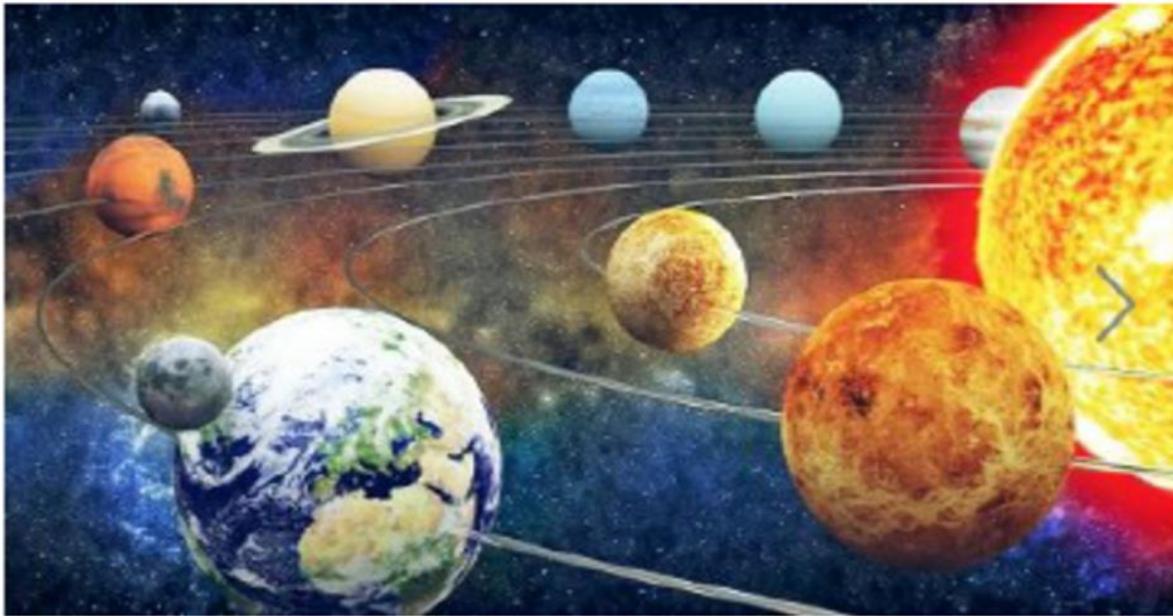


*Starting in the name of Allah,*

*the most beneficial,  
the most merciful.*



آمُر لِلْإِنْسَانِ مَا تَكْنُونَ  
٢٣

کیا انسان کو ہر وہ چیز حاصل ہے جس کی اس نے تمنا کی؟



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## Surah An-Najm Chapter 53 Verse 39

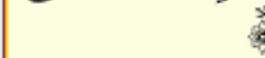
اور یہ کہ انسان کو وہی ملنا ہے جس کی وجہ کوشش کر رہے

القرآن (٥٣:٣٩)

*And there is not for man except that [good] for which he strives.*



وَأَنَّ لَيْسَ لِلْإِنْسَانِ إِلَّا مَا سعِيَ



اور یہ کہ انسان کے لیے نہیں یہ مگر وہی  
کچھ جس کی اس نے سعی کی ہوگی۔

القرآن - سورۃ نمبر 53 النجم  
آیت نمبر 39



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# *Internet Application Development*

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*Department of Computer Science (DCS/UBIT)  
University of Karachi  
January 2025*

# Who am I?

## *Humera Tariq*

*PhD, MS, MCS (Computer Science), B.E (Electrical)*

*Postdoc (Medical Image Processing, Deep Neural Networks)*

Email: [humera@uok.edu.pk](mailto:humera@uok.edu.pk)

Web: <https://humera.pk/>

Discord: <https://discord.gg/xeJ68vh9>

# Before we formally start! ..... DCS Alumni success story

Jazakallah" (جزاک اللہ) to DCS/UBIT Alumni for sharing resources and offering us license to the paid web development course.

<https://www.codewithahsan.dev/courses/web-dev-basics>



How to Access the Angular Course? → IOMECHS will reach us soon!



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# Why do you need this?

## Chapter 3

### Why Web Development?



Web development is an industry that won't die out anytime soon.

In fact, the US Bureau of Labor Statistics has predicted a 27% growth in available web development jobs through 2024.

It was also rated as the #2 hottest job in 2016.

Put simply, if you can develop this skill, you won't have a hard time finding work for the foreseeable future.

# Grading

Share if you have  
a better plan

LIFE IS 10%  
WHAT YOU MAKE  
IT AND 90% HOW  
YOU TAKE IT.

RONALD REAGAN  
MATTERS

Concepts/practice/In-class discussions	35%
Team project	20% + Bonus
Challenge Time: Team A vs Team B	20%
Final exam	25%
Total	100%

# Progress Tracking/ Meeting Plans

- (1) Reading material and resources will be posted on Discord.
- (2) You are supposed to demonstrate learning by showing up in front of the class and participating in Discord individually and as a team.

~ Total Weeks = 12-15                  No. of Students per section= ~ 80

~Team size =  $80/8 = 10$  persons                  ~Team count = 8

Weekly lab meet-up = 2 teams => 20 students

Round 1 Progress: 5 weeks

Round 2 Progress: 10 weeks

# Course Objectives

At the end of this course, you will be able to:

- 
- 1) Web page **structure and appearance** with HTML5 and CSS
  - 2) Client-side **interactivity and behavior** with JavaScript
  - 3) Using web services (APIs) **on the front-end** with asynchronous JavaScript
  - 4) Writing web services with **server-side** JavaScript via Node.js
  - 5) Storing and retrieving information in a **database** with SQLite

## Popular Programming Languages

2000--2023

2000



## Client-side Language?

- ✓ Single threading
- ✓ Limited precision of numbers
- ✓ Limited multithreading
- ✓ Limited concurrency
- ✓ Limited low-level operations
- ✓ Lack of type safety
- ✓ Limited OOP support

THERE'S NO  
ONE RULE  
FITS ALL, NOT  
IN ART, NOR  
IN LIFE

<https://hackr.io/documents/webdev-ebook.pdf>

# Preface

*“Most good programmers do programming not because they expect to get paid or get adulation by the public, but because it is fun to program.”*

- Linus Torvalds

*Creator of Linux Operating System*

# Where to start & Where should stop!

**Data in academia**



**Data in the real world**

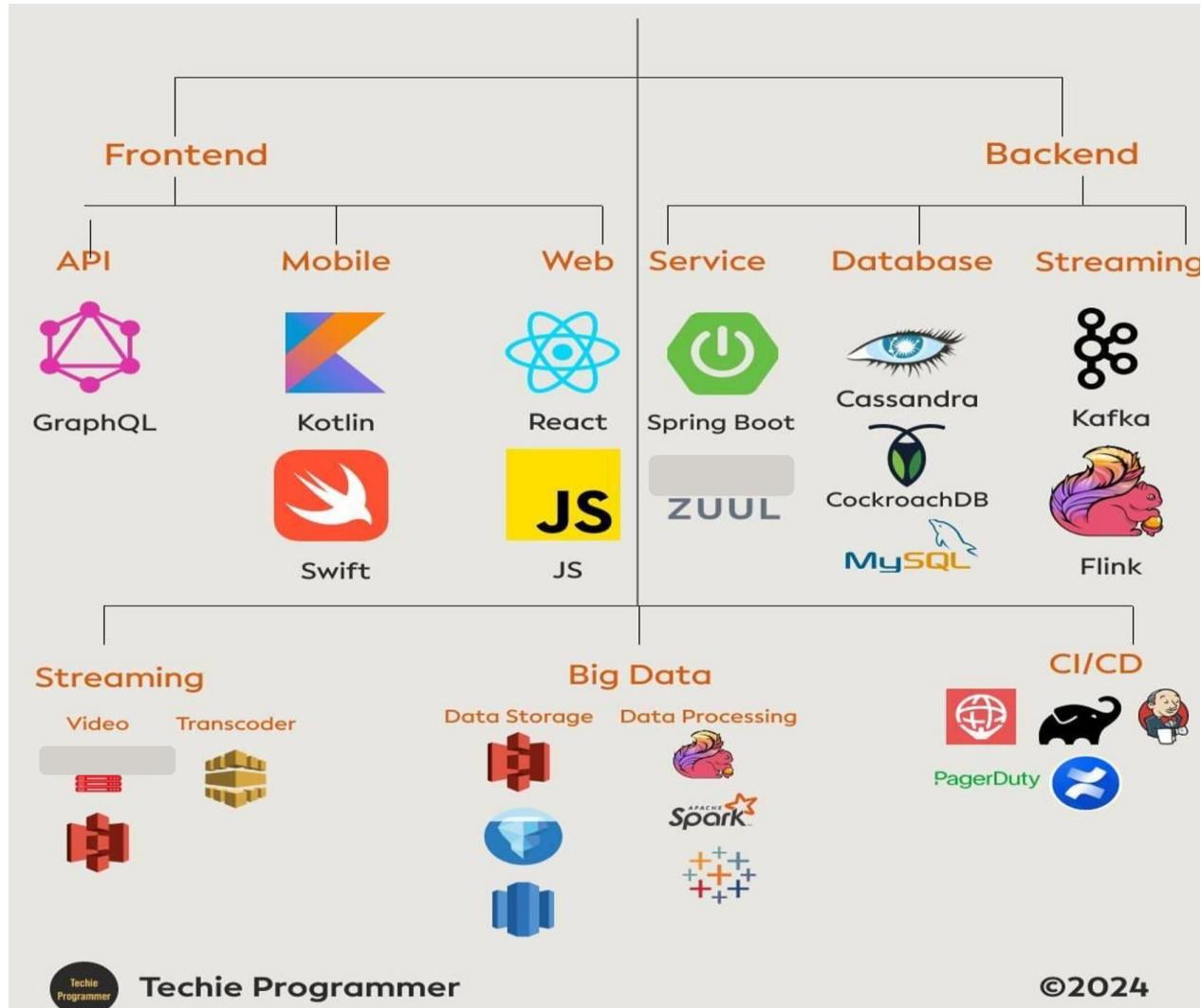


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# Example Real world Architecture

Aws.amazon.com.  
[Online].

Accessed: 17 June  
2024. url:  
<https://aws.amazon.com/what-is/web-application/>.

