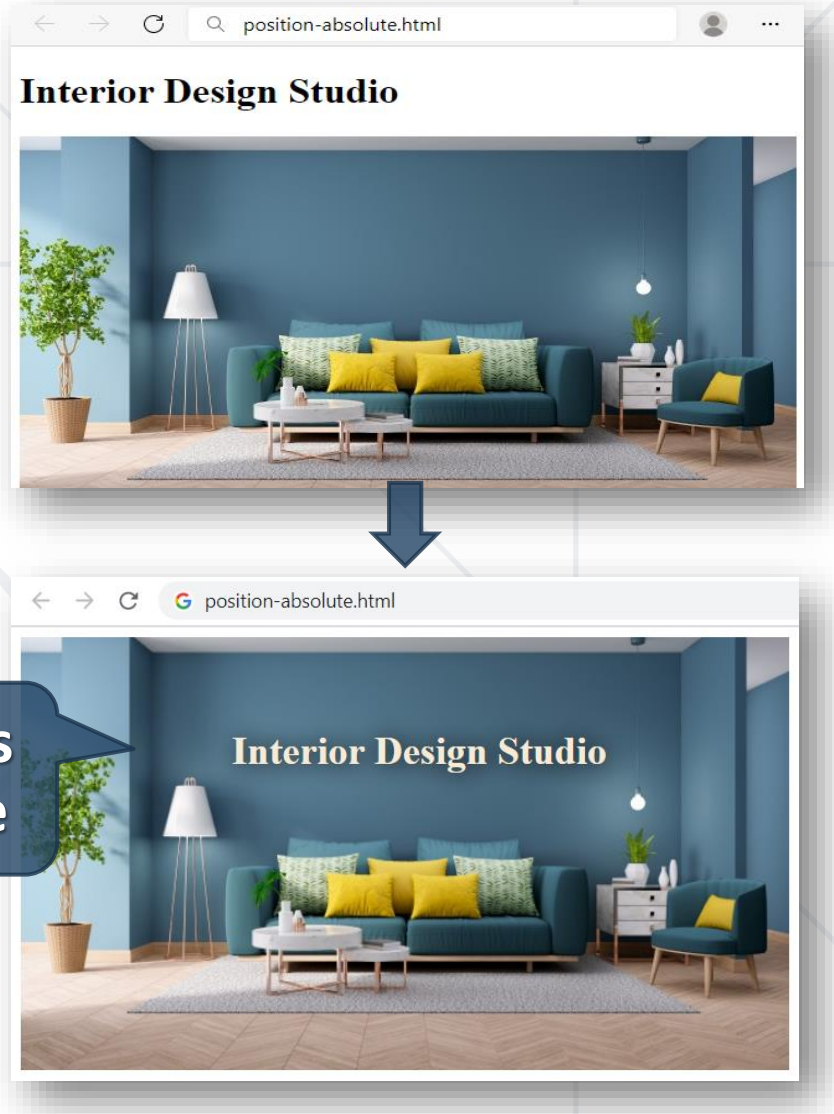


Position Absolute

- Absolute positioning → from the **upper left corner** of the parent

```
<h1>Interior Design Studio</h1>
<img src="livingroom.jpg">
```

```
h1 {
  position: absolute;
  top: 60px;
  left: 180px;
  color: antiquewhite;
  text-shadow: 1px 1px 20px black;
}
```

