

Build a Web Page

An Introduction to Web for Business Professionals

Web and Web Page

- The Web has many *Web sites*.
- A Web site has many *Web pages*.
- A Web page has three parts:
 - *Content*: has texts and hyperlinks that link to a different location in a page that might be in different pages in different sites.
 - *Styles*
 - A Web page may have several styles, one for screen, one for printer, one for speaker,,,
 - A Web page could be *responsive*: different contents for different devices.
 - *Behaviors*
 - User interaction

Let's Check it

- What's your favorite web site/page?
- Right click to "View Page Source"

```
<!DOCTYPE html>  
<html>  
  <head>...</head>  
  <body>...</body>  
</html>
```

A Professional Editor

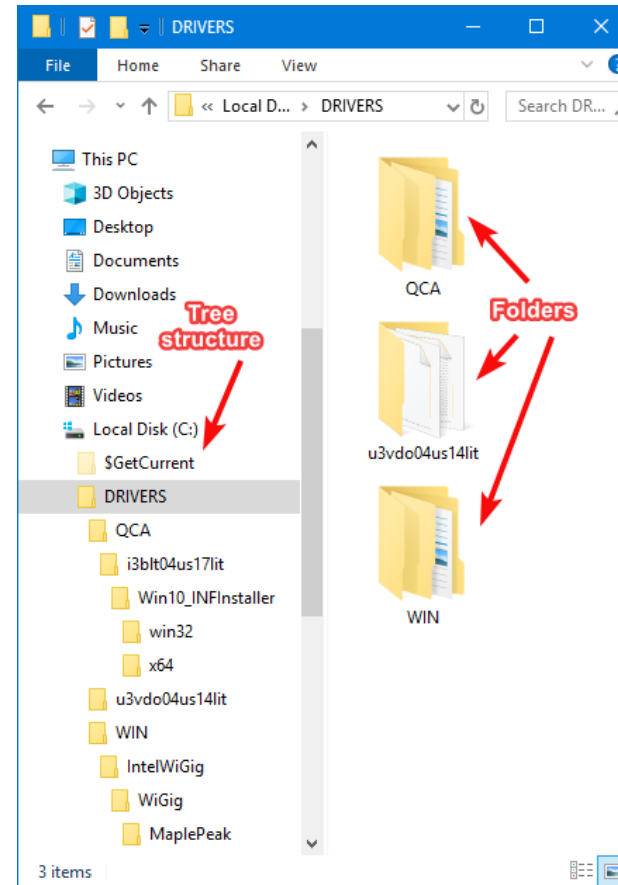
- Word/PPT/Excel are not for creating Web pages
- A Web page has special syntax – it requires a **text editor** (no hidden contents, you control the content).
- A Professional Text Editor, called as **Integrated Development Environment (IDE)** helps a lot
 - Generate content
 - Syntax highlight
 - Error report
 - View/Debug/Run

Visual Studio Code

- Abbreviation is *VS Code*
- Several ways to use it
 - Use VS Code for the Web in a Browser
 - <https://vscode.dev/>
 - Easy for simple tasks, no need to install anything
 - Download and install it as a local Desktop application
 - <https://code.visualstudio.com/download>
 - Rich functions
- This class use the desktop application. Almost all Web developers use the desktop edition.

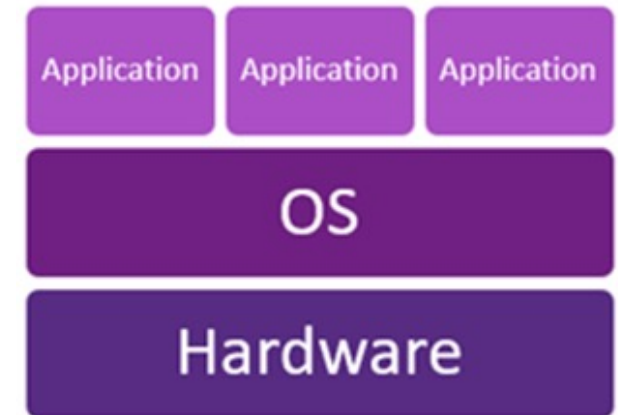
Basic Knowledge

- Hardware
 - Smartphone, PC, Laptop, Server
- Software
 - Operating Systems (OS): Windows, MacOS, Linux
 - Applications: Office, Chrome
- Data Organization
 - Folder Tree
 - Files



<https://www.digitalcitizen.life/what-is-folder/>

Basic Computing Stack



<https://www.comptia.org/content/articles/what-is-an-operating-system>

Please Create an IS300 Folder

- Create an **IS300** folder using File Explorer (Windows) or Finder (MacOS). Better in **Documents** folder, avoid ~~Desktop~~ folder for a clean desktop view.
- Create a **homework** folder inside **IS300** folder.
- Use VS Code to open the **homework** folder
- Getting started with VS Code
 - <https://code.visualstudio.com/docs/introvideos/basics>

Create the Home Page File

- The first left icon is file **Explorer**, followed by a **Search** icon
- Click New File, or the **New File** icon in the **Explorer** view
- Give a filename **index.html**, make sure it is in **IS300/homework** folder
- The **“.html”** postfix tells the **editor/operating system** that it is a web page file.

