

# Introduction to Software Systems

## Lab

Starts at 2.05 PM

18/06/2021

## HTML, CSS and JavaScript

- Setting-up development environment
- Basics of HTML, CSS and JS
- Demo activities
  - Add a background color picker to `example.com`



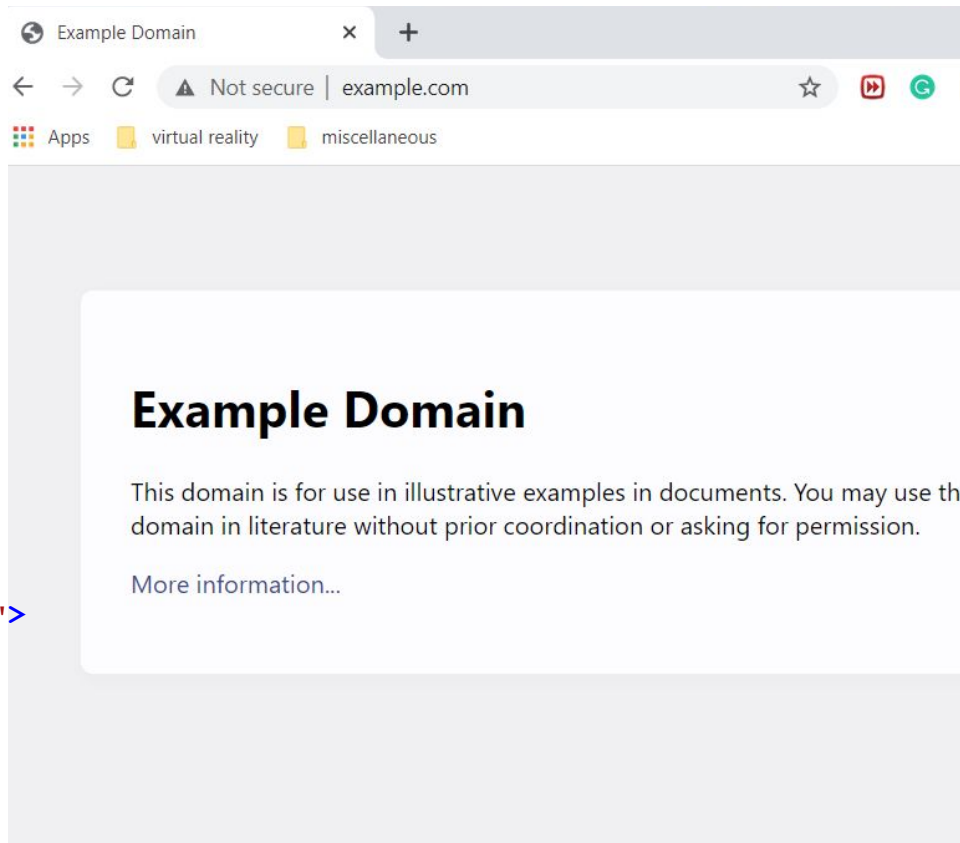
# Hyper Text Markup Language (HTML)

```
<html>
<head>
  <title>Example Domain</title>
</head>
<body>
  <div>
    <h1>Example Domain</h1>
    <p>
      This domain is for use in
      illustrative examples in documents.
      You may use this domain in literature
      without prior coordination or asking for
      Permission.
    </p>
    <p>
      <a href="https://www.iana.org/domains/example">
        More information...
      </a>
    </p>
  </div>
</body>
</html>
```

- `<tag> some content </tag>`
- `<tag attribute = "value">`  
some content `</tag>`
- HTML elements
  - `html, head, body, div, h1, p, a, img, meta`
- Attributes
  - `href, style, type, src`