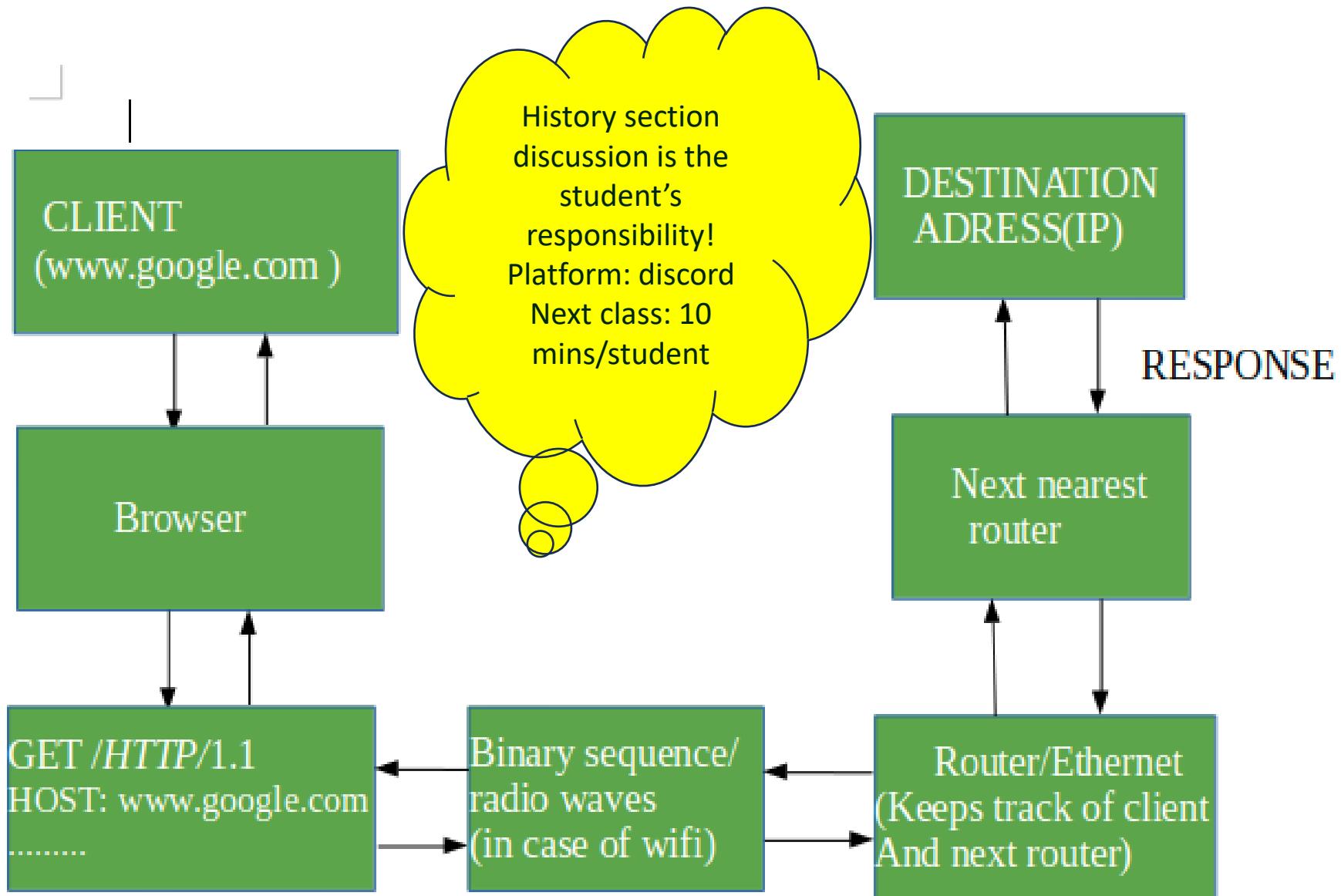


A web application is a software program that runs on a web server and is accessed by users through a web browser. Unlike traditional desktop applications, web applications do not need to be installed on the user's device and can be used on any device with a compatible browser. Web applications typically involve a combination of frontend and backend technologies to deliver interactive, dynamic, and responsive user experiences.

Yours turn to  
speak and  
share!

# *History + Web-Tech Overview*

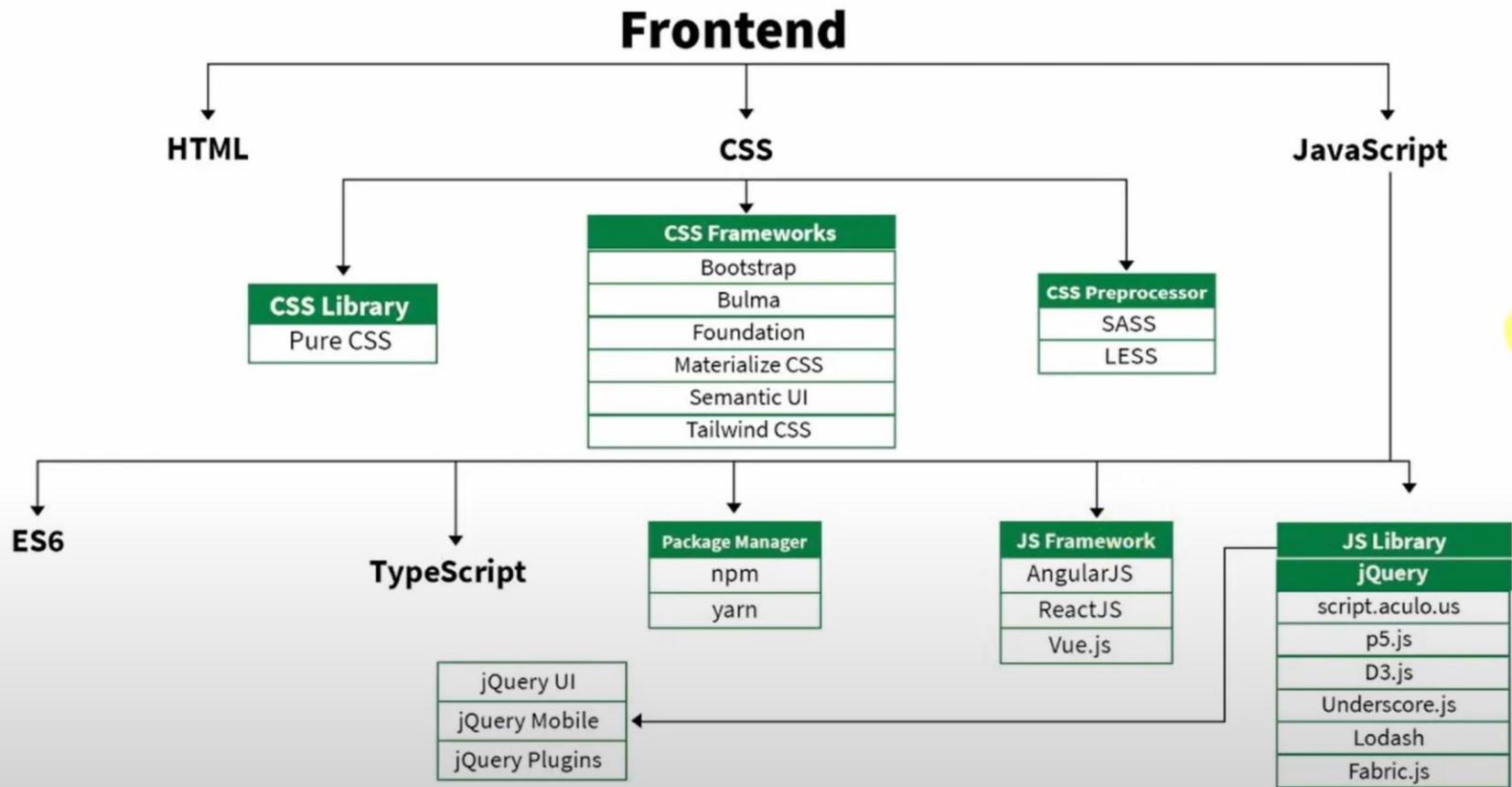
# How Does Internet and Web Programming Work?





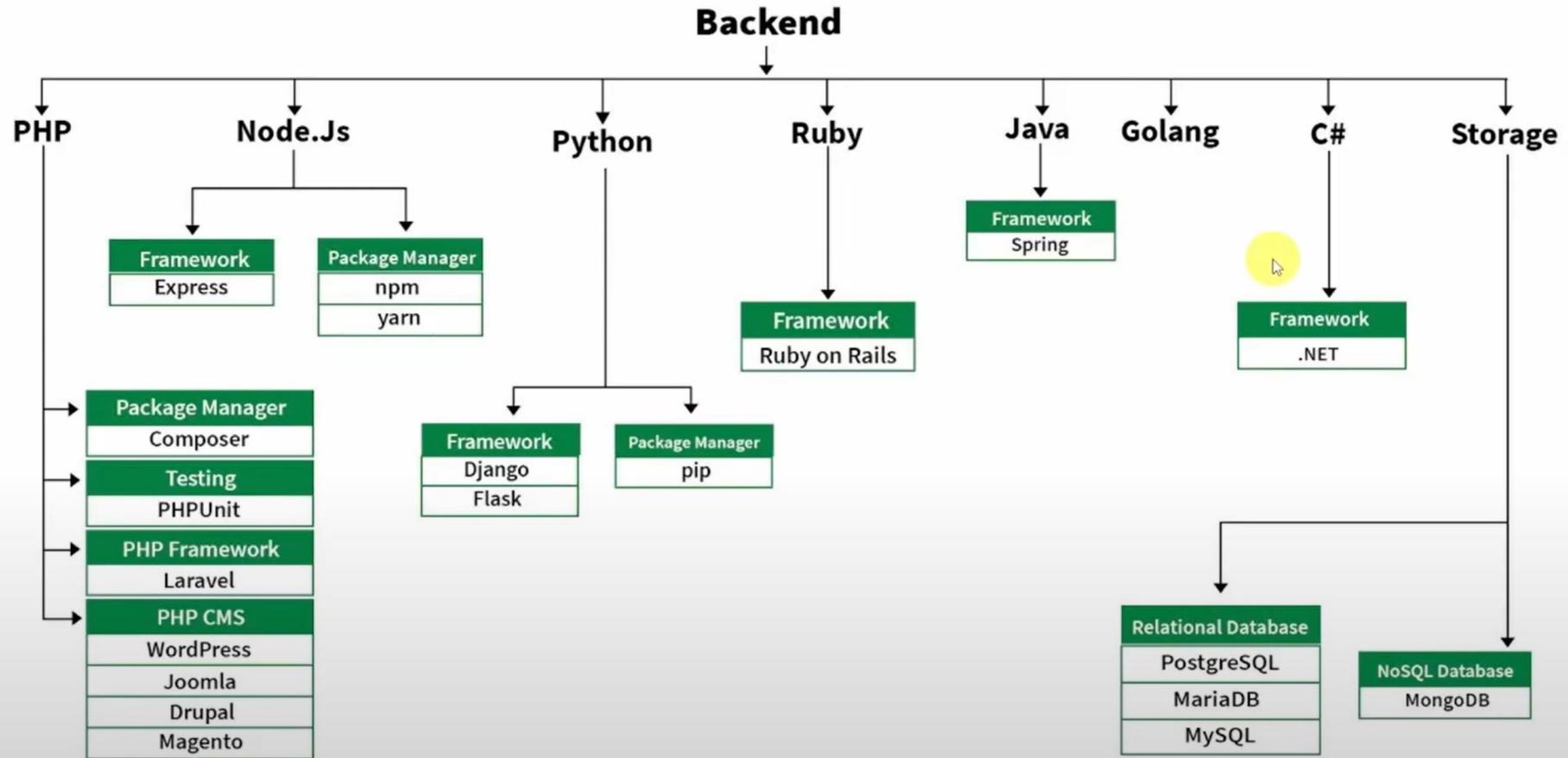
# Front end development overview

<https://www.codewithahsan.dev/courses/web-dev-basics/what-is-web-development>



# Back end development overview

<https://www.codewithahsan.dev/courses/web-dev-basics/what-is-web-development>

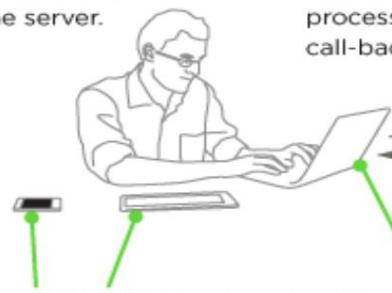


# 3 web development specialties

## FRONT-END DEVELOPMENT



- 1** A site is loaded in a browser from the server.

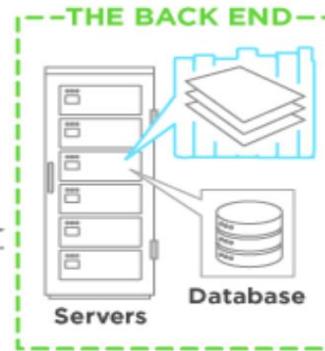


- 2 Client-side scripts**  
Run in the browser and process requests without call-backs to the server

Request



- 3** When a call to the database **is** required JavaScript and AJAX send requests to the back end.



**Responsive** front-end design allows a site to adapt to a user's device.

Everything a user sees in the browser is a mix of **HTML**, **CSS**, and **JavaScript**.

- 5 Server-side scripts** process the data, then update the site—populating drop-down menus, loading products to a page, updating a user profile, and more.

- 4** The **back-end server-side scripts** process the request, pull what they need from the database then send it back.

**2- Backend development:** The “backend” is like the portion of the iceberg below the surface. Without it, the website can’t function. The backend deals with things like servers, applications, and databases.

**3- Full-stack development:** This is the combination of both backend and frontend development.



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# The future of the internet?