Learning Resources

- W3School:

- <https://www.w3schools.com/html/>
- <https://www.w3schools.com/css/>
- <https://www.w3schools.com/js/>
- YouTube Video: <https://youtu.be/GTMOmRrqkU?t=108>

Hello World

- It is a tradition to say **Hello World** at the beginning of a programming book.
- Type **Hello World** in the file.
- In OS file explorer, double click to open the file, OS knows the file type and uses a browser to open the file.
 - When you change the file, you can refresh the browser to re-load the file.
- This is an **incorrect** HTML page; the Browser just displays (tolerates) the text.

A Basic Web Page

- It starts with a special declaration: `<!DOCTYPE html>`
- Code Emmet <https://code.visualstudio.com/docs/editor/emmet>
 - Typing `!` and `tab` will generate the basic HTML template for you
- An element is a pair of tags
 - Open and close tags: `<tag>...</tag>`
 - Must be properly nested
- Special tags

```
<html>
```

```
  <head>...</head>
```

```
  <body>...</body>
```

```
</html>
```

HTML Elements

- An *element* has a *start tag* and a *matching end tag*
 - `<tagname>element content</tagname>`
- *Elements can be nested. Most page contents are nested in the `<body>` element.*
- Tag name is not case sensitive but W3C recommends lowercase in HTML.

Head

- See: https://www.w3schools.com/html/html_head.asp
- The `<head>` element contains
 - `<title>`
 - `<meta>`
 - `<style>`
 - `<script>`
- The `<title>` element defines the page title. For example:
`<title> IS300 Web Site </title>`

Page Content

- A paragraph: `<p>Hello World</p>`
- Headings in descending font sizes: `<h1>`, `<h2>`, ... `<h6>`
- A generic element: `<div>`
- A list:

```
<ul>
```

```
  <li>Eggs</li>
```

```
  <li>Milk</li>
```

```
  <li>Cheese</li>
```

```
</ul>
```

HTML Attributes

- Elements can have *attributes*.
- Attributes provide additional information about the element. For example, image location, element id, class, etc.
- Attributes are specified in the start tag.
- An attribute is usually a pair of name and value: `attr="value"`. *For example:*

```
<img src=https://images.freeimages.com/images/large-previews/b02/szczeniak-a-puppy-1638921.jpg alt="dog" />
```

URL

- You specify resources using URL
- URL stands for Uniform Resource Locator (<https://en.wikipedia.org/wiki/URL>)
- It can be absolute or relative
 - Absolute: full path starting with HTTPS
 - Relative: for local files. For example: `src="/images/dog.jpg"`

The Link and Its Attribute

- A link is also called a hyper link.
- The HTML `<a>` tag defines a hyperlink, its `href` attribute gives the link address.

```
<a href="https://google.com">A link to Google</a>
```

```
<a href="https://www.w3schools.com/">Visit  
W3Schools.com!</a>
```

Form For User Input

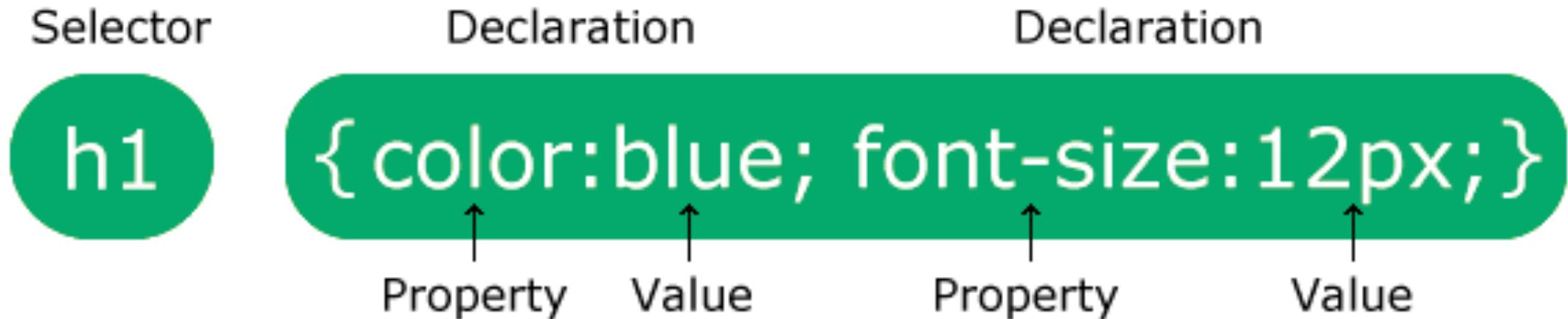
```
<form action="/action_page.php" id="form1">  
  <label for="fname">First name:</label>  
  <br>  
  <input type="text" id="fname" name="fname">  
  <br>  
  <label for="lname">Last name:</label>  
  <br>  
  <input type="text" id="lname" name="lname">  
</form>
```