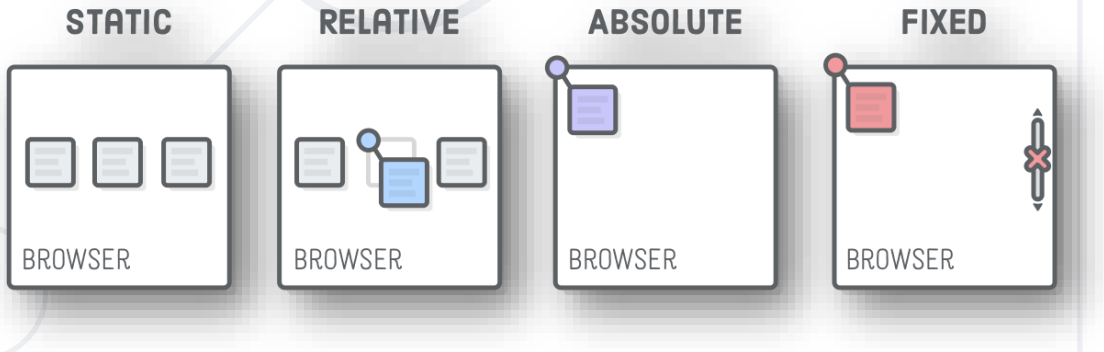


<h1> frees its original place

Position Fixed

- The element is removed from the normal document flow, and no space is created for the element in the page layout
- The element is positioned relative to its initial containing block, which is the viewport in the case of visual media
- Its final position is determined by the values of top, right, bottom, and left

```
div {
  position: fixed;
}
```



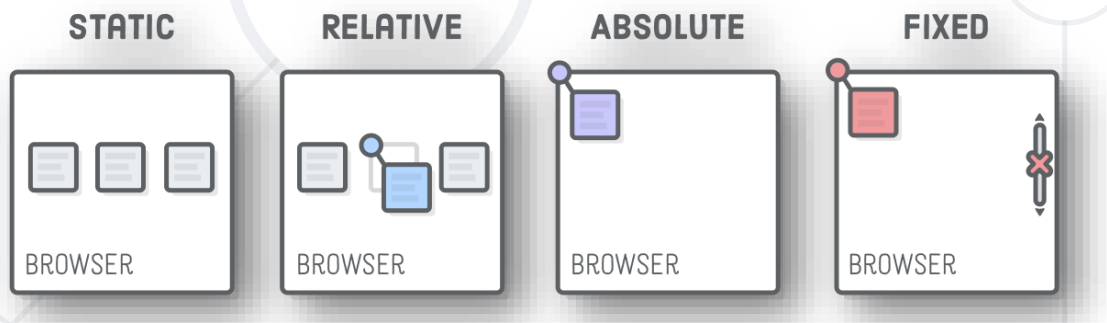
Position Fixed

- This value always creates a new stacking context
- In printed documents, the element is placed in the same position on every page

Position Sticky

- The element is positioned according to the normal flow of the document, and then offset relative to its nearest scrolling ancestor and containing block (nearest block-level ancestor), including table-related elements, based on the values of top, right, bottom, and left.
- The offset does not affect the position of any other elements.