# FRONT END DEVELOPMENT

HTML- The Skeleton of a webpage

CSS- Beauty of a webpage

JAVASCRIPT- Behaviour of a webpage

User Interface Design/User Experience Design

Responsive Web Design



<https://hackr.io/documents/webdev-ebook.pdf>



## Section 1 - Introduction

Introduction to Software Development	3
What/Who is a Web Developer?	5
Why Web Development?	7

## Section 2 - Front End Development

HTML- The Skeleton of a webpage	10
CSS- Beauty of a webpage	12
JAVASCRIPT- Behaviour of a webpage	13
User Interface Design/User Experience Design	14
Responsive Web Design	16

## Section 3 - Back End Development

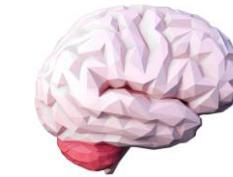
Programming Languages	18
Databases	20
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API- Application Programming Interface	22

## Section 4 - Essentials for every developer

Data Structures and Algorithms	23
SEO	24
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# Front End Languages

- HTML/CSS
- Javascript
- Java (applets)



*What is the most popular?*

*Answer: Javascript/HTML/CSS is the only real option for front-end native languages and is basically the standard. But there are many variations on JavaScript that are used.*

**HTML**



**CSS**



**JS**



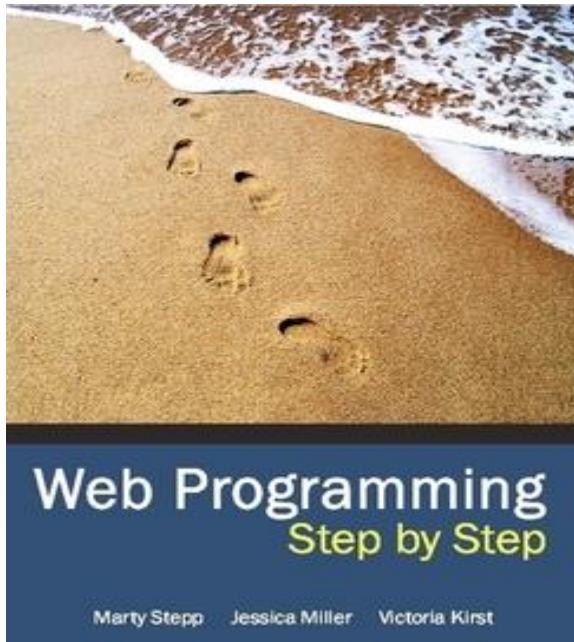
# *Resources*

## *Internet Application Development*

Books,  
notes,  
links

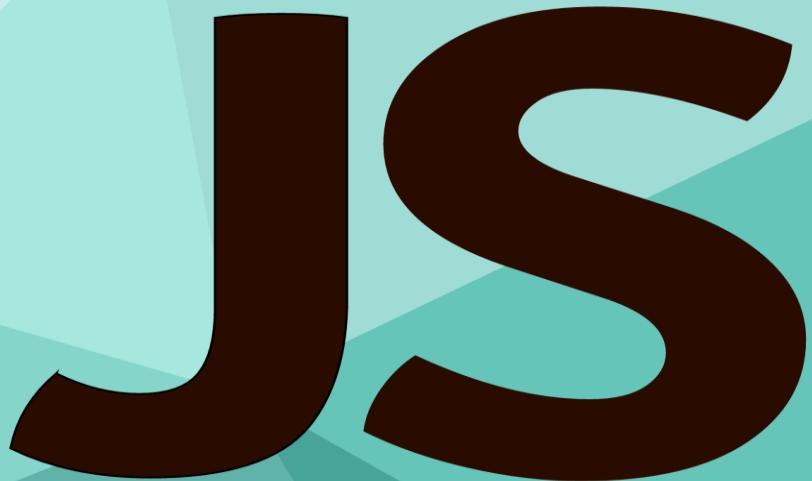
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*January 2025*



- [Chapter 2: HTML Basics](#) (excerpt)
- [Chapter 3: CSS for Styling](#) (excerpt)
- [Chapter 6: Forms](#) (excerpt)
- [Chapter 7: Web Design](#) (excerpt)
- [Chapter 14: Cookies and Sessions](#) (excerpt)
- [Chapter 15: Web Security](#) (excerpt)
- [Appendix A: Syntax Reference](#) (excerpt)

# Browser: Document, Events, Interfaces



## Table of contents

Main course contains 2 parts which cover JavaScript as a programming language and working with a browser. There are also additional series of thematic articles.

PART 1

The JavaScript language

PART 2

Browser: Document, Events, Interfaces

PART 3

Additional articles

Available  
on discord  
resources



Discussion

# *Week 01*

## *Internet Application Development*

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*January 2025*

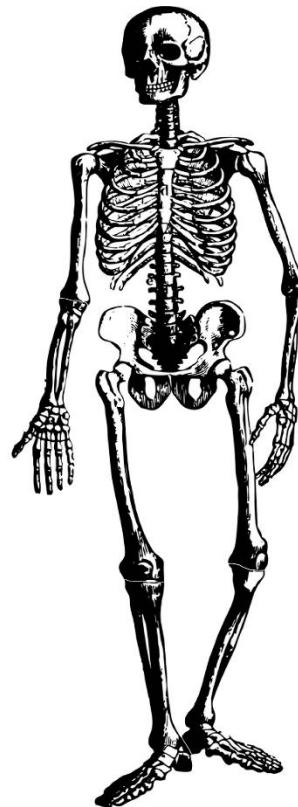
# Websites

Content



Words and images

Structure



HTML

Style



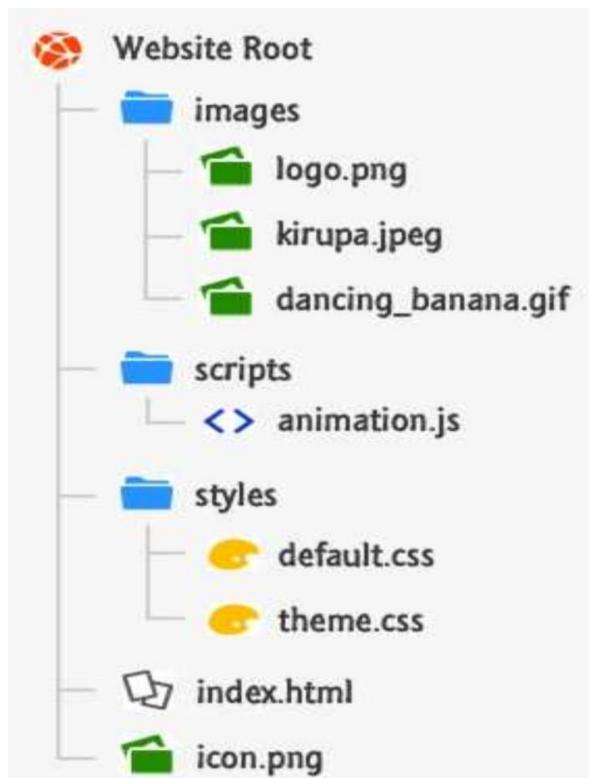
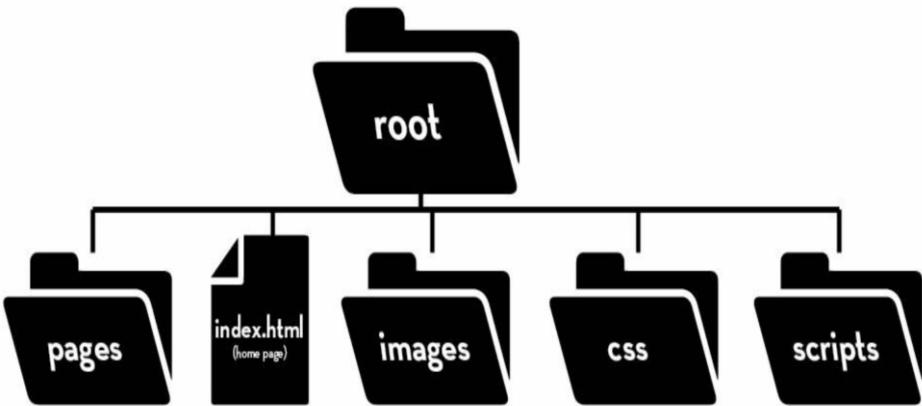
CSS

Behaviour



JS and server  
programs

# html-css-js project directory structure



<https://www.uok.edu.pk/>

Elements Console Sources

Page Workspace Overrides Content scripts

- top
- www.uok.edu.pk
  - alumni
  - css
  - images
  - js
- (index)
- platform.twitter.com
- static.licdn.com
- chromewebdata/

# The only file a website actually needs is one called: index.html

typing **WWW.PRACTICALSERIES.COM** into a web browser will cause it to look for and load a file called **index.html** at that address.

## OTHER DEFAULT FILE NAMES

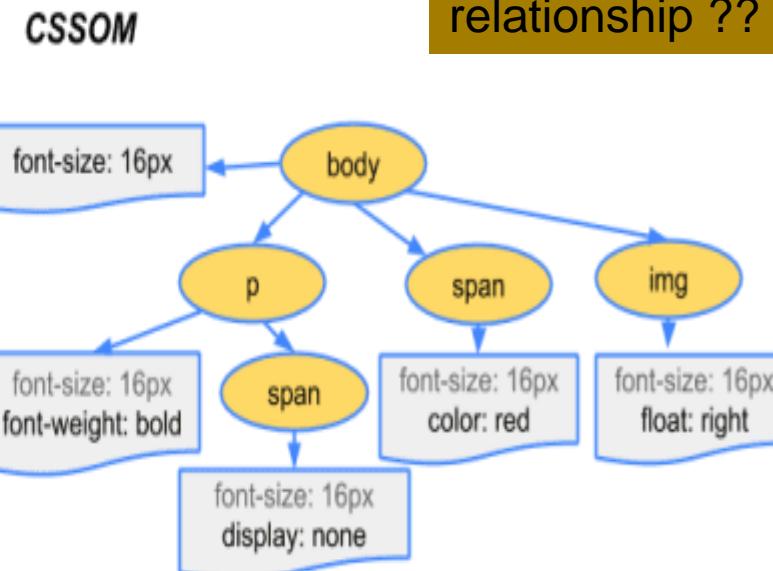
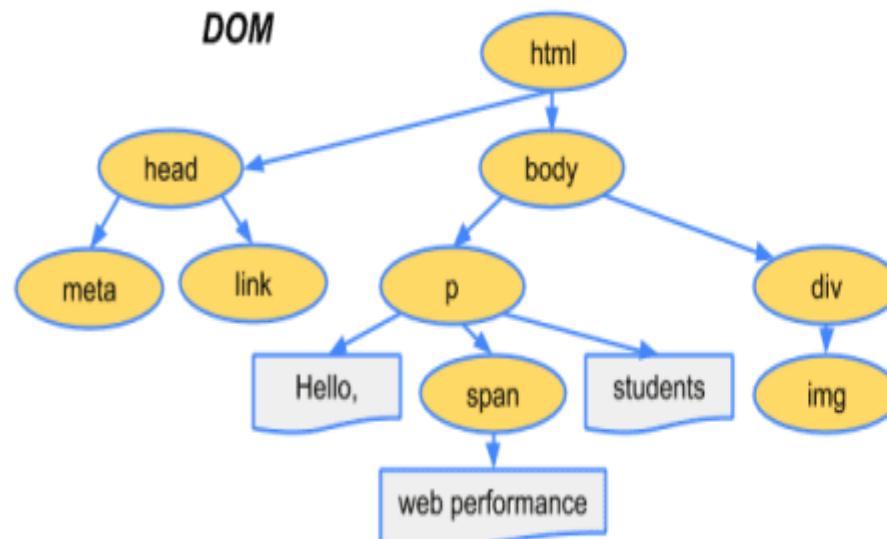
**index.html** is not the only default file name for a web site, the following all work:

index.html	default.html	Index.cgi
index.htm	default.htm	Default.html
index.shtml	home.html	Default.htm
index.php	home.htm	Home.html
index.php5	Index.html	Home.htm
index.php4	Index.htm	placeholder.html
index.php3	Index.shtml	
index.cgi	Index.php	

*Note: the difference between lower and upper case in the starting letters*

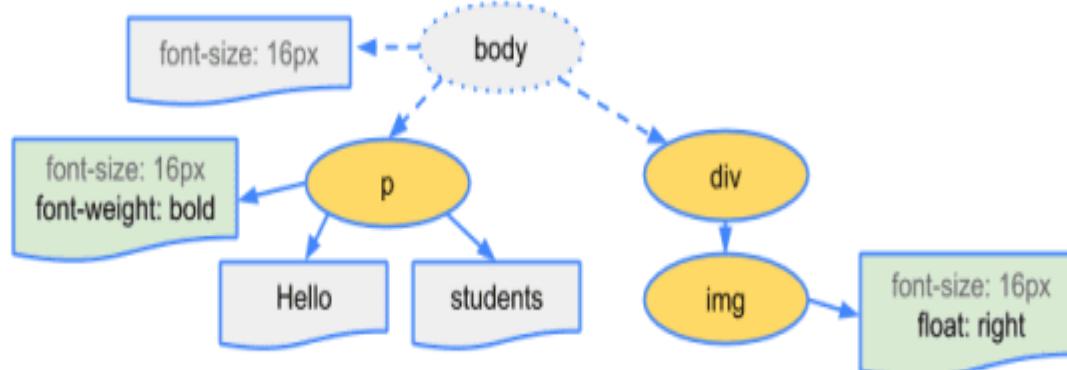
Web browsers look for files in the order listed above—starting top left with **index.html** and ending bottom right with **placeholder.html**.

