Internet Technologies

Introduction to HTML and CSS - Part 3 (Exercises)
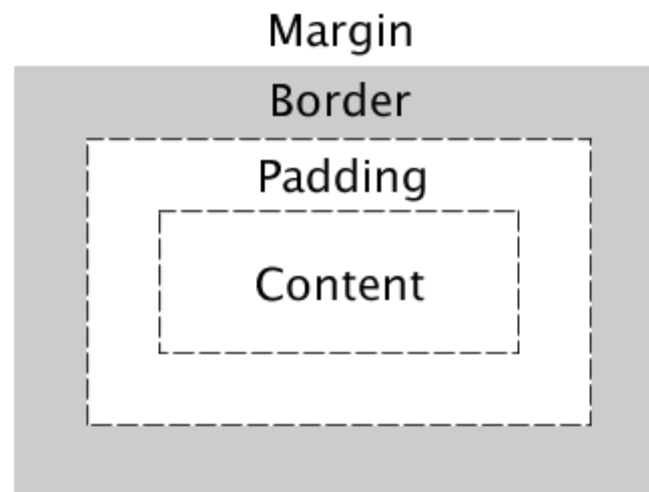
Box Model, Positioning

University of Cyprus
Department of Computer Science

The CSS Box Model

- Every HTML element is composed of 4 layers:
  - the element's content
  - the **border** around the element's content
  - **padding** space between the content and border (inside)
  - a **margin** clears the area around border (outside)

border

- Specify border (Property may be specified using one, two, or three of the values listed below. The order of the values does not matter)
  - ➢ Note: The border will be invisible if its style is not defined. This is because the style defaults to none.
  - o border: solid;
  - o border: dashed red;
  - o border: 10px solid;
  - o border: 5px double #32a1ce;

- Can also specify each border individually:
  - o border-top
  - o border-bottom
  - o border-left
  - o border-right

border: width style color;

```html
<div>Welcome to CS425: Internet Technologies!</div>
<div>In this course you will learn modern web development techniques.</div>
```

```css
div {
    border: 2px solid black;
}
```

padding

```css
div {
    border: 2px solid black;
    padding: 10px;
}
```
CSS

Welcome to CS425: Internet Technologies!

In this course you will learn modern web development techniques.

- padding is the space between the border and the content.
    o Can specify padding-top, padding-bottom, padding-left, padding-right
    o There's also a shorthand (clockwise starting from top):
      padding: 2px 4px 3px 1px;   <- top|right|bottom|left
      padding: 10px 2px;   <- top&bottom|left&right
      padding: 1px 2px 3px;   <- top|left&right|bottom

margin

```
div {
    margin: 20px;
    border: 2px solid black;
    padding: 10px;
}
```
CSS

Welcome to CS425: Internet Technologies!

In this course you will learn modern web development techniques.

- margin is the space between the border and other elements..
  o Can specify margin-top, margin-bottom, margin-left, margin-right
  o There's also a shorthand (clockwise starting from top):
    margin: 2px 4px 3px 1px;   <- top|right|bottom|left
    margin: 10px 2px;   <- top&bottom|left&right
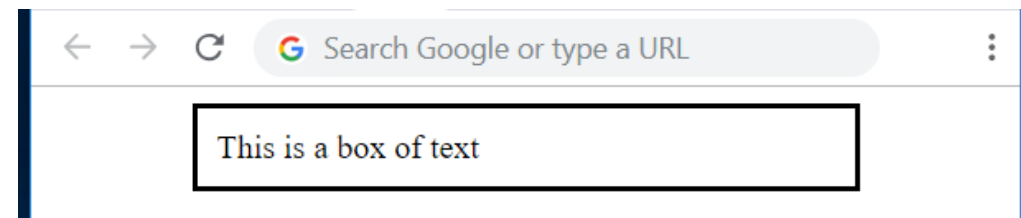   margin: 1px 2px 3px;   <- top|left&right|bottom

auto margins

- If you set `margin-left` and `margin-right` to `auto`, you can horizontally center a block-level element with a specified width:

```html
<div>
    This is a box of text
</div>
```
HTML

```css
div {
    margin-left: auto;
    margin-right: auto;
    border: 2px solid black;
    padding: 10px;
    width: 300px;
}
```
CSS

Moving things with `position`

- **Positioned layout** lets you define precisely where an element should be in the page ([mdn](#)).

- You can use positioned layout doing the following:

1. Define a **position** method:
   `static`, `fixed`, `absolute`, `relative`

2. Define **offsets**:
   `top`, `left`, `bottom`, `right`

3. (optional) Define **z-index** for overlapping layers ([mdn](#))

Moving things with `position`

- To specify exactly where an element goes, set its **top**, **left**, **bottom**, and/or **right** offset.

- The meaning of these offset values depend on the **reference point set by position**:
  - **static**: no reference point; static block can't move (this is the default style for every element)
  - **fixed**: a fixed position within the viewport
  - **absolute**: a fixed position within its "containing element"
  - **relative**: offset from its normal static position

position: fixed

```css
#menubar {
    position: fixed;
    top: 50px;
    right: 100px;
    width: 400px;
}
```


- For **fixed positioning**, the offset is the distance positioned relative to the viewport.

- The element **does not move** when the webpage is scrolled.

