**THEORY OF EACH WP EXPERIMENT LAB FILE**

**Text Editor Used: -**

**Visual Studio Code (VS Code)**

**Visual Studio Code,** also commonly referred to as **VS Code,** is a source-code editor developed by Microsoft for Windows, Linux, macOS and web browsers. Its features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded version control with Git. Users can change the theme, keyboard shortcuts, preferences, and install extensions that add functionality. In the Stack Overflow 2023 Developer Survey, Visual Studio Code was ranked the most popular developer environment tool among 86,544 respondents, with 73.71% reporting that they use it.

**History: -**

**Visual Studio Code** was first announced on April 29, 2015 by Microsoft at the 2015 Build conference. A preview build was released shortly thereafter. On November 18, 2015, the project **"Visual Studio Code - Open Source" (also known as "Code - OSS"),** on which Visual Studio Code is based, was released under the open-source MIT License and made available on GitHub. Extension support was also announced. On April 14, 2016, Visual Studio Code graduated from the public preview stage and was released to the web.

**Features: -**

**Visual Studio Code** is a source-code editor that can be used with a variety of programming languages, including **C, C#, C++, Fortran, Go, Java, JavaScript, Node.js, Python, Rust, and Julia.** Visual Studio Code employs the same editor component (codenamed **"Monaco"**) used in Azure DevOps (formerly called **"Visual Studio Online" and "Visual Studio Team Services").** The downloadable version of Visual Studio Code is built on the Electron framework, which is used to develop Node.js web applications that run on the Blink layout engine.

Out of the box, Visual Studio Code includes basic support for most common programming languages. This basic support includes syntax highlighting, bracket matching, code folding, and configurable snippets.

Visual Studio Code also ships with IntelliSense for JavaScript, TypeScript, JSON, CSS, and HTML, as well as debugging support for Node.js. Support for additional languages can be provided by freely available extensions on the VS Code Marketplace.

Instead of a project system, it allows users to open one or more directories, which can then be saved in workspaces for future reuse. This allows it to operate as a language-agnostic code editor for any language. It supports many programming languages and a set of features that differs per language. Unwanted files and folders can be excluded from the project tree via settings. Many Visual Studio Code features are not exposed through menus or the user interface but can be accessed via the command palette. The command palette is able to execute virtually every feature the graphical interface supports, making it very keyboard-accessible.

Visual Studio Code can be extended via extensions, available through a central repository. This includes additions to the editor and language support. A notable feature is the ability to create extensions that add support for new languages, themes, debuggers, time travel debuggers, perform static code analysis, and add code linters using the Language Server Protocol.

Source control is a built-in feature of Visual Studio Code. It has a dedicated tab inside of the menu bar where users can access version control settings and view changes made to the current project. To use the feature, Visual Studio Code must be linked to any supported version control system (Git, Apache Subversion, Perforce, etc.). This allows users to create repositories as well as to make push and pull requests directly from the Visual Studio Code program.

**Exp 1: -**

**Theory:** Creating a CV in HTML involves using various HTML tags to structure and organize information effectively.

1. Semantic Structure Tags:
   * <header>: For the CV title or personal details.
   * <section>: To group content like contact info, education, work experience, etc.
   * <h1>, <h2>, etc.: Headings to organize sections hierarchically.
2. Lists:
   * <ul>: Unordered lists for items like skills or contact details.
   * <ol>: Ordered lists for sequences like work experiences with dates.
3. Tables:
   * <table>, <tr>, <th>, <td>: Create tables for tabular data, e.g., skills with proficiency levels.
4. Text Formatting:
   * <p>, <strong>, <em>: Paragraphs and text formatting for descriptions, emphasizing text, etc.
5. Links:
   * <a>: For hyperlinks to external pages or sections within the document.
   * mailto: Linking email addresses to allow direct emailing.
6. Styling:
   * CSS: Apply styles for better visual presentation, including fonts, colours, layout adjustments, etc.

**Learning Outcome:** Proficiency in employing various HTML tags and structures to effectively organize and present information in a CV format on the web. This includes using semantic elements, lists, tables, and proper structuring techniques to create a clear and accessible document.

**Exp 2: Create a webpage that displays brief details of various programming language using various types of CSS.**

**Theory:** While HTML stands for Hyper Text Markup Language and is used to create the basic structural layout of the webpage, CSS stands for Cascading Style Sheets and it helps to add vibrancy and appeal to the webpage and describes to the user how to display HTML elements on the screen in a proper format. In simple words, cascading style sheets are a language used to simplify the process of making a webpage. With the help of CSS, we can control the colour of text and style of fonts, and we can control the spacing between the paragraph and many more things. CSS is easy to understand and provides strong control on the webpage combined with HTML.