# Every Browser knows and process HTML



Parent-child  
relationship ??

**Render Tree**



# Welcome to HTML5 Black and White, World!

stackblitz.com/edit/stackblitz-starters-q269pttc?file=index.html

Ebook websites DLI Event | Deep Le... YouTube Maps All Bookmarks

Save Fork Share Static Starter

b Open in bolt.new | A

PROJECT Create a repository

INFO FILES

week01\_xtra index.html package-lock.json package.json script.js styles.css

# BSCS 4th Year 2025!

Welcome to HTML5 Black and White, World!

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>BSCS 633 Week 01 Website</title>
</head>
<body>
    <h1>BSCS 4th Year 2025!</h1>
    <p>Welcome to HTML5 Black and White, World!</p>
</body>
</html>
```



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# Tags vs Elements



IAD-cheat-sheet\_01.pdf

- An HTML Element is everything from the start tag to the end tag

e.g. `<p>Some text</p>` - is referred to as an element, including starting tag- content- ending tag

`<p>` and `</p>` - are referred to as tags.

## Tags Used in the `<head>` Section

Tag	Description
<code>&lt;title&gt; text &lt;/title&gt;</code>	title shown on page tab
<code>&lt;meta attribute="value" ... /&gt;</code>	page metadata
<code>&lt;link href="url" type="text/css" rel="stylesheet" /&gt;</code>	links to a CSS style sheet
<code>&lt;script src="url"&gt;&lt;/script&gt;</code>	link to JavaScript code
<code>&lt;!-- comments --&gt;</code>	comment (can appear in head or body)

# Code break down

Element	Purpose
<!DOCTYPE html>:	This tells the browser that we're using HTML5
<html lang="en">:	This is the root element of the HTML page. The lang="en" attribute specifies that the content is in English.
<head>:	This contains meta information about the document.
<meta charset="UTF-8">:	This specifies the character encoding for the document (UTF-8 is the standard for most websites).
<meta name="viewport" content="width=device-width, initial-scale=1.0">:	This ensures that the website looks good on all devices, including mobile phones.
<title>:	This sets the title of the webpage, which appears in the browser tab.
<body>:	This is where all the visible content of your webpage goes.
<h1>:	This creates a large heading.
<p>:	This creates a paragraph of text.

# 4- Ways to set the background color

## BSCS 633 Year 2025!

Welcome to HTML5 colored, World!

### **Coloring the background of div Element using color name**

This is a paragraph

### **Coloring the background of div Element Using RGB values**

RGB values `rgb(0,255,0)`

### **Coloring the background of div Element Using Hex color**

Hex Color `#FF0000`

### **Coloring the background of div Element Using RGB with Alpha**

`rgba(0,0,255,0.5)`

```
<body style="background-color:aqua"> set HTML background color in the <body> element
```

```
  <h1>BSCS 633 Year 2025!</h1>
```

```
  <p>Welcome to HTML5 colored, World!</p>
```

```
<div style="background-color:red">
```

```
  <h2>Coloring the background of div Element using color name</h2>
```

```
  <p>This is a paragraph</p>
```

```
</div>
```

```
<div style="background-color:rgb(0,255,0)">
```

```
  <h2>Coloring the background of div Element Using RGB values</h2>
```

```
  <p>RGB values rgb(0,255,0)</p>
```

```
</div>
```

```
<div style="background-color:#FF0000">
```

```
  <h2>Coloring the background of div Element Using Hex color</h2>
```

```
  <p>Hex Color #FF0000</p>
```

```
</div>
```

```
<div style="background-color:rgba(0,0,255,0.5)">
```

```
  <h2>Coloring the background of div Element Using RGB with Alpha</h2>
```

```
  <p>rgba(0,0,255,0.5)</p>
```

```
</div>
```

```
</body>
```

Save Fork Share D Static Starter

index.html • index\_colors.txt

P ⌂ ⌄ ⌅ ⌆ ⌇ stackblitzstartersq269pttc-ltw2--8080--c8c182a3.local-cred...

15 <body style="background-color:green" >  
16  
17 <h1>Welcome to BSCS 633 Website!</h1>  
18  
19 <h2>Lets Learn About UBIT Architecture !</h2>  
20  
21   
22  
23 <p> The Department of Computer Science, University of Karachi, was established by a resolution of Academic Council in its meeting, held on November 27. 1984, and it began functioning in the academic year 1985-86 by offering a Degree Program in Master of Computer Science (MCS) and become one of first institutions in Karachi imparting education in Computer Science and Technology.  
The department has started in the year 1996  
24

Prompt run, edit, and deploy full-stack web apps.

# Welcome to BSCS 633 Website!

## Lets Learn About UBIT Architecture !



## Tags Used in the <body> Section

Tag	Display	Description
<p> text </p>	Block	paragraph
<h1> text </h1>	Block	(h1 for largest to h6 for smallest)
<h2> text </h2>		
...		
<h6> text </h6>		
	Inline-Block	image

Here are some **highlights** of UBIT Architecture:

- Inspired by Roman Pantheon
- A magnificent temple to all of the gods, the Roman Pantheon has stood on its site on the *Campus Martius* for almost *2,000 years*
- The inscription declares that it was built by **Marcus Agrippa** who built the original Pantheon in **27 BC**

```
<p>Here are some <strong>highlights</strong> of UBIT Architecture:</p>
<ul>
```

```
    <li> Inspired by Roman Pantheon </li>
```

```
    <li>A magnificent temple to all of the gods, the Roman Pantheon has stood on its site on t
he <em>Campus Martius</em> for almost <em>2,000 years</em></li>
```

```
    <li>The inscription declares that it was built by <strong>Marcus Agrippa</strong> who bui
lt the original Pantheon in <strong>27 BC</strong></li>
```

```
</ul>
```

<em> text </em>	Inline	emphasis (italic)
<strong> text </strong>	Inline	strong emphasis (bold)
<ol>       <li> text </li>       <li> text </li>       <li>         <ul>           <li> nested item </li>           <li> nested item </li>         </ul>       </li>     </ol>	Block	ordered (ol) and unordered (ul) list; list item (li)

To turn the element to a link? The closest equivalent would be to use an <a href=...>

Want to learn more about UBIT? Visit the official dcs/ubit website.

### Tags Used in the <body> Section

Tag	Display	Description
<p> text </p>	Block	paragraph
<a href="url"> text </a>	Block	anchor (link)
	Inline-Block	image

```
<p>Want to learn more  
about UBIT? <a  
href="https://www.uok.edu.  
pk/faculties/  
computerscience/ubit.  
php">Visit the official  
dcs/ubit website</a>.</p>
```



**www.uok.edu.pk** refused to connect.

```
<p>Want to learn more  
about UBIT? <a  
href="https://humera.pk/  
>Visit the official dcs/  
ubit website</a>.</p>
```



**humera.pk** refused to connect.

# Html5 Link to Open New Tab Example

```
<!DOCTYPE HTML>
<html>
<head> <meta charset="utf-8">
<title>Creating Links</title>
</head>
```