The *id* attribute uniquely identifies an element

CSS

- <https://www.w3schools.com/css/>
- CSS defines the styles of a Web page: how an HTML document is displayed in Browser/Printer/Phone/TV.
- The styles include
 - Color
 - Background color
 - Font size/weight
 - Height/width
 - Layout/Position
 - ...

CSS Syntax



CSS Selectors

- A CSS selector selects the HTML element(s) you want to style.
- There are many types of selectors, but the most common ones are:
 - By element tag name: `p { color: red;}`
 - By unique id attribute: `#para1 { color: red;}`
 - By class attribute: `.center { text-align: center; color: red;}`

Combinator Selectors

```
h1, h2, p {  
  text-align: center;  
  color: red;  
}
```

```
p.center {  
  text-align: center;  
  color: red;  
}
```

Where to Define Styles?

- Inline: defined in start tag, not common
- Internal Style: define in `<head>` section, not common,
- External style: defined in an external CSS file. It is the most common way to define styles. Why?

Inline and Internal Styles

```
<!DOCTYPE html>
<html>
  <head>
    <style>
      h1 { color: orange; }
    </style>
  </head>

  <body>
    <h1>H1 with internal style</h1>
    <h1 style="color:blue;text-align:center;">H1 with inline
style</h1>
    <p style="color:red;">This is a paragraph with inline
style.</p>

  </body>
</html>
```


External Style File

```
<head>  
<link  
    rel="stylesheet"  
    type="text/css"  
    href="style.css">  
</head>
```

External CSS Example

index.html

```
<!DOCTYPE html>
<html>
<head>
<link rel="stylesheet" href="style.css">
</head>
<body>

<h1>CSS background-color example!</h1>
<div>
This is a text inside a div element.
<p>This paragraph has its own background color.</p>
We are still in the div element.
</div>

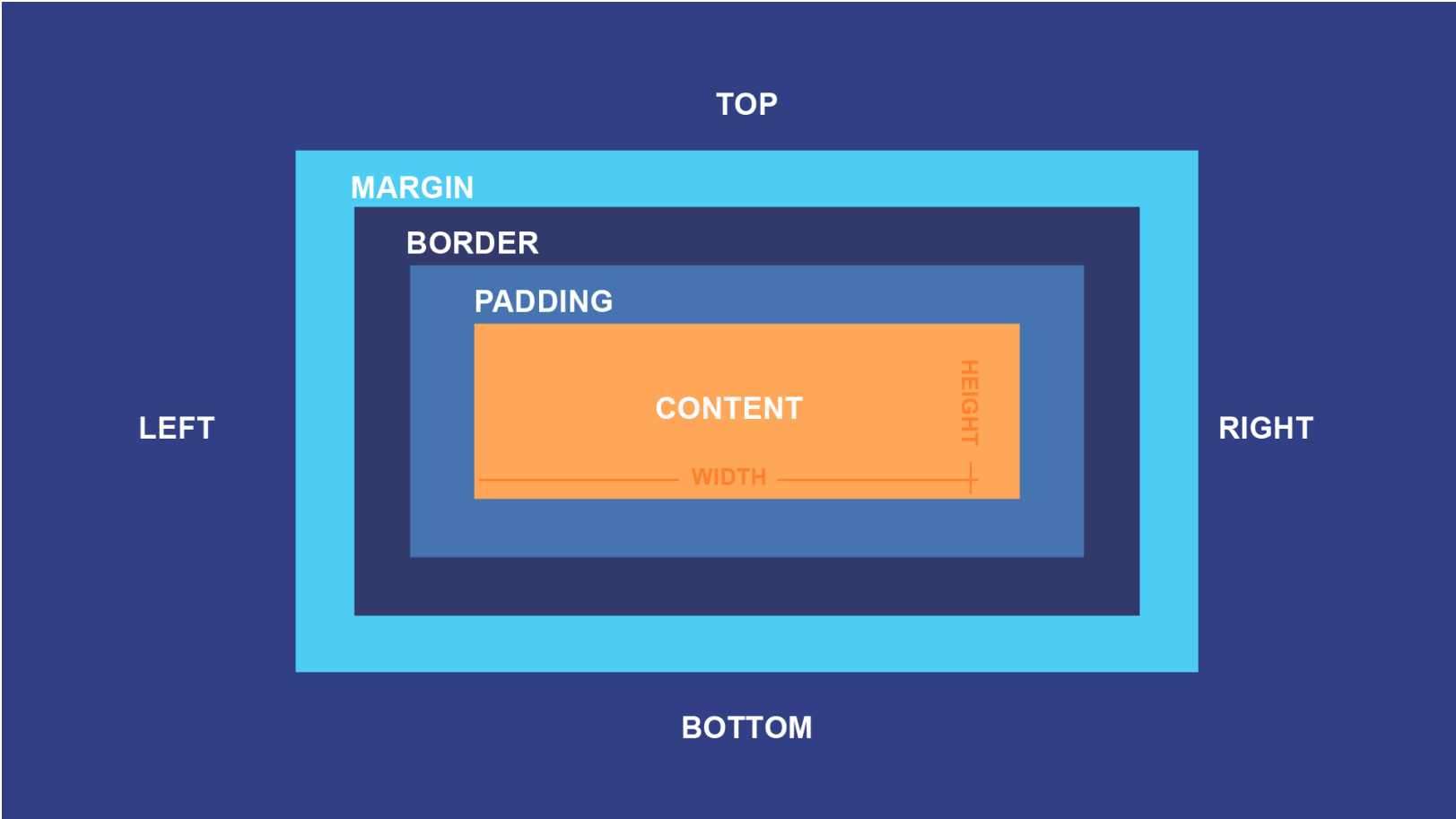
</body>
</html>
```