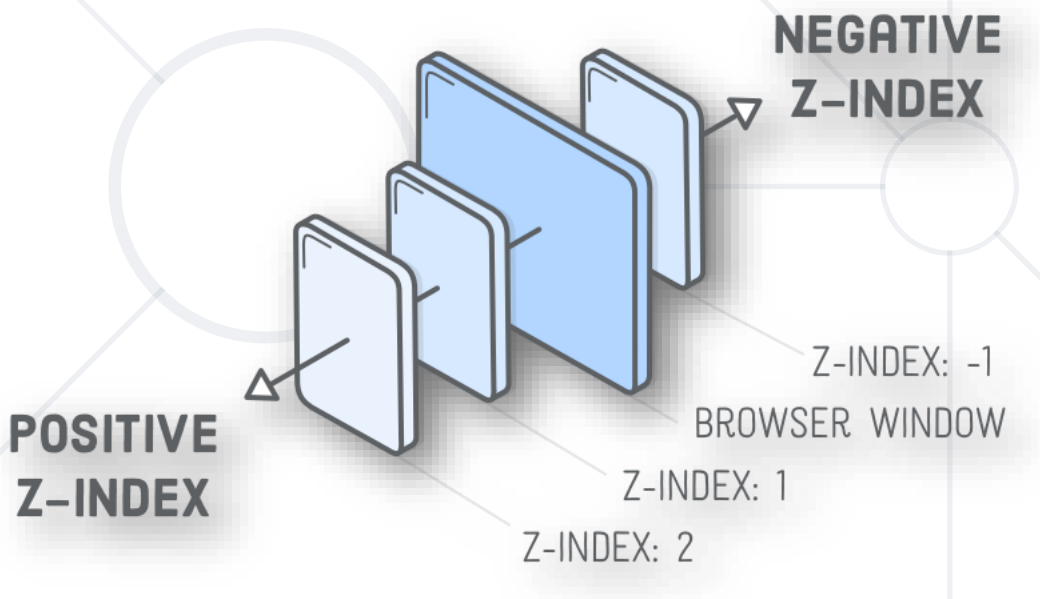
```
.box {
  position: sticky;
}
```



Z-index

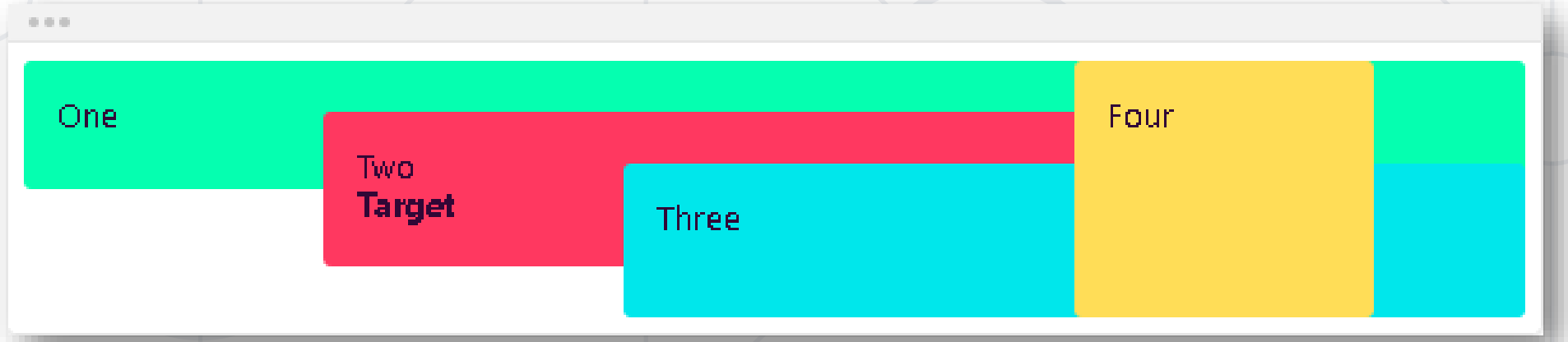
- The **z-index** CSS property sets the z-order of a positioned element and its descendants or flex items
- Overlapping elements with a larger **z-index** cover those with a smaller one
- *Example*

```
.box {
  z-index: [number];
}
```