```
<body>
<h1>How to Create Hyperlinks in HTML 5</h1>
<p><a href=
https://www.uok.edu.pk/faculties/computerscience/
ubit.php
</a> is a static website using php.
</p>
</body>
</html>
```

1999.

Here are some **highlights** of UBIT Architecture:

- Inspired by Roman Pantheon
- A magnificent temple to all of the gods, the Roman Pantheon on *Campus Martius* for almost 2,000 years
- The inscription declares that it was built by **Marcus Agrippa** in the Pantheon in **27 BC**

Want to learn more about UBIT? [Visit the official dcs/ubit website](#)

Open link in new tab

Open link in new window

Open link in incognito window

 Open link as humera

---

Save link as...

Copy link address

---

Get image descriptions from Google

>

Inspect

# *Team Assignment 01*

## *Internet Application Development*

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*January 2025*

# Online Thrift Store 633

Using HTML 5 only, create a prototype of an online Thrift store by ubit students.

Validate and verify the result on the browser as you proceed. Don't mind about the visual aspect of the result (that will be taken care by using CSS).

- Use the site <http://www.lipsum.com/> if you need to generate example paragraphs.
- Create separate **sections** for the header, menu and body of the Thrift Store. Use semantic tags (**section**, **header**, **nav**, ...) for those sections...
- The header should have a title (**h1**), a subtitle (**h2**) and a logo (**img**).
- The menu should have links to each of the online thrift store sections (Books, Electronics, ..... ) organized using an unordered list (**ul**). These links can simply point to example URLs.
- The thrift store body should have a section for each second hand/used item. Use the semantic tag **article**.
- Old items should have a title (**h3**), an introduction (**p**) and an image (**img**). It should also have a footer containing the owner name and age of used item.
- Don't forget to [validate](#) the page when you're done.

# IAD Project



Nabeel Khan

imnabeelkhan



## About Me

I am a man of three fairs: Integrity, Faith, and Crocodile tears.

## ✓ Features to get credits (20% + Bonus) :

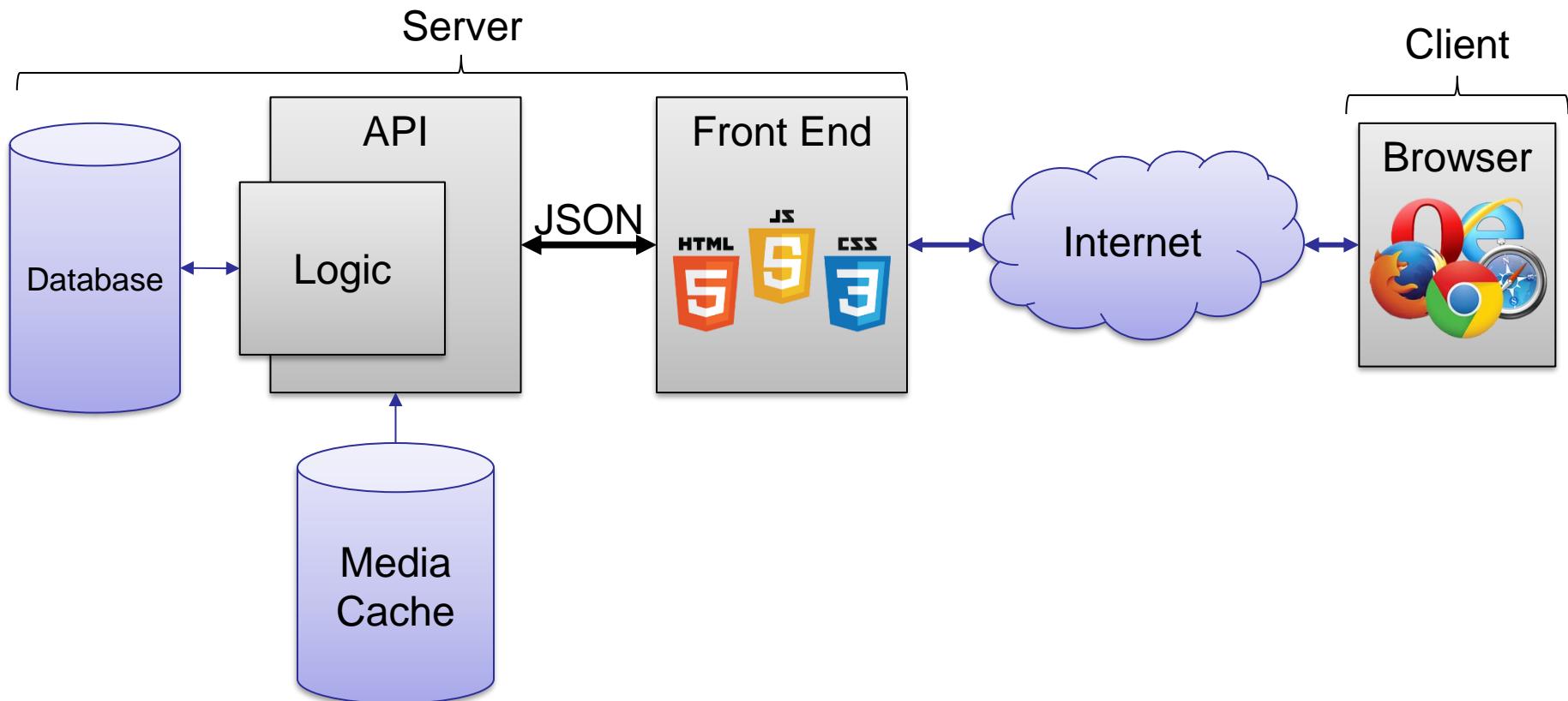
- 1) Web page **structure and appearance** with HTML5 and CSS
- 2) Client-side **interactivity and behavior** with JavaScript
- 3) Using web services (APIs) **on the front-end** with asynchronous JavaScript
- 4) Writing web services with **server-side** JavaScript via Node.js
- 5) Storing and retrieving information in a **database** with SqLite
  - *Go Mobile*
  - *Multimedia(sound + video) to enhance user experience*



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# IAD Project: Core Components of Internet Applications

- UI (Front End (DOM, Framework))
- Request Layer (Web API)
- Back End (Database, Logic)



# *Week 01*

*Internet Application Development*



Discussion  
Continued

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January 2025*

# Semantic Elements

Semantic element clearly describes its meaning to the browser and the developer.

- Examples: <table>, <form>, <header> and <footer>
- Non-semantic element tells nothing about its content. - Examples: <div> and <span>

<div> ... </div>	Block	block-level section of a page
<span> ... </span>	Inline	inline-level section of a page

## HTML5 Semantic Grouping Tags

Tag	Display	Description
<header>	Block	Container for a header of a document
<footer>	Block	Container for a footer of a document
<article>	Block	A standalone piece of content (e.g., entire blog post including title, author, etc.)
<section>	Block	A piece of content that is part of another (e.g., a chapter section of a reading)
<aside>	Block	Defines some content aside from the content it is placed in (e.g., a sidebar in an article)
<main>	Block	Specifies the main content of a document. The content inside should be unique to the document and not contain content that is repeated across pages (e.g., sidebars, nav links, search bars, etc.)

# Why Semantic Elements in HTML5?

- ✓ In <div>, we give an id or class which tells about what kind of content it is holding; either body, header or footer etc.
- ✓ In case of semantic elements of HTML5, tag name itself clearly defines what kind of code it's holding, and it is for which part of the website.
- ✓ Allows data to be shared and reused across applications, enterprises and communities.
- ✓ <header> <footer> <nav> <section> <article> looks more organized and easier.

# Basic wireframe using HTML5 Semantic Elements

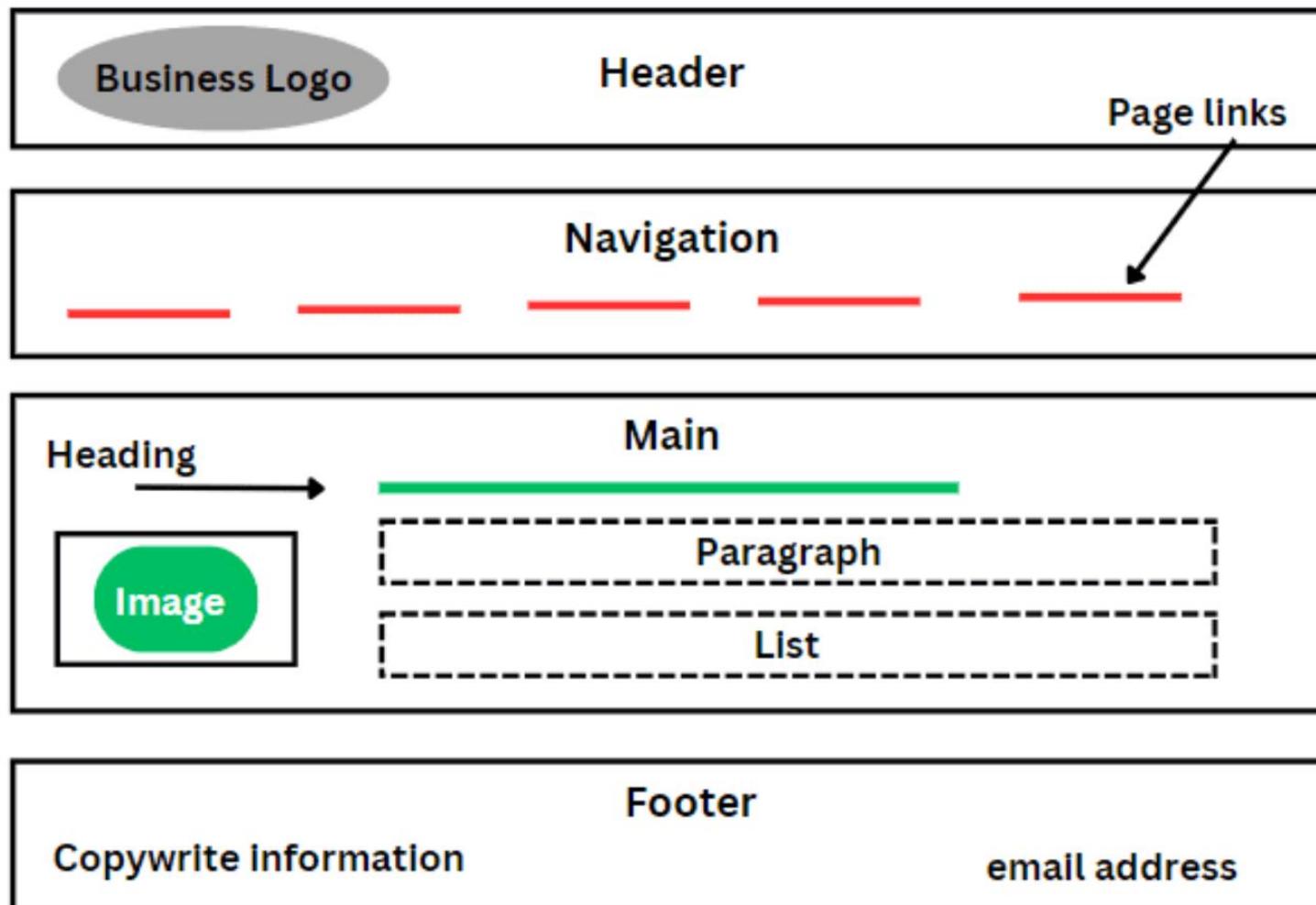


Fig: Basic webpage wireframe

Scientechn Easy

# Semantic Elements Example

index.html ●



stackblitzstartersq269pttc-ltw2--80

```
3   <header>
4     |   <h2>My Website</h1>
5   </header>
6   <nav>
7     |   <ul>
8       |     |   <li><a href="index.html">Home</a></li>
9       |     |   <li><a href="about.html">About</a></li>
10      |     |   <li><a href="about.html">Services</a></li>
11      |     |   <li><a href="#">Contact</a></li>
12     |   </ul>
13   </nav>
14
15   <article>
16     |   <p> Lets sale something to ubitians here </p>
17   </article>
18
19
20   <footer>
21     |   <p>Copyright BSCS 633 2025</p>
22   </footer>
23
24   </section>
25
```

# My Website

- [Home](#)
- [About](#)
- [Services](#)
- [Contact](#)

Lets sale something to ubitians here

Copyright BSCS 633 2025



### Syntax:

```
<a href="#section1" >section 1</a>
```

### Approach

- **Use the Anchor Tag `<a>`:** In HTML, use the `<a>` tag to create links within the same page.
- **Assign Unique IDs:** Assign unique IDs to different sections of the webpage using the `id` attribute.
- **Set the `href` Attribute:** Set the `href` attribute of the anchor tag to `"#section1"` (replace `"section1"` with the desired ID) to link to a specific section.
- **Avoid Using Class Names in `href`:** Class names are not unique identifiers and should not be used in the `href` attribute for internal linking.

# Dividing the webpage into sections using <div>

index.html X semantic.txt

P

II

...

↻

🔒

stackblitzstartersq269pttc-ltw2--...