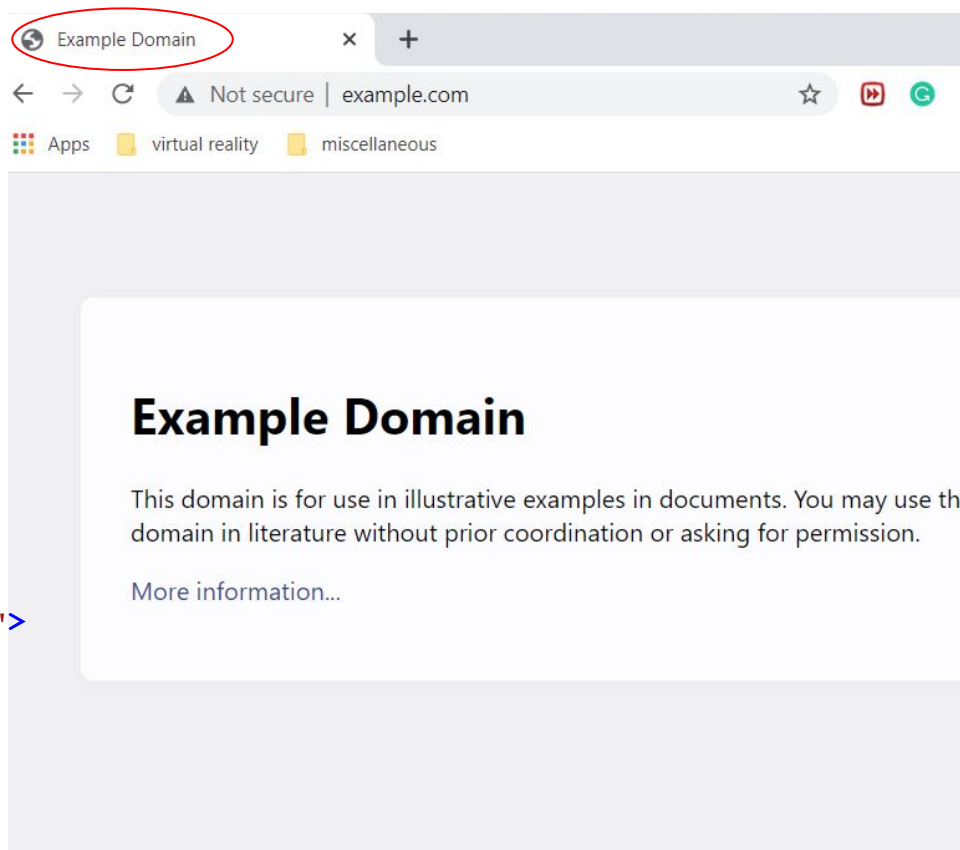
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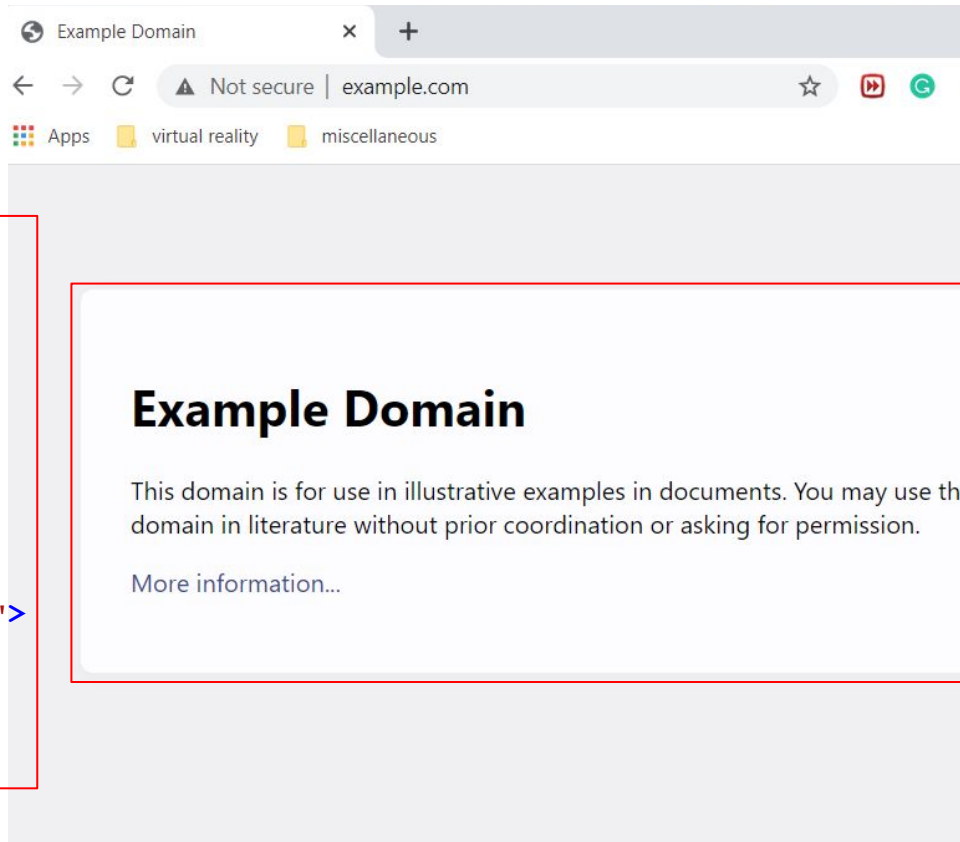
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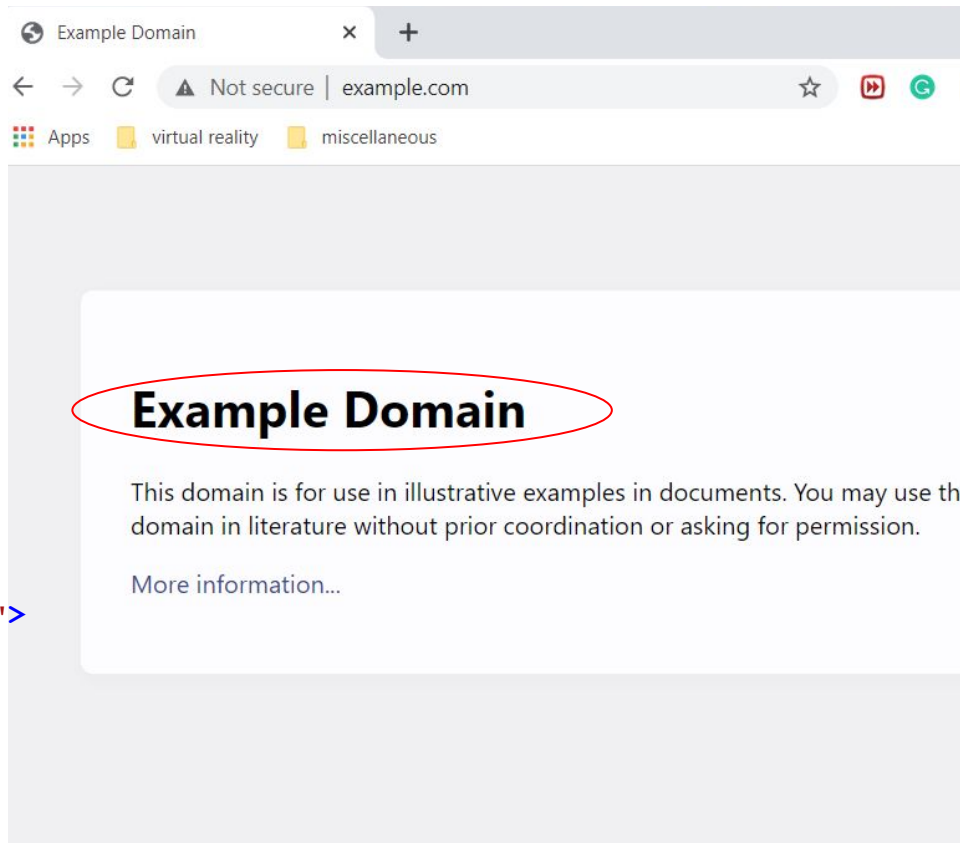
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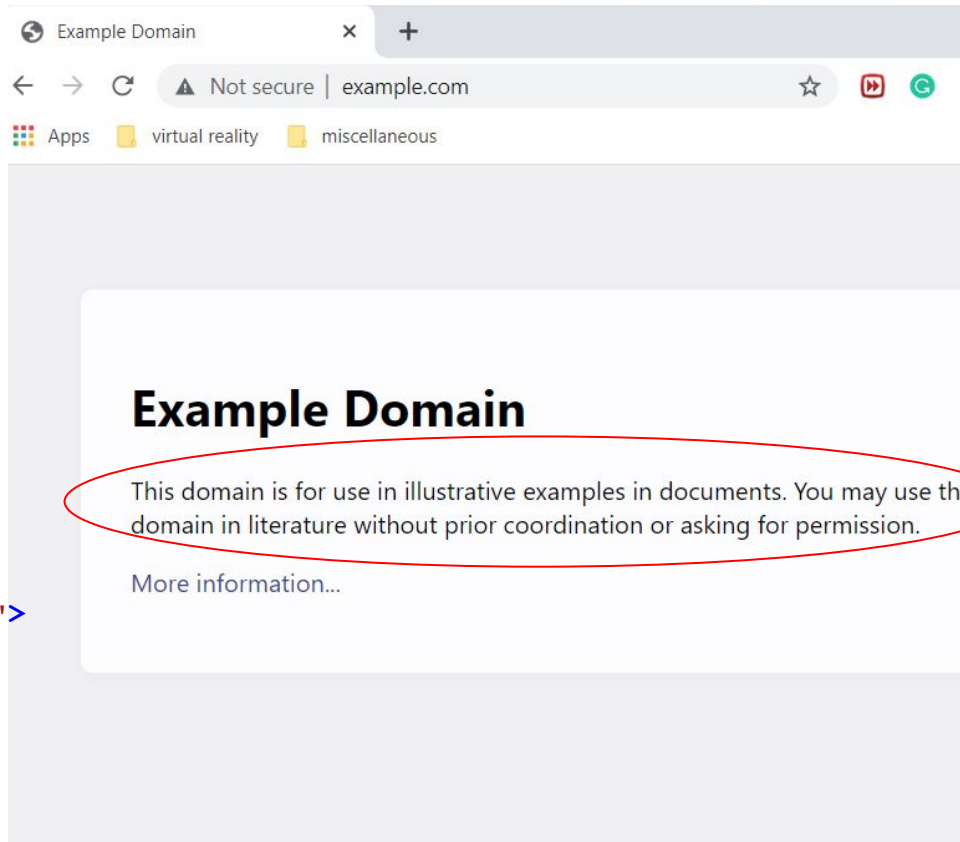
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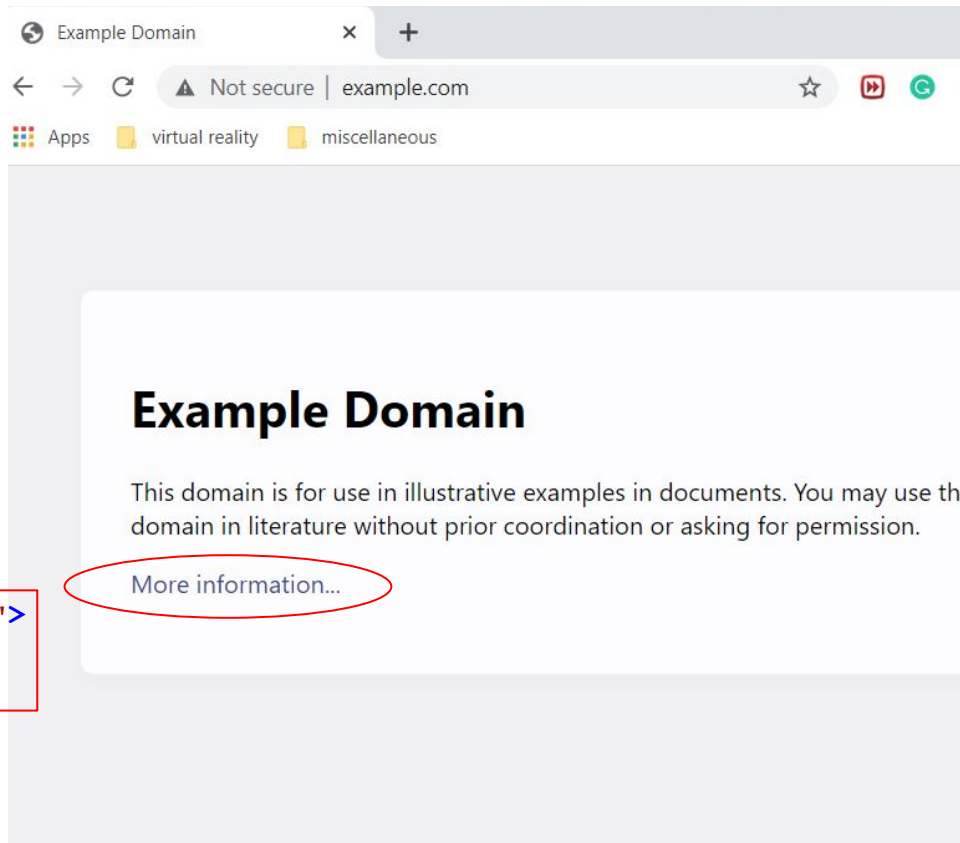