- Element is removed from normal document flow, positioned on its own layer
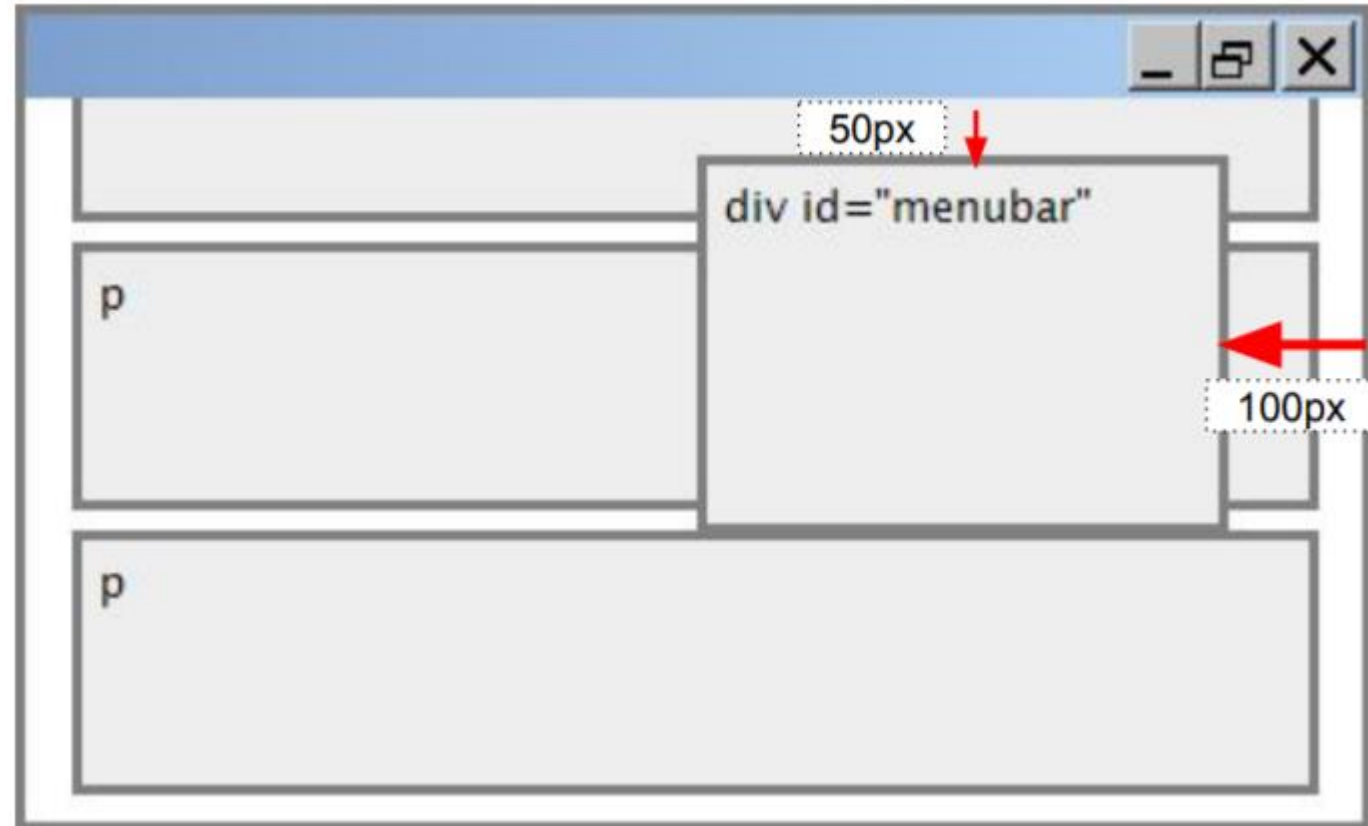
Often used to implement UIs; control bars that shouldn't go away

position: absolute

```css
#menubar {
    position: absolute;
    left: 400px;
    top: 50px;
    width: 300px;
}
```

- For **absolute positioning**, the offset is the distance from the nearest **positioned** "ancestor element", if no positioned ancestor, document body used (example)

- Element is removed from normal document flow, positioned on its own layer
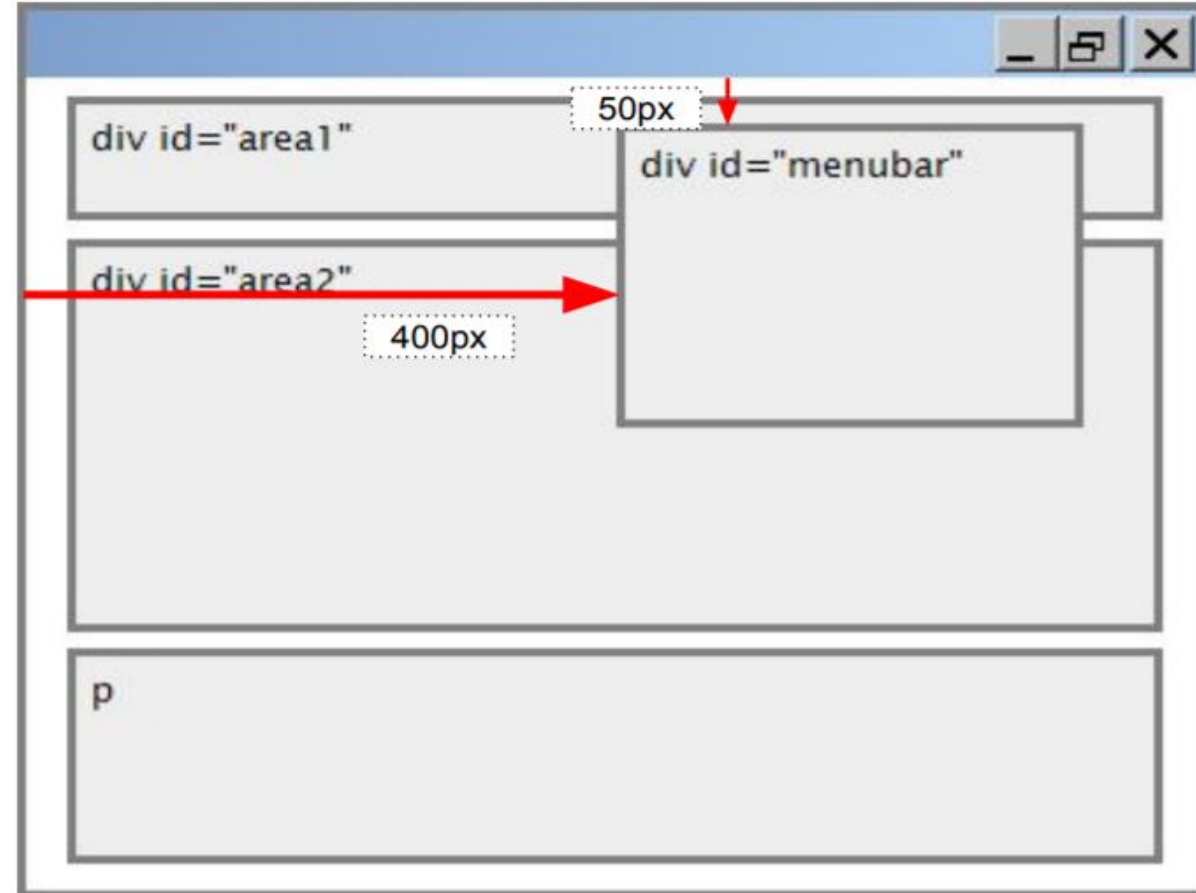
position: relative