style.css

```
body {
  background-color: lightblue;
}
h1 {
  background-color: green;
}
div {
  background-color: lightblue;
}
p {
  background-color: yellow;
}
```

The Box Model

Source: <https://edu.gcfglobal.org/en/basic-css/margins-in-css/1/>



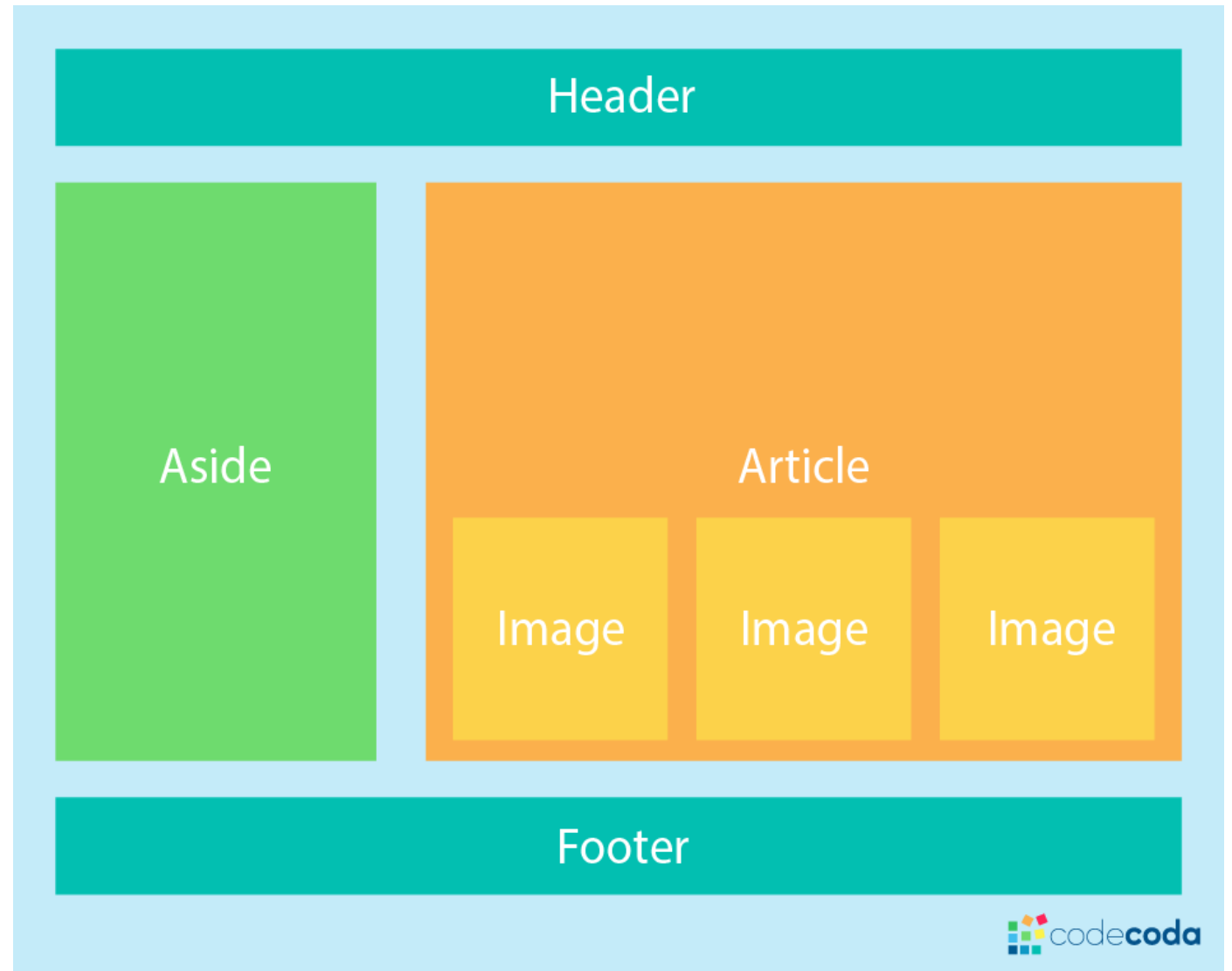
Box Model Demo

```
<!DOCTYPE html>
<html>
<head>
<Link rel="stylesheet"
  href="style.css">
</head>
<body>
<h2>Box Model Demo</h2>
</body>
</html>
```

```
h2 {
  background-color: lightgrey;
  width: 300px;
  border: 15px solid green;
  padding: 50px;
  margin: 20px;
}
```