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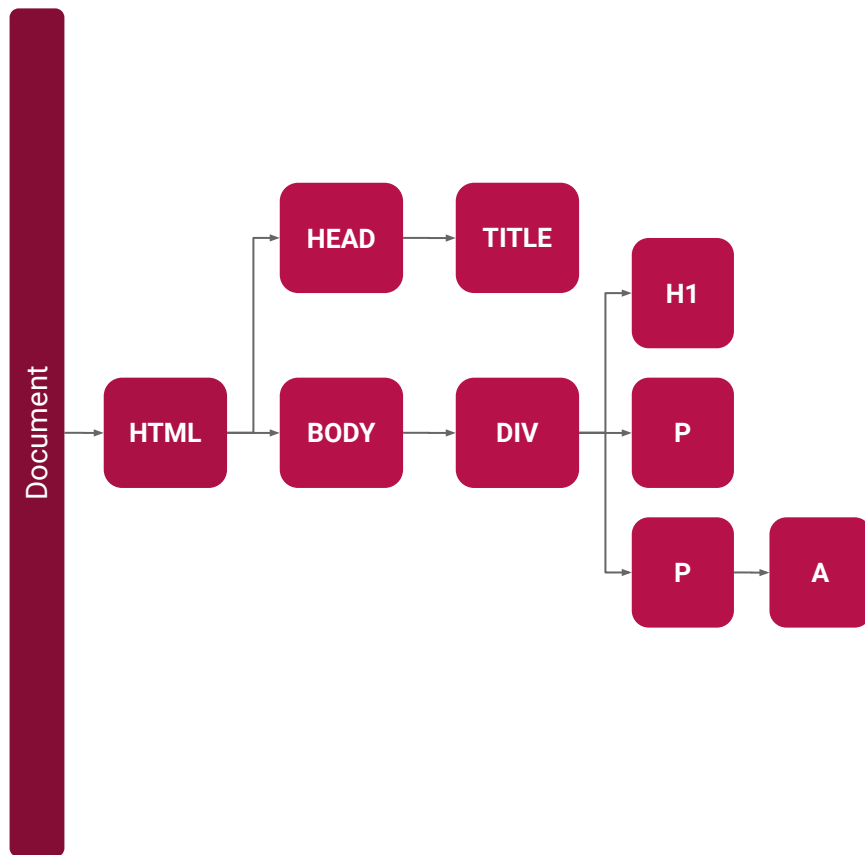
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# Document Object Model (DOM)

```
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```



# JavaScript - Playing with DOM

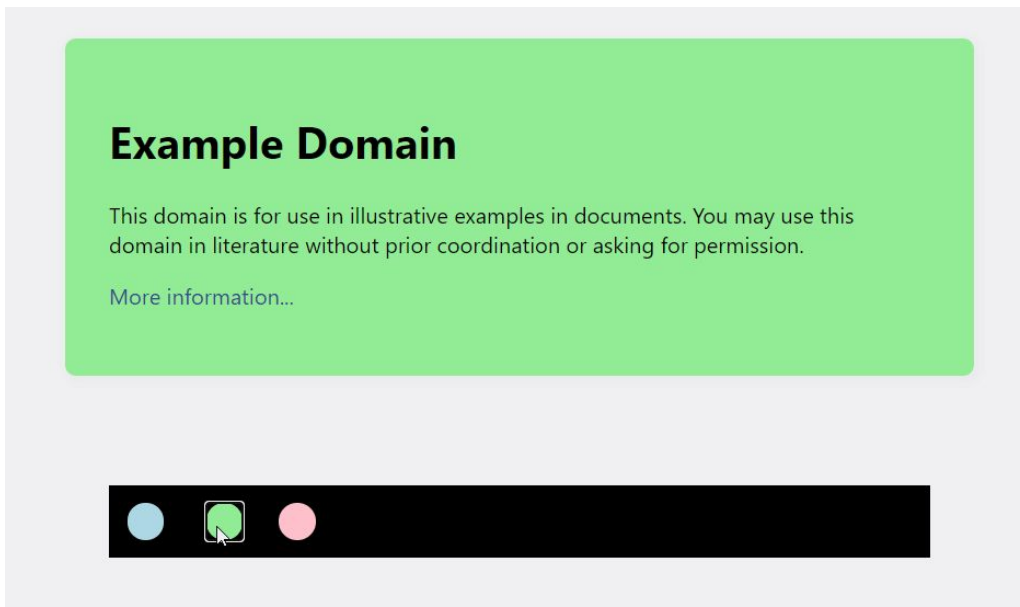
- 3 ways to access and manipulate DOM structure and content
  - Finding HTML elements
    - `document.getElementById(id)`
    - `document.getElementsByTagName(name)`
  - Changing HTML elements
    - `element.innerHTML = new html`
    - `element.attribute = new value`
  - Adding and deleting HTML elements
    - `document.createElement(element)`
    - `document.removeChild(element)`
    - `document.appendChild(element)`

# JavaScript - Playing with DOM

- Manipulate DOM structure, content and style
  - Select DOM
    - `document`
  - Find and select target node(s)
    - `document.getElementById("myId")`
  - Change/update attribute values
    - `document.getElementById("myId").style.background = "blue"`
  - OR replace Inner HTML
    - `document.getElementById("myId").innerHTML = " ... "`
  - OR add or remove child nodes
    - `document.getElementById("myId").appendChild(element)`
    - `document.getElementById("myId").removeChild(element)`
- There are many more...

# Demo Activity

- Let user change background color of `div` on <http://example.com>.



# Cascading Style Sheet