- For `position: relative;` the element is placed where it would normally be placed in the layout of the page but shifted by the `top` / `left` / `bottom` / `right` values.

```css
#box2 {
    height: 100px;
    width: 100px;
    background-color: blue;
    position: relative;
    top: 50px;
    left: 50px;
}
```
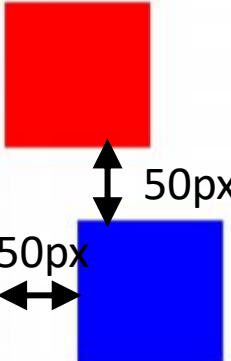CSS

Codepen

Positioning elements with `float`

- The float property specifies how an element should float:
  - left - The element floats to the left of its container
  - right- The element floats to the right of its container
  - none - The element does not float (will be displayed just where it occurs in the text). This is default
  - inherit - The element inherits the float value of its parent

- Note: Absolutely positioned elements ignores the float property!

- Note: **Elements after a floating element will flow (wrap) around it**
  - to avoid this, use the clear property or the clearfix hack

Positioning elements with `float`

(example without float)

- `<div>` takes the height of the containing element(s): **`<p> <img>`**

```
<h2>UCY campus</h2>
<div>
  <img src="ucy-cafe.jpg"/>
  <p>Welcome to the UCY campus</p>
</div>
```

```
div {
    background-color: lightblue;
}
img {
    height: 200px;
}
```

UCY campus

Welcome to the UCY campus

Both `<p>` and `<img>` are contained within the `<div>` so the lightblue background covers both of them.

Positioning elements with `float`

(example **with** float)

- `<div>` takes the height of the containing element(s): **`<p>`**

```html
<h2>UCY campus</h2>
<div>
  <img src="ucy-cafe.jpg"/>
  <p>Welcome to the UCY campus</p>
</div>
```
HTML

```css
div {
    background-color: lightblue;
}
img {
    height: 200px;
    float: left;
}
```
CSS

UCY campus

Welcome to the UCY campus

`<div>`

Floated element `<img>` is not contained within the `<div>` anymore (actually `<img>` is removed from the normal document flow, and floats to the left of `<div>`) so the lightblue background covers only the `<p>` which is still contained within the `<div>`

Positioning elements with `float`

(example **with** float)

- `<div>` takes the height of the containing element(s): **`<p>`**

```
<h2>UCY campus</h2>
<div>
  <img src="ucy-cafe.jpg"/>
  <p>Welcome to the UCY campus</p>
</div>
```

```
div {
    background-color: lightblue;
    overflow: hidden;
}
img {
    height: 200px;
    float: left;
}
```

UCY campus

Welcome to the UCY campus

`overflow:hidden` hides any part of an element which flows out of the parent container. At the same time, it "forces" the child elements to be contained within the parent element.

Positioning elements with `display:flex`

HTML

```
<div class="parent">
  <div class="child">
    <h2>First paragraph</h2>
    Lorem ipsum dolor sit amet, consectetur
adipiscing elit, ...
  </div>
  <div class="child">
    <h2>Second paragraph</h2>
    Lorem ipsum dolor sit amet, consectetur
adipiscing elit, ...
  </div>
  <div class="child">
    <h2>Third paragraph</h2>
    Lorem ipsum dolor sit amet, consectetur
adipiscing elit, ...
  </div>
  <div class="child">
    <h2>Fourth paragraph</h2>
    Lorem ipsum dolor sit amet, consectetur
adipiscing elit, ...
  </div>
</div>
```
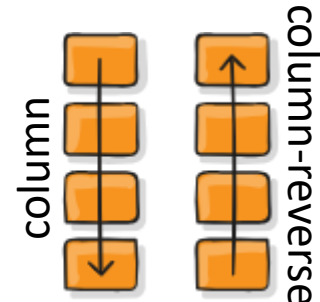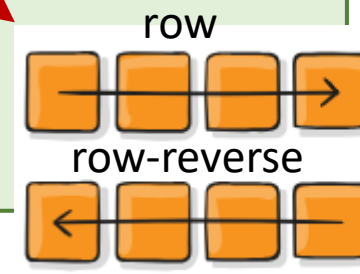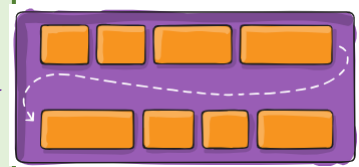
CSS

```
.parent {
  display: flex;
  flex-flow: row wrap;
}


.child {
  width: 40%;
}
```

row

row-reverse

column

column-reverse

First paragraph

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

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Third paragraph

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https://codepen.io/paulantoniou/pen/ExMqmom