```
1  <div id="container">
2    <div id="header">
3      <h2>My div Website</h2>
4    </div>
5
6    <div class="nav">
7      <ul>
8        <li><a href="index.html">Home</a></li>
9        <li><a href="about.html">About</a></li>
10       <li><a href="about.html">Services</a></li>
11       <li><a href="#">Contact</a></li>
12     </ul>
13   </div>
14
15   <div id="main">
16     <p>Lets sale something to juniors</p>
17   </div>
18
19   <div id="footer">Copyright BSCS633 supervisor HT.</
20     div>
21   </div>
```

## My div Website

- [Home](#)
- [About](#)
- [Services](#)
- [Contact](#)

Lets sale something to juniors

Copyright BSCS633 supervisor HT.



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*Quick Overview*  
*VS code*  
*DOM*  
*Chrome developer tools*

*Copyright © 2025, Humera Tariq*

*Department of Computer Science (DCS/UBIT)*  
*University of Karachi*  
*January 2025*

Open the Extension section and search for your extension in the search bar.

EXTENSIONS: MARKETPLACE

live server

Live Server

Launch a development local Server with I...

Ritwick Dey

Install

This screenshot shows the Visual Studio Code Marketplace interface. At the top, there's a search bar with the text "live server". Below the search bar, the "Live Server" extension by "Ritwick Dey" is listed. The developer's name, "Ritwick Dey", is highlighted with a red rectangle. To the right of the developer's name is a blue "Install" button. Above the developer's name, the extension's icon (a purple speaker-like icon) is displayed. To the right of the icon, the extension's name "Live Server" is shown in bold, followed by its download count "58M" and a star rating "4.5". Below the extension's name is a brief description: "Launch a development local Server with I...".

This PC > Storage (D:) > bscs\_633

Name

- css
- images
- script
- index.html

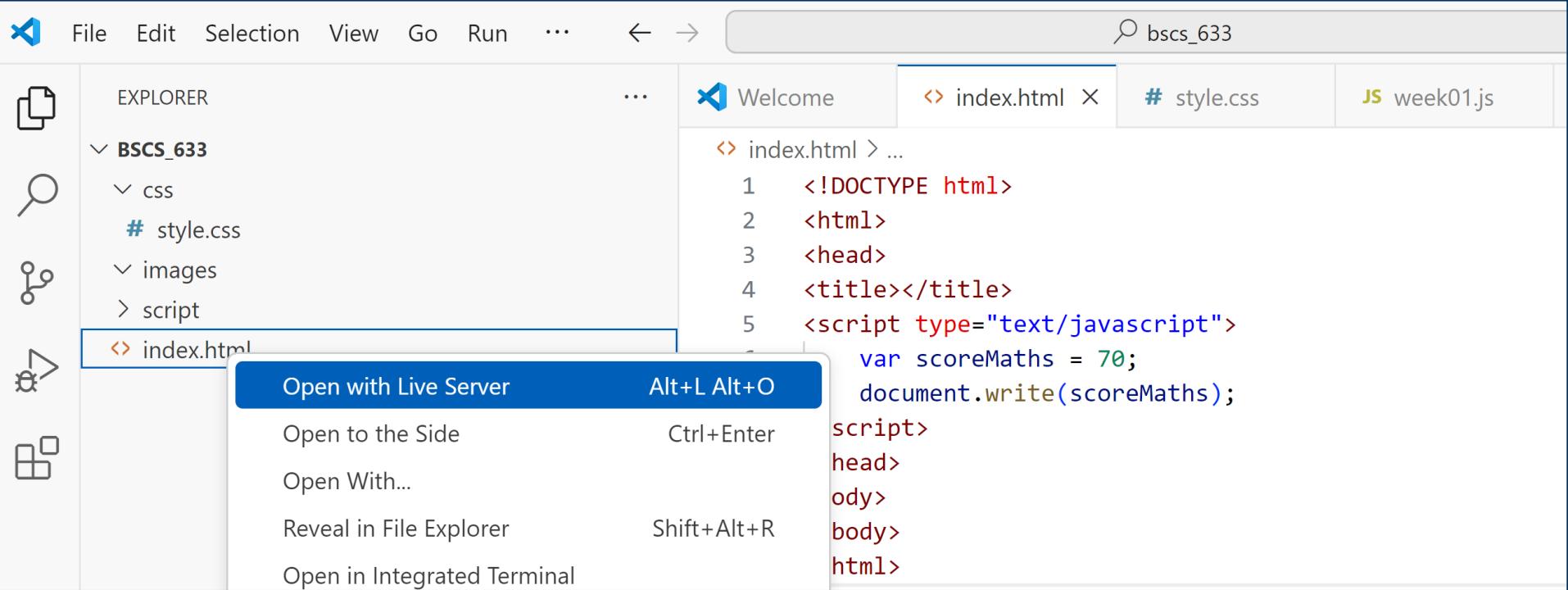
Sort View ...

EXPLORER

BSCS\_633

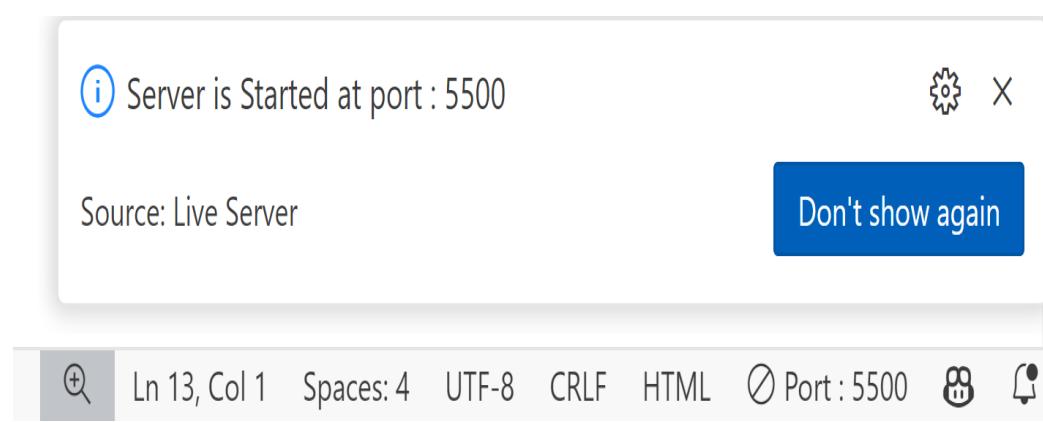
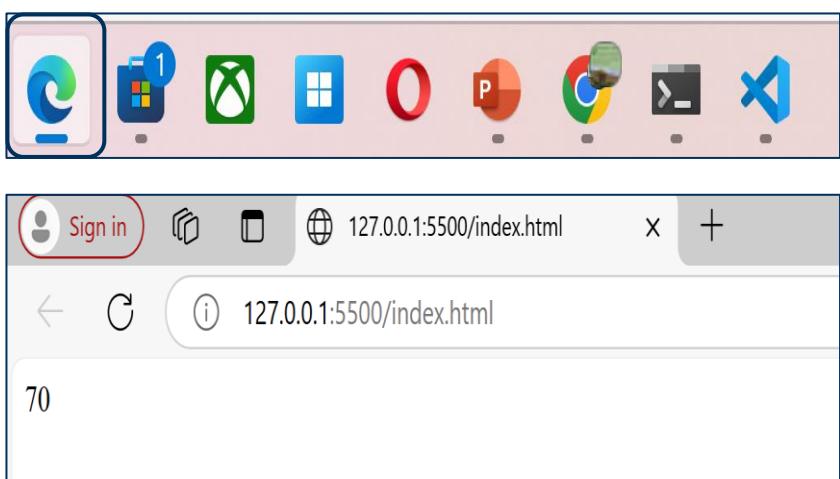
- css
- # style.css
- images
- script
- JS week01.js
- index.html

This screenshot shows a Windows File Explorer window. The path "This PC > Storage (D:) > bscs\_633" is visible at the top. On the left, there's a list of files and folders: "css", "images", "script", and "index.html". On the right, the "EXPLORER" view shows a tree structure for the "BSCS\_633" folder. It contains "css" (which further contains "style.css"), "images", "script" (which contains "week01.js"), and "index.html". A red box highlights the "script" folder in the Explorer view. At the bottom of the screen, the taskbar is visible with several pinned icons.



The screenshot shows the Visual Studio Code interface. The top bar includes File, Edit, Selection, View, Go, Run, and a search bar containing 'bscs\_633'. The Explorer sidebar shows a project structure for 'BSCS\_633' with files like 'style.css', 'images', and 'script'. The 'index.html' file is selected and has a context menu open. The menu items are: Open with Live Server (Alt+L Alt+O), Open to the Side (Ctrl+Enter), Open With... (Shift+Alt+R), Reveal in File Explorer, and Open in Integrated Terminal.

```
1 <!DOCTYPE html>
2 <html>
3 <head>
4 <title></title>
5 <script type="text/javascript">
var scoreMaths = 70;
document.write(scoreMaths);
</script>
<head>
<body>
</body>
</html>
```





Sign in



BSCS 633 Humera Tariq, World!



127.0.0.1:5500/index.html

Hello  
World!

The internet is a series of tubes.

index.html X style.css

JS week01.js

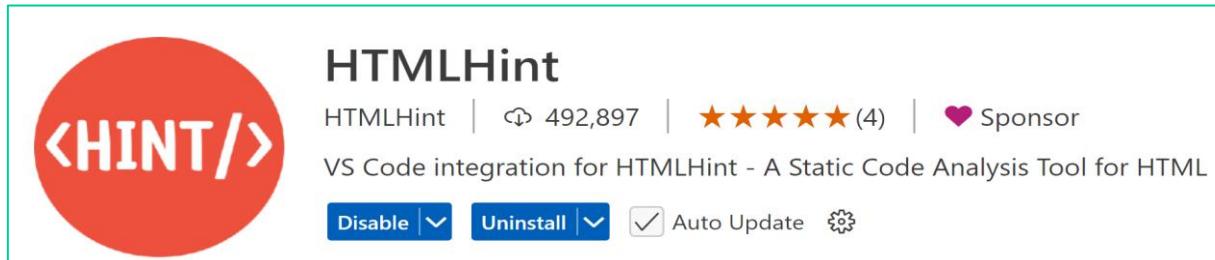
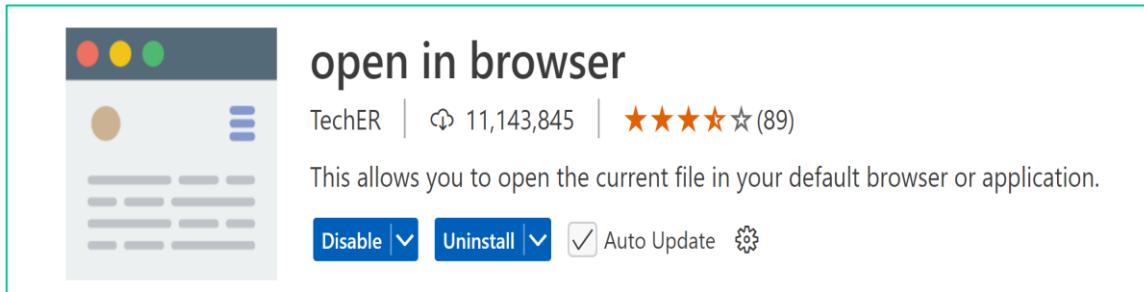
index.html > ...

```
1 <html lang="en">
2 <head>
3   <title> BSCS 633 Humera Tariq, World! </title>
4 </head>
5 <body>
6 <div>
7   <span>Hello <div>World!</div></span>
8   <src="hello.jpg" alt="image of hello" img>
9 </div>
10 <p>
11   BSCS 633 is the best class ever! #propagandamachine
12 </p>
13 <blockquote>
14   The internet is a series of tubes.
15 </body>
16 </html>
```



Visual Studio Code  
doesn't have HTML  
validation by default.  
But it allows you to  
add extensions and  
enable these  
features.

To add **HTML validation (linting)**, open Visual Studio Code, and then press **Ctrl + P**. Then paste ext install **HTMLHint** in it, and press Enter. It will install an HTML validator. You may need to reload Visual Studio Code to load the extension.





stackblitz.com/edit/stackblitz-starters-q269pttc?file=index.html

5 index.html X



stackblitzstartersq269pttc-ltw2--...



```
1 <html lang="en">
2 <head>
3 | <title> BSCS 633 Humera Tariq, World! </title>
4 </head>
5 <body>
6 <div>
7 | <span>Hello <div>World!</div></span>
8 | <src="hello.jpg" alt="image of hello" img>
9 </div>
10 <p
11 | BSCS 633 is the best class ever! #propagandamachine
12 </p>
13 <blockquote>
14 | The internet is a series of tubes.
15 </body>
16 </html>
```

Hello  
World!

The internet is a series of tubes.



srcfme.com

ID 34210352 © Stuart Miles

Terminal +

```
█ Serving: /home/projects/stackblitz-starters-q269pttc
█ Local: http://localhost:8080
█ Network: http://192.168.1.104:8080
```

## ▼ &lt;&gt; index.html 6

- ⚠ Doctype must be declared first. (doctype-first) [Ln 1, Col 1]
- ⚠ Special characters must be escaped : [ < ]. (spec-char-escape) [Ln 8, Col 2]
- ⚠ Special characters must be escaped : [ > ]. (spec-char-escape) [Ln 8, Col 43]
- ⚠ Special characters must be escaped : [ < ]. (spec-char-escape) [Ln 10, Col 1]
- ⚠ Tag must be paired, no start tag: [ </p> ] (tag-pair) [Ln 12, Col 1]
- ⚠ Tag must be paired, missing: [ </blockquote> ], start tag match failed [ <blockquote> ] on line 13. (tag-pair) [Ln 15, Col 1]

&lt;&gt; index.html 6 ×

Extension: open in browser

# style.css

JS week01.js

&lt;&gt; index.html &gt; html

```
1  <html lang="en">
2  <head>
3  | <title> BSCS 633 Humera Tariq, World! </title>
4  </head>
5  <body>
6  <div>
7  | <span>Hello <div>World!</div></span>
8  | <src="hello.jpg" alt="image of hello" img>
9  </div>
10 <p>
11 | BSCS 633 is the best class ever! #propagandamachine
12 </p>
13 <blockquote>
14 | The internet is a series of tubes.
15 </body>
16 </html>
```

# First look at HTML, DOM and JS!