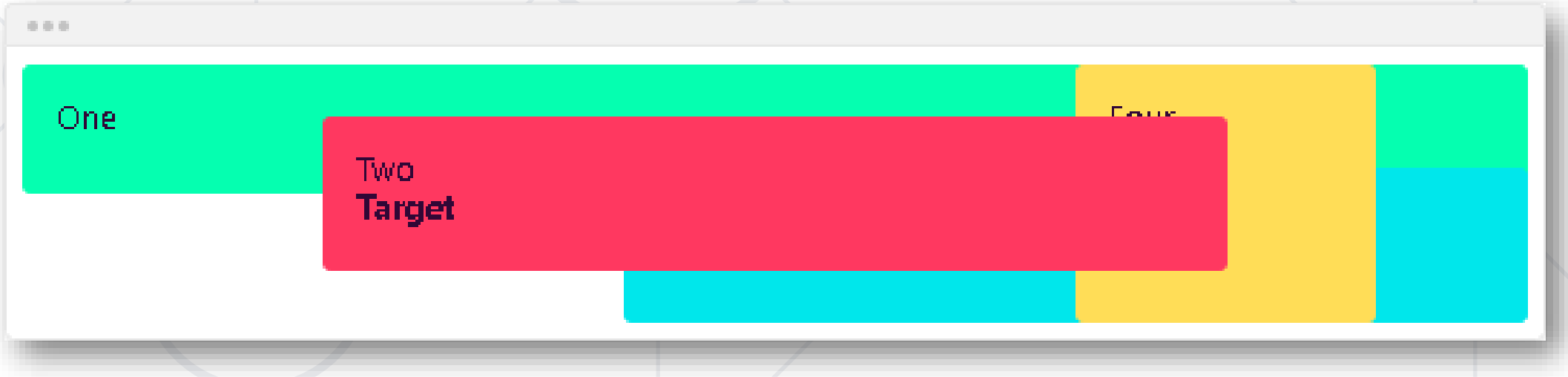
Z-index

- Defines the order of the elements on the **z-axis**. It only works on positioned elements (**anything apart from static**)
  - Default value: `z-index: auto;`
  - The order is defined by the order in the HTML code:



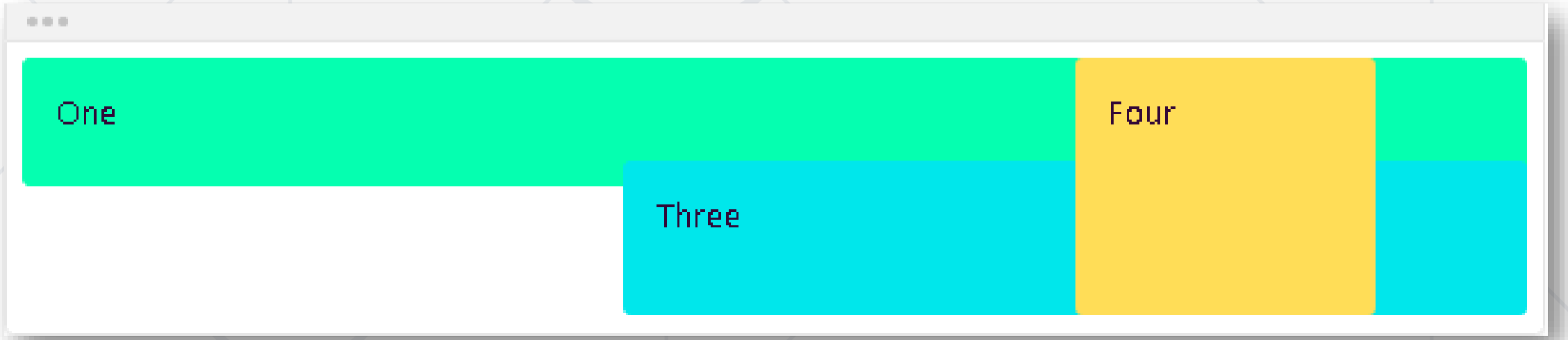
Z-index

- The z-index value is relative to the other ones
- The target element is move in **front** of its siblings
  - `z-index: 1;`



Z-index

- You can use **negative** values
- The target element is moved **behind** its **siblings**
  - `z-index: -1;`



Resources – Box Model

Software University

- https://developer.mozilla.org/en-US/docs/Web/CSS/CSS_Box_Model
- https://developer.mozilla.org/en-US/docs/Web/CSS/display
- https://developer.mozilla.org/en-US/docs/Web/CSS/box-sizing
- https://css-tricks.com/the-css-box-model
- https://css-tricks.com/box-sizing
- https://www.paulirish.com/2012/box-sizing-border-box-ftw/
- https://www.w3schools.com/css/css_icons.asp