Positioning elements with `display:flex`

```html
<div class="parent">
  <div class="child">
    <h2>First paragraph</h2>
    Lorem ipsum dolor sit amet, consectetur
adipiscing elit, ...
  </div>
  <div class="child">
    <h2>Second paragraph</h2>
    Lorem ipsum dolor sit amet, consectetur
adipiscing elit, ...
  </div>
  <div class="child">
    <h2>Third paragraph</h2>
    Lorem ipsum dolor sit amet, consectetur
adipiscing elit, ...
  </div>
  <div class="child">
    <h2>Fourth paragraph</h2>
    Lorem ipsum dolor sit amet, consectetur
adipiscing elit, ...
  </div>
</div>
```
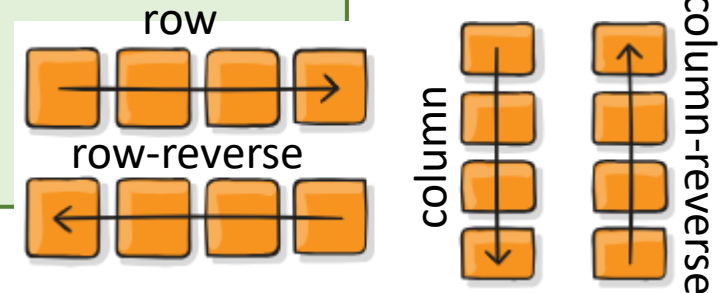
```css
.parent {
  display: flex;
  flex-flow: row nowrap;
}


.child {
  width: 40%;
}
```

row

row-reverse

column

column-reverse

First paragraph

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

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https://codepen.io/paulantoniou/pen/ExMqmom

Positioning elements with `display:flex`

```html
<div class="parent">
  <div class="child">
    <h2>First paragraph</h2>
    Lorem ipsum dolor sit amet, consectetur
adipiscing elit, ...
  </div>
  <div class="child">
    <h2>Second paragraph</h2>
    Lorem ipsum dolor sit amet, consectetur
adipiscing elit, ...
  </div>
  <div class="child">
    <h2>Third paragraph</h2>
    Lorem ipsum dolor sit amet, consectetur
adipiscing elit, ...
  </div>
  <div class="child">
    <h2>Fourth paragraph</h2>
    Lorem ipsum dolor sit amet, consectetur
adipiscing elit, ...
  </div>
</div>
```

```css
.parent {
  display: flex;
  flex-flow: row wrap;
  justify-content: center;
}

.child {
  width: 40%;
}
```
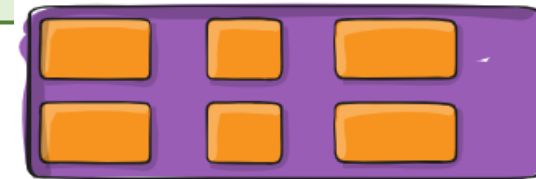
flex-start

flex-end

center

space-between

space-around

space-evenly

Defines the alignment along the main axis. It helps distribute extra free space leftover when either all the flex items on a line are inflexible, or are flexible but have reached their maximum size.

https://codepen.io/paulantoniou/pen/ExMqmom

Positioning elements with `display:flex`

HTML

```html
<div class="parent">
  <div class="child">
    <h2>First paragraph</h2>
    Lorem ipsum dolor sit amet, consectetur
adipiscing elit, ...
  </div>
  <div class="child">
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adipiscing elit, ...
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  <div class="child">
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adipiscing elit, ...
  </div>
  <div class="child">
    <h2>Fourth paragraph</h2>
    Lorem ipsum dolor sit amet, consectetur
adipiscing elit, ...
  </div>
</div>
```

CSS

```css
.parent {
  display: flex;
  flex-flow: row wrap;
  justify-content: center;
  gap: 10px 40px;
}


.child {
  width: 40%;
}
```

gap: 10px

gap: 30px
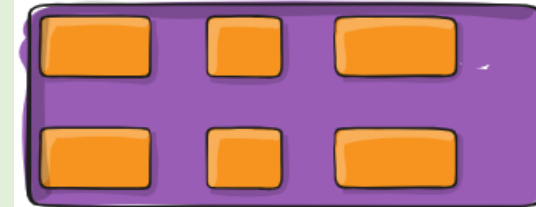
gap: 10px 30px

First paragraph

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

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https://codepen.io/paulantoniou/pen/ExMqmom

Random useful CSS

How to set an image within a div

- 1st way: Use <img> inside <div>

```
<div class="header">
    <img src=background.png" height="400px"/>
</div>
```

- 2nd way: Set it as background-image on <div> element

```
<div class="header">
</div>
```

```
.header {
    background-image: url(background.png);
    height: 400px;
}
```

background properties

- You can then use [additional background properties](#) to further style it:

```
background-size: cover;

background-size: contain;

background-repeat: no-repeat;

background-position: top;

background-position: center;

background-attachment: fixed;
```

- ([CodePen](#): Try resizing the window)

background-repeat property

```css
.header {                                          CSS
    background-image: url(https://cs.ucy.ac.cy/images/ucy_logo_en.png);
    height: 195px;
}
```



```css
.header {                                          CSS
    background-image: url(https://cs.ucy.ac.cy/images/ucy_logo_en.png);
    background-repeat: no-repeat;
    height: 195px;
}
```

`background-size` property


```css
.header {                                            CSS
   background-image: url(https://cs.ucy.ac.cy/images/ucy_logo_en.png);
   height: 195px;
   background-size: contain;
}
```


contain: Scales the image as large as possible (e.g. here height to be 195px) <u>without cropping or distorting</u> the image (show the whole image). If space remains, another image is inserted.