Layout: Flexbox

- 100 seconds: <https://youtu.be/K74l26pE4YA>
- 8 minutes: <https://youtu.be/phWxA89Dy94>
- 2 hours: <https://css-tricks.com/snippets/css/a-guide-to-flexbox/>



Source: <https://codecoda.com/en/blog/entry/css-layout-grid-vs-flexbox>

JavaScript

- <https://www.w3schools.com/js/>
- A Web page uses JavaScript code to
 - handle user interaction: click a button, change content/styles
 - add dynamic behavior: fetch data in the background
- JavaScript is the most popular programming language
- The code tells computer what to do

Programming Language

- Has Special Syntax
- Better to use an IDE such as VS Code
- Three types of programming languages:
 - *Scripts* such as JavaScript, Python or PHP are executed directly by a program, called a **Virtual Machine** (V8 inside the browser).
 - *Compiled* program languages like C/C++/Rust requires a **compiler** to compile them into machine code that is executed by a computer directly.
 - *Mixed*: languages such as Java/C#/Kotlin requires a **compiler** to compile them into an intermediate language that is executed by a **virtual machine**.

Programming

- Sequential: one by one instruction
- Branch: if condition do_1 else do_2
- Loop: while condition do_something

- Function: a set of instructions that execute together

Where to Write JavaScript Code

- Inline
- Internal
- External

Inline Example

```
<h2>My First JavaScript</h2>
```

```
<button type="button"  
onclick="document.getElementById('demo').innerHTML = 'Hello  
World!'">
```

```
Say Hello.</button>
```

```
<p id="demo"></p>
```

Internal `<script>`

```
<h2>JavaScript in Body</h2>
```

```
<p id="demo"></p>
```

```
<script>
```

```
document.getElementById("demo").innerHTML = "HeLLo WorLd!";
```

```
</script>
```

Head Script

```
<head>
<script>
function myFunction() {
    document.getElementById("demo").innerHTML = "Hello World!";
}
</script>
</head>
<body><h2>Demo JavaScript in Head</h2>

<p id="demo">A Paragraph</p>
<button type="button" onclick="myFunction()">Try it</button>
</body>
```

External Script

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

- Demo
- The place matters:
 - Define in `<head>`, it executes the code first. The document might not be ready yet. Usually fetch data first.
 - Define in the end before `</body>`, it executes the code last. If you change document, here is the place.

Congratulations

- You are a programmer now
- Two types of programmers/knowledge workers
 - Passionate
 - Others
- Keep practicing

A Fun Fact

- Almost all (100%) web sites today are created dynamically by a Web Application.
- A Web Application, typically written in JavaScript, PHP, Java, and C# programming languages, general HTML/CSS/JavaScript dynamically.