```
<!doctype html>
<html>
  <head>
    <title>Hello, world!</title>
  </head>
  <body>
    <h1>Hello, world!</h1>
    <p>This is a hypertext document on the World Wide Web.</p>
    <script src="/script.js" async></script>
  </body>
</html>
```

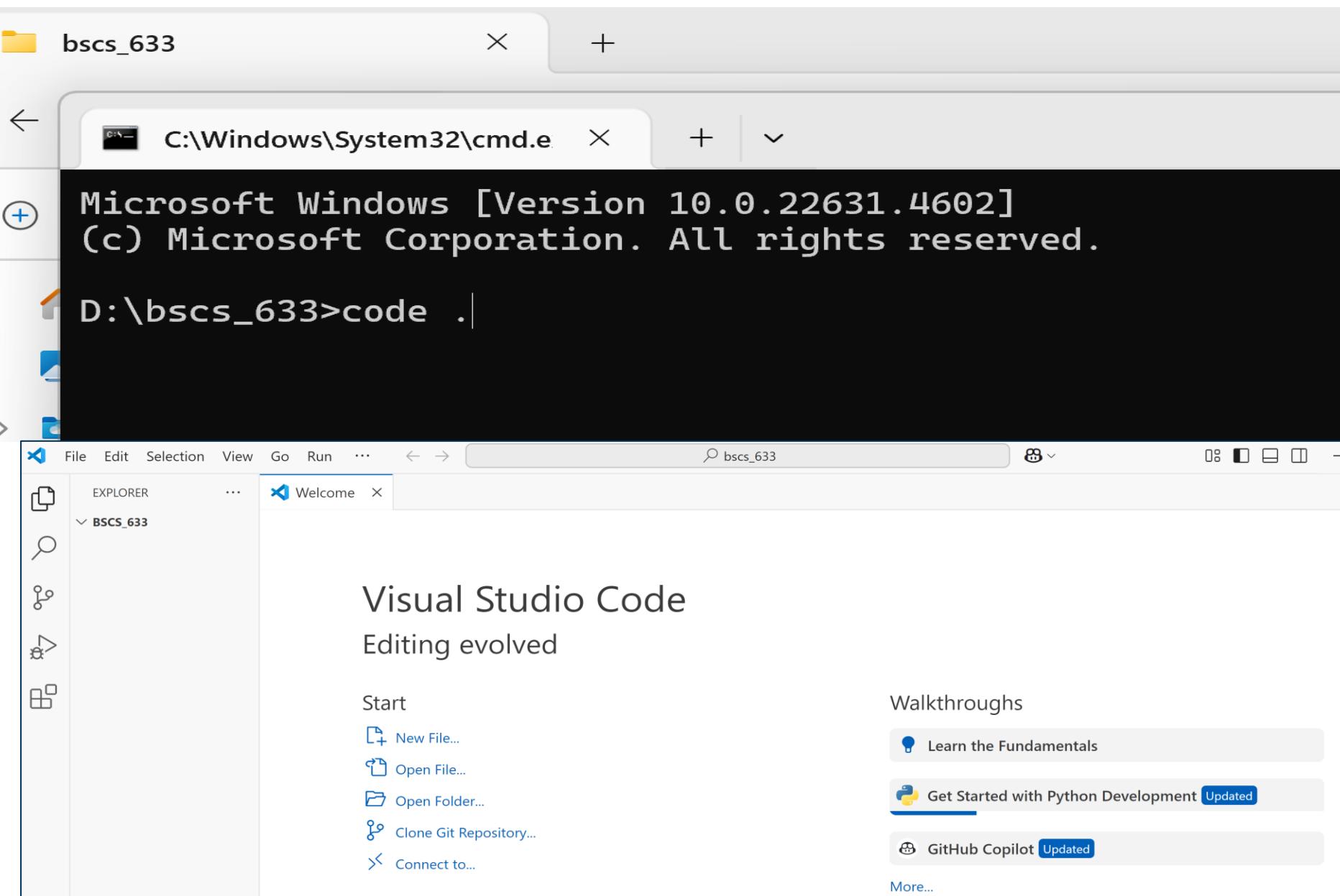
```
html
  head
    title
  body
    h1
    p
    script
```

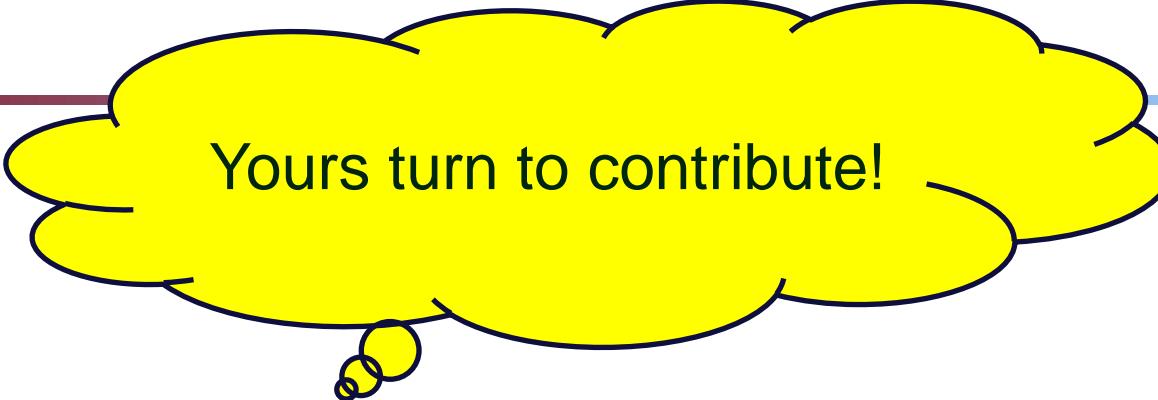
```
const h1 = document.querySelector('h1');
h1.parentElement.removeChild(h1);
const p = document.createElement('p');
p.textContent = 'Wildcard!';
document.body.appendChild(p);
```



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# Create project folder and open in VSCode





Yours turn to contribute!

## Class Activity 1: Arrange and Translate the given workflow into a schematic/block diagram showing the sequence with appropriate numbering

- ✓ The script referenced at the bottom of the HTML runs controller code
- ✓ The browser parses the HTML and creates a tree of objects
- ✓ The JS code removes the h1 node and adds another p node to the DOM.
- ✓ When you use a web browser to request a page like <https://example.com> the server returns HTML
- ✓ The page's HTML is now different than its DOM.



# Class Activity 2

Yours turn to contribute!

a) Write and draw a new DOM as Tree!

```
html
  head
    title
  body
    h1
    p
  script
```

```
const h1 = document.querySelector('h1');
h1.parentElement.removeChild(h1);
const p = document.createElement('p');
p.textContent = 'Wildcard!';
document.body.appendChild(p);
```

b) Choose the best word/rewrite given line using correct words:

(HTML,DOM) represents initial page content/state, and the

(HTML,DOM) represents current page content. When (HTML,

JavaScript,DOM) adds, removes, or edits nodes, the (HTML,DOM,JS)

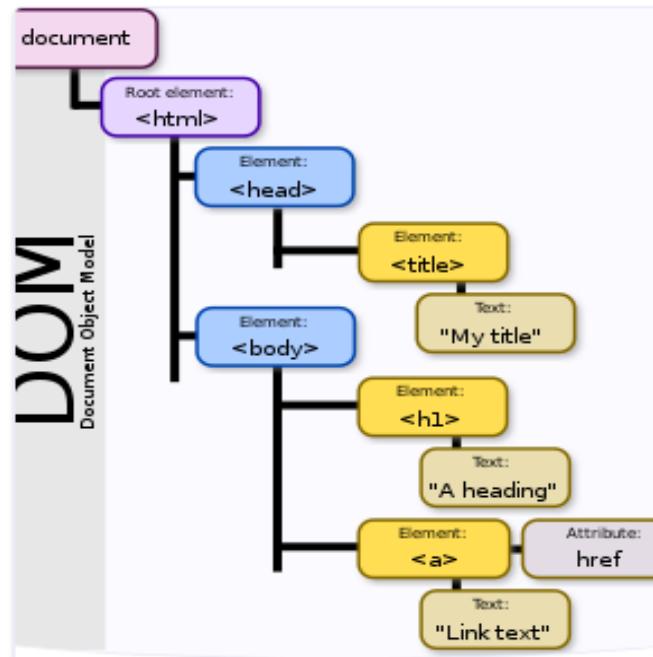
becomes different than the (HTML, DOM,JS).



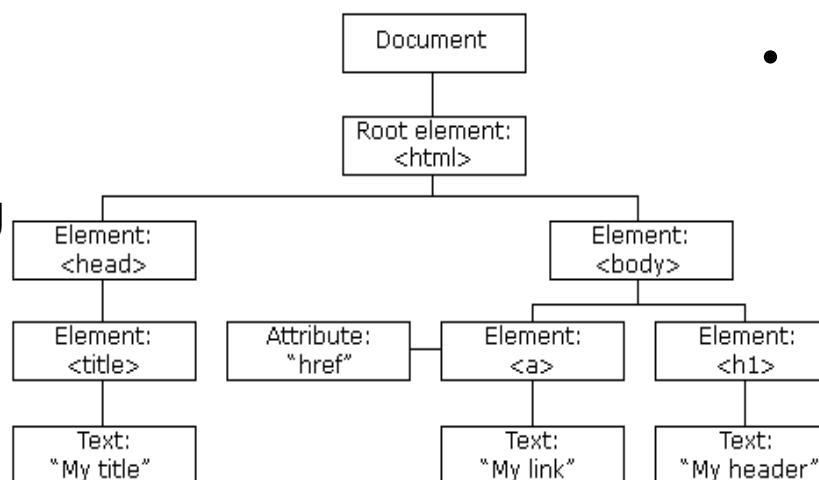
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# What the heck is the DOM?

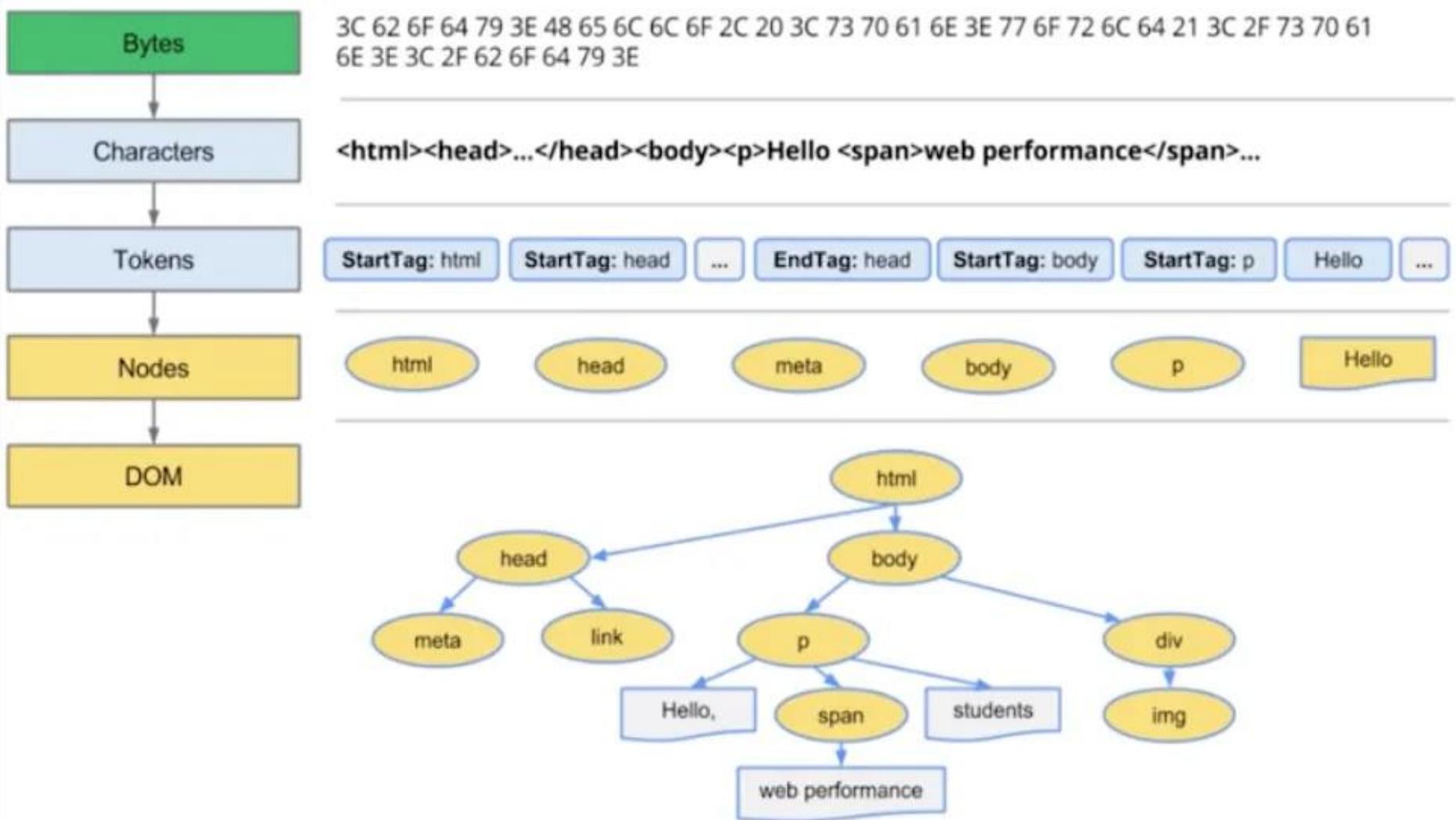
- Your web browser builds a *model* of the web page (the *document*) that includes all the *objects* in the page (tags, text, etc)
- All of the properties, methods, and events available to the web developer for manipulating and creating web pages are organized into objects
- Those objects are accessible via scripting languages in modern web browsers



- Document Object Model makes every addressable item in a web application an Object that can be manipulated for color, transparency, position, sound and behaviors.
- Every HTML Tag is a DOM object



HMTL is a Page Description Language, like PDF, or post script



# *Take home*

## *Internet Application Development*

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*Department of Computer Science (DCS/UBIT)*  
*University of Karachi*  
*January 2025*

## ***Practice, Practice , Practice.....***

<https://developer.chrome.com/docs/devtools>

<https://www.youtube.com/watch?v=wcFnnxfA70g>

<https://stackblitz.com/register>

“StackBlitz is the first online IDE whose compute model makes sense to me.”



**Tom Preston-Werner**

founder of GitHub & investor in StackBlitz



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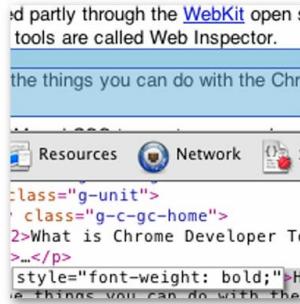
# Chrome Developer Tools Cheat Sheet

Open with **Ctrl - Alt - I** or **right click** and **inspect element**. View keyboard shortcuts with **?**

## HTML

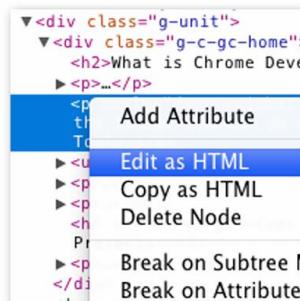
### Edit DOM attributes inline

In *Elements* tab or styles drawer, **double click** attribute.



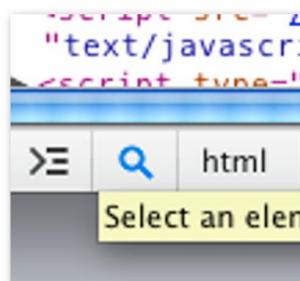
### Edit chunks of HTML

In *Elements* tab, **right click** an element and select "Edit as HTML"



### Visually inspect DOM elements

In *Elements* tab, **click** footer button or **Ctrl - Shift - C** and select desired element in page.

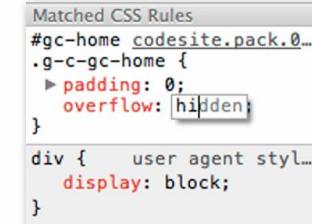


## CSS

### Inline CSS per-element styling

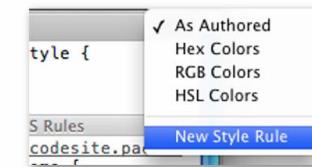
In *Elements* sidebar, **double click** CSS

- Autocompletion of keys and values
- Tab** between keys and values
- Double click** after closing bracket to add new property



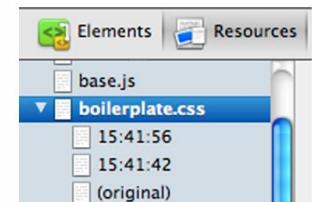
### Create new CSS rules

Click on gear icon in *Elements* sidebar



### Free form CSS editing

In *Resources* sidebar, **double click** CSS and **Ctrl - S**



### Versioned CSS/JS

CSS/JS changes get saved into versions

- Right click** and revert to a revision.
- Right click** and save back to a local file.



# Chrome Developer Tools Cheat Sheet

Open with **Ctrl - Alt - I** or **right click** and **inspect element**. View keyboard shortcuts with **?**

## JavaScript

### Console

Invoke with **Esc** or **Ctrl - Alt - J** or *Console*

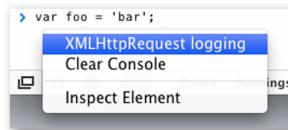
- Get current DOM element with `$0`