```
body {  
    background: lightgrey;  
    font-family: arial;  
    padding: 10%;  
}  
  
div {  
    background: white;  
    margin: auto;  
    padding: 5% 2% 4% 2%;  
    border-radius: 10px;  
}
```

```
element {  
    property: value;  
    property: value;  
    ..  
    ..  
}
```

# External CSS

```
body {  
    background: lightgrey;  
    font-family: arial;  
    padding: 10%;  
}  
  
div {  
    background: white;  
    margin: auto;  
    padding: 5% 2% 4% 2%;  
    border-radius: 10px;  
}
```

filename.css

# Inline CSS

```
<body style="background: lightgrey;  
           Font-family:arial;  
           padding: 10%">  
    <div style= "background:white; margin:auto;  
               padding: 5% 2% 4% 2%;  
               border-radius: 10px">  
        .....  
        .....  
    </div>  
</body>
```

```
<head>  
    <link rel="stylesheet" href="styles.css">  
</head>
```

# Internal CSS

```
<head>
  <style>
    body {
      background: lightgrey;
      font-family: arial;
      padding: 10%;
    }

    div {
      background: white;
      margin: auto;
      padding: 5% 2% 4% 2%;
      border-radius: 10px;
    }
  </style>
</head>
```

## External JS file

```
function myFunction() {  
    var demo = document.getElementById("demo");  
    demo.innerHTML = "Paragraph changed.";  
}
```

filename.js

```
<head>  
    <script src="myScript.js"></script>  
</head>
```

</head>

OR

```
<body>  
    ...  
    ...  
    <script src="myScript.js"></script>  
</body>
```

## JS inside HTML