`background-size` property


```
.header {                                    CSS
    background-image: url(https://cs.ucy.ac.cy/images/ucy_logo_en.png);
    height: 195px;
    background-size: cover;
}
```


cover: Scales the image as large as possible <u>without distorting</u> the image to cover width and height. If the proportions of the image differ from the element, it is <u>cropped either vertically or horizontally so that no empty space remains</u>. Above image is stretched to cover whole width, even that it is cropped below.

`background-attachment` property

- Parallax scrolling is a web site trend where the background content (i.e. an image) is moved at a different speed than the foreground content while scrolling:
  - create a container element (e.g. a div)
  - add a background image to the container with a specific height
  - add background-attachment: fixed to create the actual parallax effect
  - other background properties can be used to center and scale the image perfectly

- See examples here:
  - W3 School: Parallax demo, No parallax
  - Codepen

Web Fonts

- You can use [Google Fonts](#) to choose from a set of visually appealing fonts:

Web Fonts

- Select font family (from previous slide)

- Click "Get Font"

- Click on the "Get embed code"
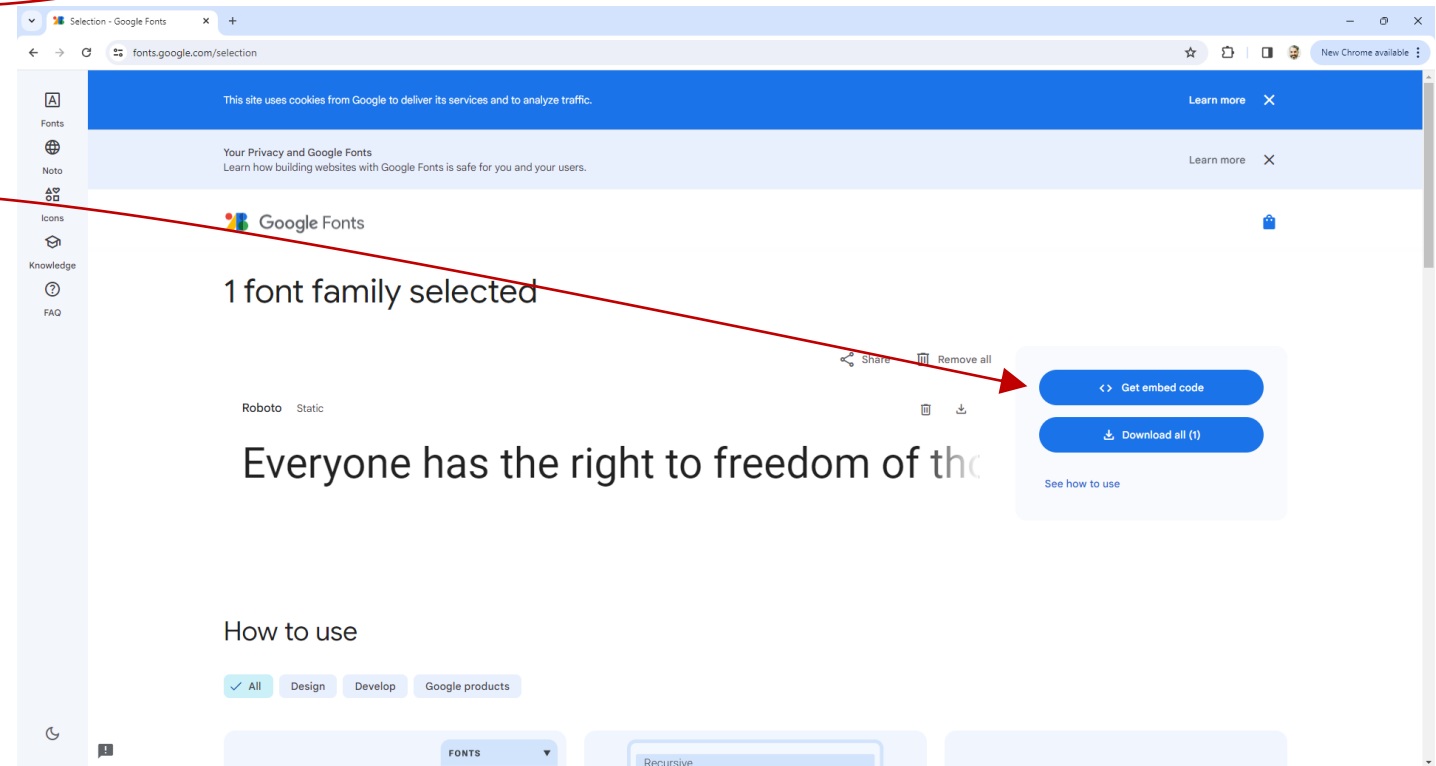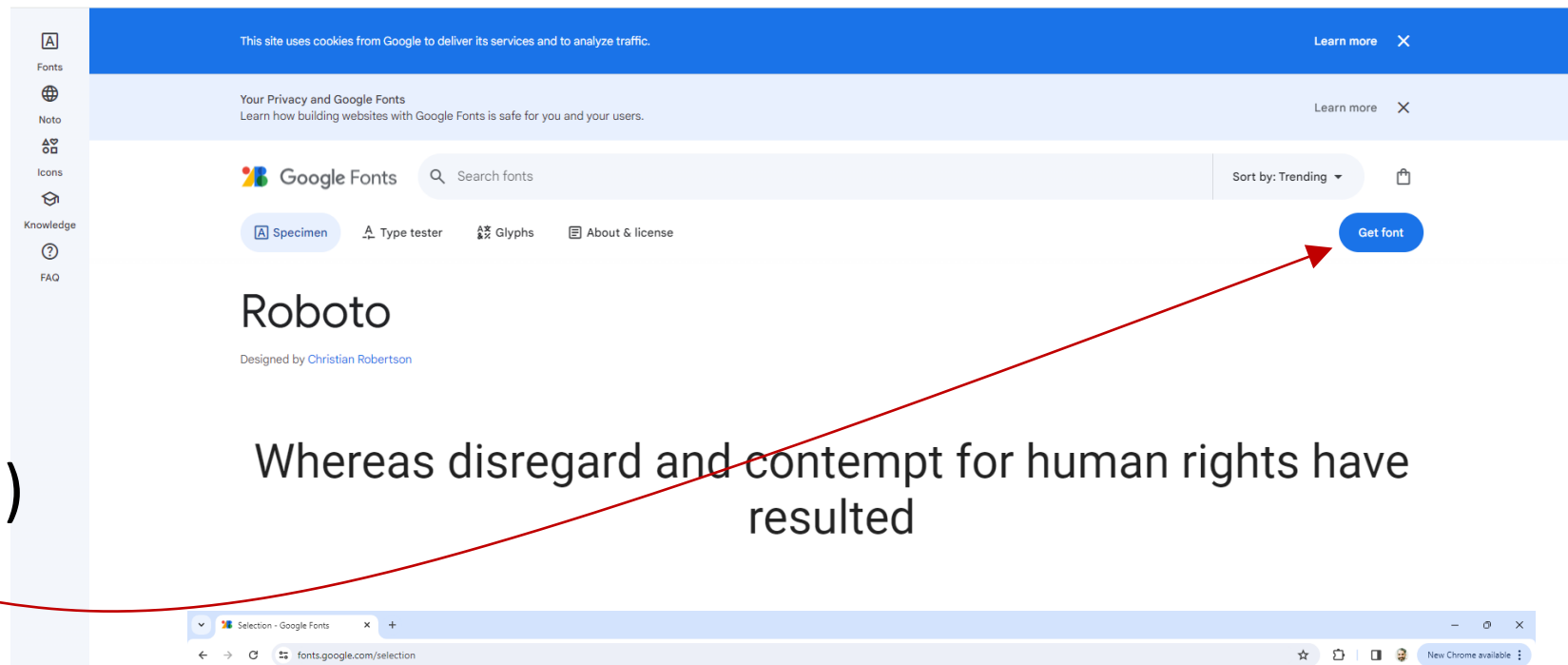
Web Fonts