Some Advantages of CSS are:

* Faster page speed
* Better user experience
* Quicker Development time
* Easy Formatting changes
* Compatibility

CSS is a powerful style sheet language used to control the HTML document to improve the webpage design.

* CSS provides efficiency in webpage design along with updates so our webpage works appropriately. With the help of CSS, we can create and apply those rules within the website. If we create a webpage design separately, we can make changes in our style sheet, and it will affect all the style sheets.
* CSS provides faster page download: CSS helps with faster page download because when we download a page, we get the cache that helps to load a page, but with the help of CSS, we can lead to load a lighter page which helps to improve the performance.
* CSS is easy to work: In CSS, we can visually inspect the entire website, separately from the content.

There are three types of CSS:

* **Inline CSS:** It is used to style the elements of HTML documents. It is used in HTML to style the attributes without using the selectors. It is challenging to manage the inline function in websites compared to other types. It is very helpful in Html in some situations.
* **Internal CSS:** It is used to design the style single page effectively. It is more time-consuming because we can only work on one page or we need to style each web page. In internal CSS, we style a single webpage uniquely.
* **External CSS:** It is used to link all webpage with an external file. CSS, which can be created in a text file. It is more efficient for styling an extensive webpage. It also increases the readability of the CSS files.

**Learning Outcome:** Proficiency in employing various HTML and CSS tags and structures to effectively organize and present information about various programming languages on the web. This includes using various types of CSS along with several tags of HTML and CSS to create a clear and accessible webpage.

**Exp 3: Create a webpage using JavaScript and HTML to demonstrate Simple Calculator Application.**

JavaScript is a lightweight, cross-platform, single-threaded, and interpreted compiled programming language. It is also known as the scripting language for webpages. It is well-known for the development of web pages, and many non-browser environments also use it.

JavaScript is a [weakly typed language](https://www.geeksforgeeks.org/type-systemsdynamic-typing-static-typing-duck-typing/) (dynamically typed). JavaScript can be used for [Client-side](https://www.geeksforgeeks.org/server-side-client-side-programming/) developments as well as [Server-side](https://www.geeksforgeeks.org/server-side-client-side-programming/) developments. JavaScript is both an imperative and declarative type of language. JavaScript contains a standard library of objects, like [Array](https://www.geeksforgeeks.org/arrays-in-javascript/), [Date](https://www.geeksforgeeks.org/javascript-date-objects/), and [Math](https://www.geeksforgeeks.org/javascript-math-object/), and a core set of language elements like [operators](https://www.geeksforgeeks.org/javascript-operators/), control structures, and [statements](https://www.geeksforgeeks.org/javascript-statements/).

* **Client-side**: It supplies objects to control a browser and its [Document Object Model (DOM).](https://www.geeksforgeeks.org/dom-document-object-model/) Like if client-side extensions allow an application to place elements on an HTML form and respond to user events such as mouse clicks, form input, and page navigation.
* **Server-side**: It supplies objects relevant to running JavaScript on a server. For if the server-side extensions allow an application to communicate with a database, and provide continuity of information from one invocation to another of the application, or perform file manipulations on a server. NodeJS is popularly used for this these days.
* **Imperative language**: In this type of language, we are mostly concerned about how it is to be done. It simply controls the flow of computation. The procedural programming approach, object, oriented approach comes under this as async await we are thinking about what is to be done further after the async call.
* **Declarative programming**: In this type of language, we are concerned about how it is to be done, basically here logical computation requires. Here main goal is to describe the desired result without direct dictation on how to get it as the arrow function does.

Some applications of JavaScript include:

1. Web Development
2. Web application
3. Server application
4. Games
5. Machine Learning
6. Mobile Applications
7. Smartwatches
8. Art

JavaScript can be added to HTML file in [two ways](https://www.geeksforgeeks.org/where-to-put-javascript-in-an-html-document/):

* Internal JS: We can add JavaScript directly to our HTML file by writing the code inside the <script> tag. The <script> tag can either be placed inside the <head> or the <body> tag according to the requirement.
* [External JS](https://www.geeksforgeeks.org/what-is-external-javascript/): We can write JavaScript code in other files having an extension.js and then link this file inside the <head> tag of the HTML file in which we want to add this code.