```
<head>  
    <script>  
        function myFunction() {  
            var demo =  
                document.getElementById("demo");  
            demo.innerHTML = "Paragraph changed.";  
        }  
    </script>  
</head>  
OR  
<body>  
    ...  
    ...  
    <script>  
        function myFunction() {  
            var demo =  
                document.getElementById("demo");  
            demo.innerHTML = "Paragraph changed.";  
        }  
    </script>  
</body>
```



# Difference between HTML, CSS and JS

**HTML** - basic structure of website and content

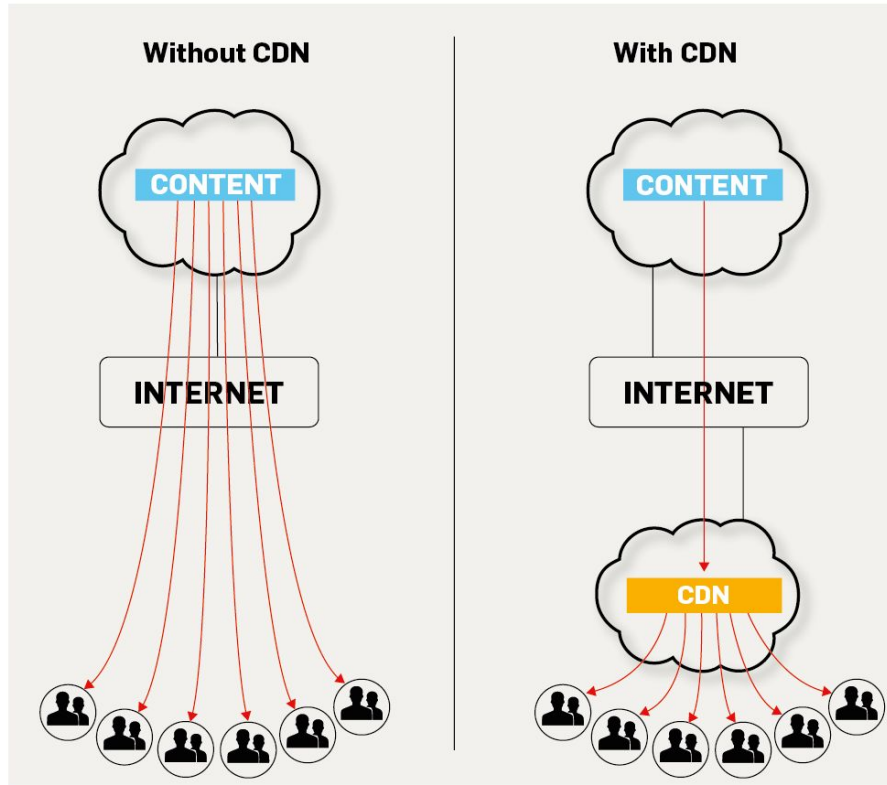
**CSS** - presentation, formatting and layout

**JS** - behaviour of different elements



- They make our site more

# Content Distribution Network - CDN



- Geographically distributed group of servers
- High availability of data and services
- Used for fast delivery of HTML pages, javascript files, stylesheets, images, and videos
- Protects host server from malicious traffic
- Examples: Cloudflare, Rackspace

# CSS and JS open-source libraries



- CSS

- Material design by Google
  - Front looks like that of Android native apps
  - Bring unified user experience across devices and apps
- Shoelace
  - Very lightweight library
  - Highly customisable
- Bootstrap
  - Focus on responsive UI
  - Mobile-first front-end

*Shoelace*



# CSS and JS open-source libraries



- Javascript

- jQuery

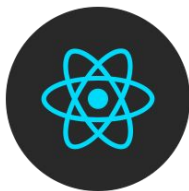
- Simplifies DOM traversal and manipulations
    - Easy to use

- D3.js

- Used for visualising data
    - Build graphs and 3D surface plots

- React JS

- Known as facebook's favourite JS library
    - Loads and updates content on frontend without page reloads (like Facebook)



# Add CSS and JS libraries to HTML using CDN

## Examples

- Add Bootstrap CSS library

- **Add this under <head> tag**

```
<link rel="stylesheet"
href="https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/css/bootstrap.min.css"
integrity="sha384-JcKb8q3iqJ61gNV9KGb8thSsNjpSL0n8PARn9HuZOnIxN0hoP+VmmDGMN5t9UJ0
Z" crossorigin="anonymous">
```

- Add jQuery JS library

- **Add this under <head> tag**

```
<script
src="https://ajax.googleapis.com/ajax/libs/jquery/3.5.1/jquery.min.js"></script>
```

# Online Resources

- Recommended courses and tutorials
  - [HTML & CSS Courses & Tutorials](#)
  - [W3Schools Online Web Tutorials](#)
  - [CS50's Introduction to Computer Science](#)
  - [freeCodeCamp.org: Learn to code at home](#)
- CSS features
  - [CSS can do that? - DEV](#)