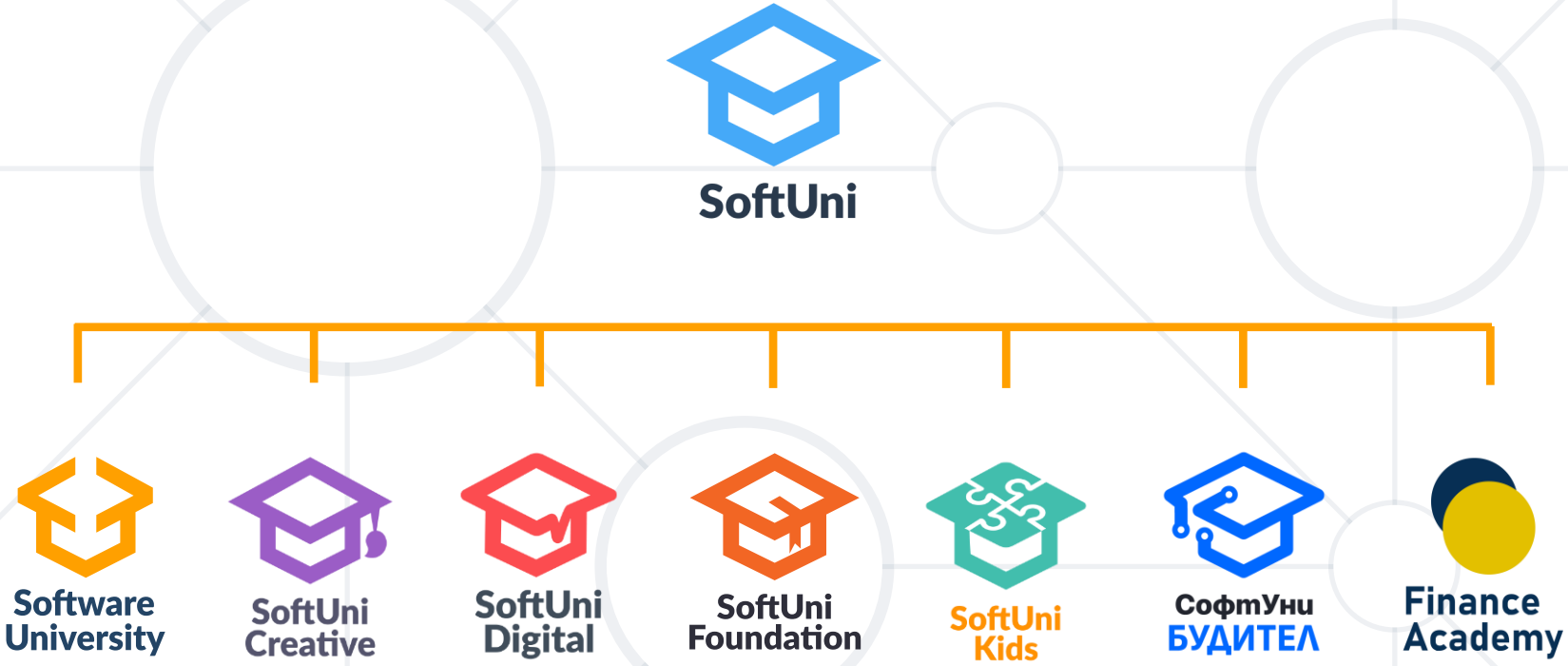
Resources – Position

- https://developer.mozilla.org/en-US/docs/Web/CSS/position
- https://developer.mozilla.org/en-US/docs/Web/CSS/z-index
- https://developer.mozilla.org/en-US/docs/Web/CSS/CSS_positioned_layout/Understanding_z-index
- https://interactive-examples.mdn.mozilla.net/pages/css/position.html
- https://css-tricks.com/video-screencasts/198-about-the-position-property/
- https://css-tricks.com/almanac/properties/p/position/
- https://css-tricks.com/position-sticky-2/

Summary

- What is **Box Model**?
- **Width** and **Height** to the elements
- What are the **Padding**, **Border** and **Margin**?
- What is **Box-sizing**?
- How to reset **Box-sizing**?
- Positioning properties
- **Z-Index**

Questions?



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Coca-Cola HBC Bulgaria

SUPER HOSTING .BG

createX

Postbank

Решения за твоето утре

DRAFT KINGS

THE CROWN IS YOURS

VIVACOM

AMBITIONED

INDEAVR

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