```
> var foo = 'bar';
```

Icons: Stop, Run, Clear, All

### Console API

- `copy(text)` – copy text to clipboard
- `dir(elt)` – show element properties
- `inspect(elt)` – open in *Elements* tab

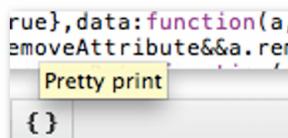


### Edit chunks of JavaScript

In *Scripts* tab, **double click** script to edit. **Ctrl - S** to save

- Go to line with **Ctrl - L**

### Script pretty printing



### Breakpoints

In *Scripts* tab, **click** in the gutter

- Conditional breakpoints  
**right click** the gutter
- DOM breakpoints  
in *Elements* tab, right click
- XHR breakpoints  
in *Scripts* sidebar **+** to filter by URL
- Event listener breakpoints  
In *Scripts* sidebar, check off type
- Exception breakpoints  
In *Scripts* tab, break icon in footer

```
5
6
7
8
9
10
11
12
13
```

```
if(!url)
    return url;
// If URL is absolute
if(/^\/[a-z\-\_]+\:\d+$/i.test(url))
    return url;
// Leading /
if(url[0] == '/')
    return document.location.href;
// Remove filename and extension
var base = document.baseURI;
if(!base) return document.location.href;
```

▶ Breakpoints  
▶ DOM Breakpoints  
▼ XHR Breakpoints +  
 Any XHR  
▼ Event Listener Breakpoints  
▶ Keyboard  
▶ Mouse

```
function theFunction()
  listen_for_broadcast();
  dispatcher[function() {
    ...
  }];
}
```

```
9
10
11
12
13
14
15
16
```

```
"http://code.google.com/p/chromium/codesearch#chromium/src/third_party/WebKit/Source/JavaScriptCore/loader/ResourceFetcher.cpp
if(url[0] == '/')
    return document.location.href;
// Remove filename and extension
var base = document.baseURI;
if(!base) return document.location.href;
```

### Variable inspection

When at a breakpoint, **hover** over variable

by @borismus and @paul\_irish



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# Chrome Developer Tools Cheat Sheet

Open with **Ctrl - Alt - I** or **right click** and **inspect element**. View keyboard shortcuts with **?**

A hands-on walk-through tweaking a web application using the developer tools is Fun!

<https://developer.chrome.com/docs/devtools>

<https://developer.chrome.com/docs/devtools/overview>

- [View and change the DOM](#)
- [View and change CSS](#)
- [Debug JavaScript](#)
- [View messages and run JavaScript in the Console](#)
- [Optimize website speed](#)
- [Inspect network activity](#)



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# HMTL is a Page Description Language, like PDF, or post script

## HTML

HTML means Hyper Text Markup Language.

The HTML allow us to define the structure of a document or a website.

HTML is **NOT** a programming language, it's a markup language, which means its purpose is to give structure to the content of the website, not to define an algorithm.

It is a series of nested tags (it is a subset of XML) that contain all the website information (like texts, images and videos). Here is an example of tags:

```
<title>This is a title</title>
```

The HTML defines the page structure. A website can have several HTMLs to different pages.

```
<html>
  <head>
  </head>
  <body>
    <div>
      <p>Hi</p>
    </div>
  </body>
</html>
```

# HTML: some basic rules

- It uses **XML** syntax (tags with attributes, can contain other tags).  
`<tag_name attribute="value"> content </tag_name>`
- It stores all the information that must be shown to the user.
- There are different **HTML** elements for different types of information and behaviour.
- The information is stored in a tree-like structure (nodes that contain nodes inside) called **DOM** (Document Object Model).
- It gives the document some semantic structure (pe. this is a title, this is a section, this is a form) which is helpful for computers to understand websites content.
- It must not contain information related to how it should be displayed (that information belongs to the **CSS**), so no color information, font size, position, etc.

# Building the HTML Page

An HTML page is a collection of nodes represented by text elements contained in angle brackets.

HTML is a page description language.

A browser connects to an HTTP server through an Internet connection and specifies a text file containing HTML code that should be returned down the TCP pipe to the requesting browser.

The browser contains an HTML rendering engine which knows how to parse the HTML document object model and render the described content onto the screen of the device.

The original HTML specification prescribed only text and images. [The current HTML specification-HTML 5](#)-allows for the use of plug-ins which can accommodate the rendering of additional rich media types such as sound and video.







**"Don't be satisfied with stories, how things have gone with others. Unfold your own myth." ~Rumi**





## Department of Compute Science (UBIT Building), Karachi, Pakistan.

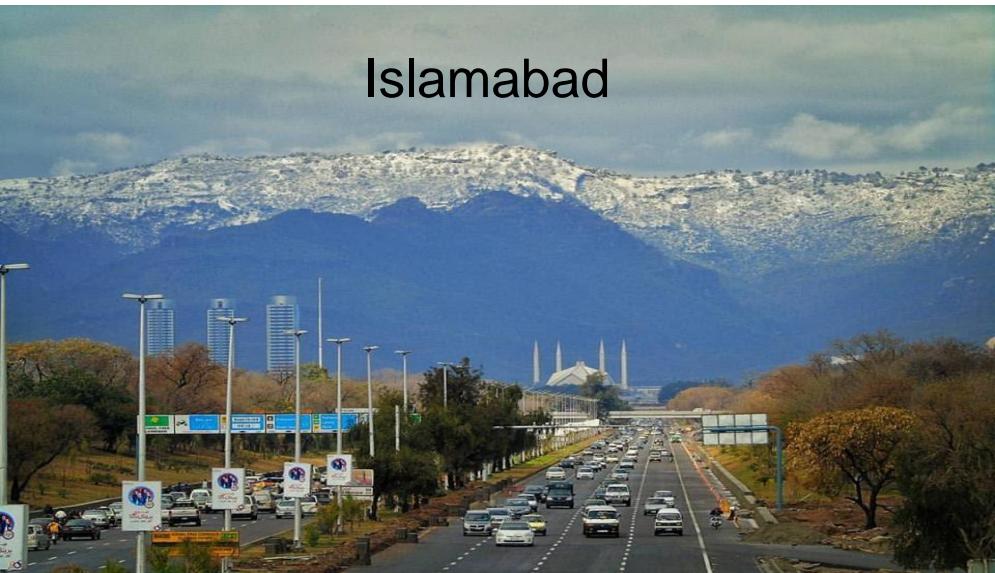
1200 Acres (5.2 Km sq.)  
53 Departments  
19 Institutes  
25000 Students



# My Homeland Pakistan



Karachi



Islamabad



Lahore



Peshawar