- Copy the given `<link>` tag into the `<head>` section of your page alongside your other CSS files

Aside: Fallback fonts

- Notice that the Google Font example shows a comma-separated list of values for `font-family`:

```
font-family: 'Roboto', sans-serif;
```

- Each successive font listed is a fallback, i.e. the font that will be loaded if the previous font could not be loaded

- There are also six [generic font names](#) which allows the browser to choose the font based on intent + fonts available on the OS.

- It's good practice to list a generic font at the end of all your `font-family` declarations.

CSS Icons – Google Material icons

- To use Google Material icons, add the following line inside the <head> section of your HTML webpage:

<link rel="stylesheet" href="https://fonts.googleapis.com/icon?family=Material+Icons">

```html
<p>Some Google icons:</p>
<i class="material-icons">cloud</i>
<i class="material-icons">favorite</i>
<i class="material-icons">attachment</i>
<i class="material-icons">computer</i>
<i class="material-icons">traffic</i>
```
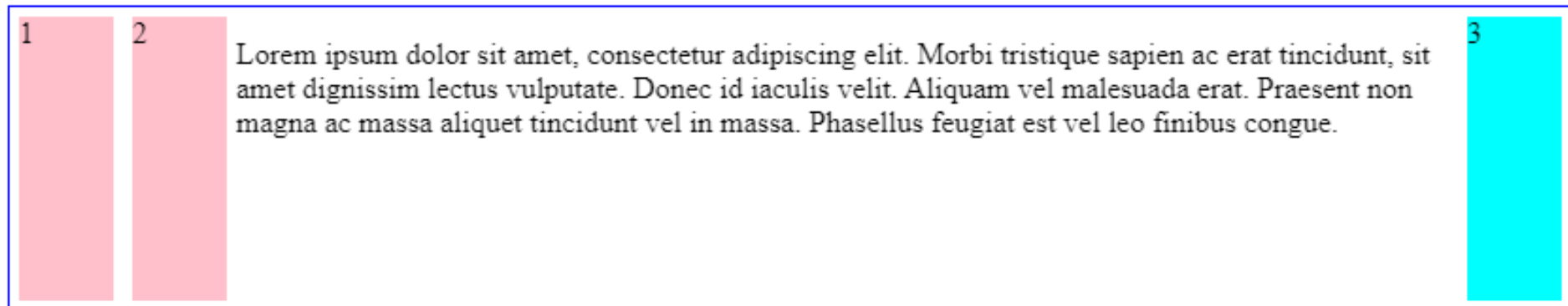
HTML