**Learning Outcome:** Proficiency in employing HTML and CSS in combination with JavaScript using various tags and structures to effectively present the basic calculator to solve arithmetic equations on the web. This includes using on-click feature in JavaScript along with various types of CSS and HTML tags to create a fully functional calculator webpage.

**Exp 4: Create a web page covering the basic CRUD operations (Create, Read, Update, Delete) that implements To-do/Grocery lists using JavaScript and HTML.**

This HTML document is a simple web application that allows users to manage a to-do or grocery list. It includes features for adding, editing, and deleting items, as well as displaying them in a structured table format. Below is a breakdown of the main components and functionalities of the code, along with an overview of the relevant HTML and JavaScript concepts used.

**JavaScript Basics**

* Variables: Used to store data (e.g., let items = [];).
* Functions: Blocks of code that perform specific tasks (e.g., function addItem()).
* DOM Manipulation: Accessing and modifying HTML elements dynamically (e.g., document.getElementById()).
* Event Handling: Responding to user actions, such as clicking buttons (e.g., onclick="addItem()").

**JavaScript Functionality**

1. Variables and Functions:
   * let items = []; initializes an empty array to store the grocery list items.
   * Functions like addItem(), clearInputs(), renderItems(), editItem(), and deleteItem() handle the main functionality of the application.
2. Adding Items:
   * The addItem() function retrieves values from input fields, validates them, and adds the item to the items array if valid.
   * It uses document.getElementById() to access DOM elements and alert() to notify users of invalid inputs.
3. Rendering Items:
   * The renderItems() function dynamically generates table rows for each item in the items array.
   * It utilizes innerHTML to insert HTML content into the table, creating a row for each item with options to edit or delete.
4. Editing and Deleting Items:
   * The editItem(index) function prompts the user to enter new values for an existing item. If valid, it updates the item in the array and re-renders the list.
   * The deleteItem(index) function removes an item from the array after confirming with the user.

**CSS Styling**

* The CSS rules define the appearance of the body, input fields, buttons, and table elements.
* Styles include:
  + Font family and margins for the body.
  + Width and padding for input fields.
  + Table styling, including borders and background colours for headers.

**Learning Outcome:** Proficiency in employing HTML and JavaScript to demonstrate fundamental concepts of HTML, CSS, and JavaScript in building a functional web application for a Grocery/To-Do List. It showcases how to structure a web page, style it for better user experience, and implement interactivity through JavaScript.

**EXP 5: - Create a JavaScript application based on various Data Types, Statements, Keywords and Operators.**

In programming, data types are an important concept. To be able to operate on variables, it is important to know something about the type. Without data types, a computer cannot function safely and properly.

A JavaScript variable can hold any type of data. The var keyword is used to declare a variable. It has a function-scoped or globally-scoped behaviour. The let keyword is a block-scoped variables. It’s commonly used for variables that may change their value. The const keyword declares variables that cannot be reassigned. It’s block-scoped as well. When adding a number and a string, JavaScript will treat the number as a string. JavaScript evaluates expressions from left to right. Hence, different sequences may produce different results at times.

JavaScript has dynamic types. This means that the same variable can be used to hold different data types. JavaScript has 8 Datatypes: -

1. [Number:](https://www.geeksforgeeks.org/javascript-numbers/) JavaScript numbers are always stored in double-precision 64-bit binary format IEEE 754. Unlike other programming languages, you don’t need int, float, etc to declare different numeric values.
2. [String:](https://www.geeksforgeeks.org/javascript-strings/) JavaScript Strings are similar to sentences. They are made up of a list of characters, which is essentially just an “array of characters”.
3. [Boolean:](https://www.geeksforgeeks.org/javascript-boolean/) Represent a logical entity and can have two values: true or false.
4. [Null:](https://www.geeksforgeeks.org/null-in-javascript/) This type has only one value that is null.
5. [Undefined:](https://www.geeksforgeeks.org/undefined-in-javascript/) A variable that has not been assigned a value is undefined.
6. [Symbol:](https://www.geeksforgeeks.org/javascript-symbol-method/) Symbols return unique identifiers that can be used to add unique property keys to an object that won’t collide with keys of any other code that might add to the object.
7. [BigInt:](https://www.geeksforgeeks.org/bigint-in-javascript/) BigInt is a built-in object in JavaScript that provides a way to represent whole numbers larger than 2^53-1.
8. Object: It is the most important data type and forms the building blocks for modern JavaScript. We will learn about these data types in detail in further articles.

Out of these the first 7 are primitive data types and the last one i.e. object is a non-primitive data type.

**EXP 6 to 10 in the File itself**