Some Google icons:

Exercise 1

- Develop the following web page using **float** positioning

- Download lab4-exercise1.html (lab webpage) & add your lab4-exercise1.css

- Specifications:
  - Outer box: 160px height, border of 1px width, solid style and blue color
  - Inner boxes: 150px height, 50px width, 5px margin and pink/cyan color respectively

Exercise 2

- Develop the displayed web page

- Download lab4-exercise2.html (lab webpage) & add your lab4-exercise2.css

- Specifications given in the next slide

Exercise 2

HEADER

home icon
location_up icon

↕ 15px

🏠 Home
📍 Contact Us

32px

200px;

SLIDE
40% from the top
of the image

↓

Welcome to the
University of Cyprus

350px;

The University of Cyprus (UCY) is the premier academic and research institution in Cyprus, founded in 1989. It is the largest research and academic institution in the country, employing over 1000 faculty, research, and administrative staff. Despite its brief history, the University has managed to perform at very high standards and has been recognized for academic excellence in research. In addition, it serves as the catalyst of change and progress of Cypriot society by contributing substantially to the enhancement of the cultural, social and economic development of Cyprus. The University of Cyprus already employs a number of leading scientists in their fields, across 5 schools and 22 departments, who have been successful in attracting highly-competitive research funding.

UCY Internationalisation Strategy ↗   trending_up icon   **ARTICLE**

The University of Cyprus is a member in University Networks and Associations worldwide, while it has signed Bilateral Agreements of Cooperation with universities and research institutions in Europe, Australia, Middle East, Asia, USA, Canada and Africa. These agreements facilitate the student and academic staff exchanges, joint research projects, conferences and exchange of teaching and research material.

International Relations

The International Relations Sector (International Relations and Promotion) is responsible for promoting the Internationalization Strategy of the University of Cyprus. This is achieved through the co-ordination of all processes related to International Recruitment, Bilateral Agreements of Cooperation with Universities, communication with the various Networks and Organizations to which the University of Cyprus is a member (such as UNICA, Santander Group, IAU), as well as the administrative support for the representation of the University of Cyprus in Network / Organization meetings.

Mobility Support

The International Relations Sector (Mobility) has the general and financial management of the Erasmus+ and Erasmus+ International Programmes (K103 and K107 Actions) for outgoing and incoming student mobility for studies and placements, mobility for teaching and administrative staff. It is also responsible for managing mobility under other Bilateral Agreements of Cooperation.

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FOOTER

Font-family : Roboto, with serif fallback
Google material icons
Menu:
- Always visible at the same (fixed) position
- Background color #e4aa09
- Links white color, not underlined, when hovered color bold black (Home links to current file, Contact Us links to contact.html)
- Use list-style: none; on li to remove bullets

Header:
- Height 100px
- Padding top/bottom: 10px, left-right: 32px
- UCY logo image height 100%

Slide:
- Full width, Height 400px
- Background image not stretched, no empty space remain, image center to be visible
- Apply the parallax effect
- Title: width 350 pixels, in the middle of the image, font size 26pt, text aligned center, text shadow x/y-offset 1px blur 15 px color black

Article:
- Padding top/bottom: 10px, left-right: 32px
- For right and left columns set appropriate float value and width 48%

Footer:
- Background color #8d9106
- Padding top/bottom: 10px, left-right: 32px
- Font size 10 pt, aligned right

position: absolute

```css
#box1 {
  height: 100px;
  width: 100px;
  background-color: red;
  position: absolute;
  top: 25px;
  left: 25px;
}

#box2 {
  height: 100px;
  width: 100px;
  background-color: blue;
  position: absolute;
  top: 50px;
  left: 50px;
}
```
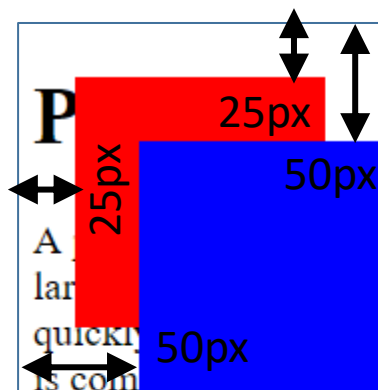
```html
<body>
  <h1>Puppy</h1>
  <p>A puppy is a juvenile d
1.36 kg), while larger ones ca
All healthy puppies grow quick
change as the puppy grows olde
the Yorkshire Terrier. In vern
specifically to dogs, while pu
such as seals, giraffes, guine
  <h2>Development</h2>
  <p>At first, puppies spend
sleeping and the rest feeding.
heap, and become distressed if
their littermates, by even a s
  <div id="box1"></div>
  <div id="box2"></div>
</body>
```

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P

A dog. Some puppies can weigh 1–3 lb (0.45–1.36 kg), while lar up to 15–23 lb (6.8–10.4 kg). All healthy puppies grow quickl puppy's coat color may change as the puppy grows older, as is com reeds such as the Yorkshire Terrier. In vernacular English, puppy refers specifically to dogs, while pup may often be used for other mammals such as seals, giraffes, guinea pigs, or even rats.

Development

At first, puppies spend the large majority of their time sleeping and the rest feeding. They instinctively pile together into a heap, and become distressed if separated from physical contact with their littermates, by even a short distance.

Codepen

position: absolute

```css
#box1 {
  height: 100px;
  width: 100px;
  background-color: red;
  position: absolute;
  top: 25px;
  left: 25px;
}

#box2 {
  height: 100px;
  width: 100px;
  background-color: blue;
  position: absolute;
  top: 50px;
  left: 50px;
}
```

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  <p>A puppy is a juvenile do
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  <p>At first, puppies spend
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their littermates, by even a sh
  <div id="box1">
    <div id="box2"></div>
  </div>
</body>
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P

A p   Some puppi   86 kg), while
lar   o 15–23 lb (6.8–10.4 kg). All healthy puppies grow
quickly a   y's coat color may change as the puppy grows older, as
is commo   ds such as the Yorkshire Terrier. In vernacular English,
puppy refe   o dogs, while pup may often be used for other mammals
such as seals, giraffes, guinea pigs, or even rats.

Development

At first, puppies spend the large majority of their time sleeping and the rest
feeding. They instinctively pile together into a heap, and become distressed if
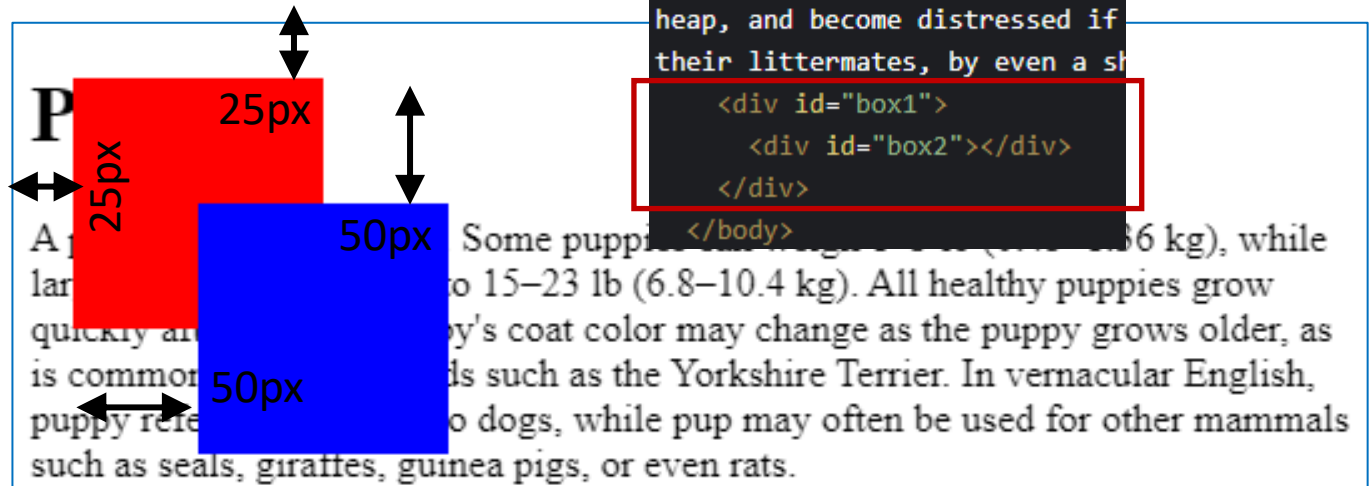separated from physical contact with their littermates, by even a short distance.

Codepen

position: absolute

```
be used for other mammals such
or even rats.</p>
    <h2>Development</h2>
    <p>At first, puppies spend
sleeping and the rest feeding.
into a heap, and become distres
contact with their littermates
    <div id="outside">
        <div id="box1"></div>
        <div id="box2"></div>
    </div>
</body>
```

CSS

```css
#box1 {
  height: 100px;
  width: 100px;
  background-color: red;
  position: absolute;
  top: 25px;
  left: 25px;
}

#box2 {
  height: 100px;
  width: 100px;
  background-color: blue;
  position: absolute;
  top: 50px;
  left: 50px;
}
```

```css
#outside {
  position: absolute;
  background-color: green;
  width: 400px;
  height: 200px;
}
```

Codepen

Puppy

A puppy is a juvenile dog. Some puppies can weigh 1–3 lb (0.45–1.36 kg), while larger ones can weigh up to 15–23 lb (6.8–10.4 kg). All healthy puppies grow quickly after birth. A puppy's coat color may change as the puppy grows older, as is commonly seen in breeds such as the Yorkshire Terrier. In vernacular English, puppy refers specifically to dogs, while pup may often be used for other mammals such as seals, giraffes, guinea pigs, or even rats.

Development

At first, puppies spend the large majority of their time sleeping and the rest feeding. They instinctively pile together into a heap, and become distressed if separated from physical contact with their littermates, by even a short distance.

25px   25px   50px
25px
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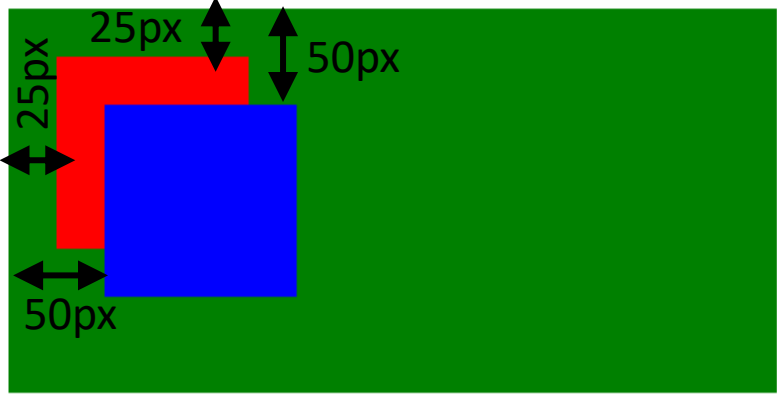
Without top/bottom, left/right offsets, defaults to the normal flow in document: as no position was applied