JavaScript

JavaScript Introduction:-

Ans:-(1)

Javascript is most popluar scripting programming language. Javascript is client & server both side used. which is used to created web side, game etc…using dynamic content.

Role of web devlopment:-

→Using javascript is adds interactivity to web pages. It's used to create dynamic content, animations, and more.

→ JavaScript can dynamically update HTML and CSS to change the content of a web page.

→ JavaScript can take data entered into a form and use it to generate a response.

Ans:-(2)

How is JavaScript different from other programming language:-

1) Runs in the Browser :- JavaScript is primarily used to run inside web browsers, making websites interactive.

2) **Interpreted, Not Compiled**:- JavaScript doesn't need a separate compilation. It runs directly in the browser or runtime environment.

3) **Object-Based:-** While JavaScript supports Object-Oriented Programming, it class-based structures like Java or C#.

Ans:-(3)

Discuss the use of <script>tag in HTML .how can you link external Javascript in HTML:-

The <script> tag in HTML is used to embed JavaScript code within a web page.

Example:-

```
<script>
   alert("Hello, World!");
</script>
```

External Javascript in HTML:-

JavaScript in an external file and link into Use the <script> tag with the src attribute to reference an external .js file.

Example:-

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

Lab Assisment:-

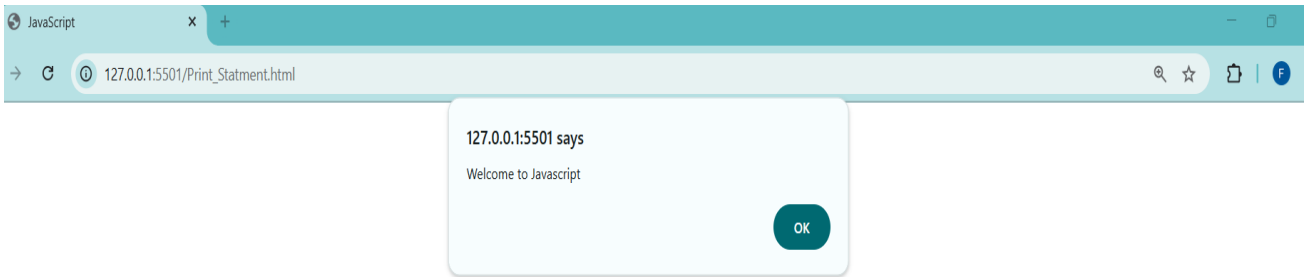
Go Run ··· Assignment_Program

Print_Statment.html

Print_Statment.html > html > body > script

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>JavaScript</title>
</head>
<body>
    <script>
        alert("Welcome to Javascript");
    </script>
</body>
</html>
```

Output:-



Variables and Data Types:-

Ans(1):-What are variables in JavaScript? How do you declare a variable:-

Variable are container for storing value.In Javascript 3 diffrente way to declare variable.

Let:- This is can't redeclare but reassign is possible using let keywords.

Var:- Redeclare and reassign both are possible using var keyword.

Const:- Redeclare and reassign both are not possible using const keywords.

Example:-

```
let a=23;

console.log(a)

var name='Foram';

console.log(name);

const pi=3.14;

console.log(3.14)
```

Ans(2):- Explain the different data types in JavaScript. Provide examples for each.

Javascript is mainly 2 categories .Primitive and Non-primitive data-type.

Primitive :- Primitive data type that means only store single value and changeable it.

(1)Number:-integer number.

Example:-

```
let age = 25;

let price = 99.99;

console.log(age,  price);

 Output: 25 99.99
```

(2)String:- string is collection of characters.

Example:-

```
let name = "John Doe";

console.log(name);

Output: string
```

(3)Boolean:- Boolean is store true or flase value. true representation1 and false representation 0.

Example:-

```
let isLoggedIn = true;

console.log(isLoggedIn);

 Output: Boolean
```

(4)Undefine:- undefined means variable that has not been assigned a value is of type.

Example:-

```
let x;

console.log(x);

Output: undefined
```

(5)Null :- Null is a special value that represents an empty or unknown value.

Example:-

```
let y = null;

console.log(typeof y);

Output: object
```

Non-Primitive:- Non-primitive data type that means store multiple value and that can't be changeable.

(1)Object:- Object is key value pairs.

Example:-

```
let person = { firstName: "John", lastName: "Doe", age: 30 };

console.log(person);

Output: john , Doe,30
```

(2)Array:-Array is collection of similar data type.

Example:-

```
let numbers = [1, 2, 3, 4, 5];

console.log(numbers);

Output: 1,2,3,4,5
```

Ans(3) :- What is the difference between undefined null in JavaScript:-

Undefined:- A variable that has been declare but has not been assigned value.

Example:-

```
let x;

console.log(x);
```

Output:-

Undefined

Null:- Represents an intentional absence value. type is object.

Example:-

let y = null;

console.log(y);

Output:-

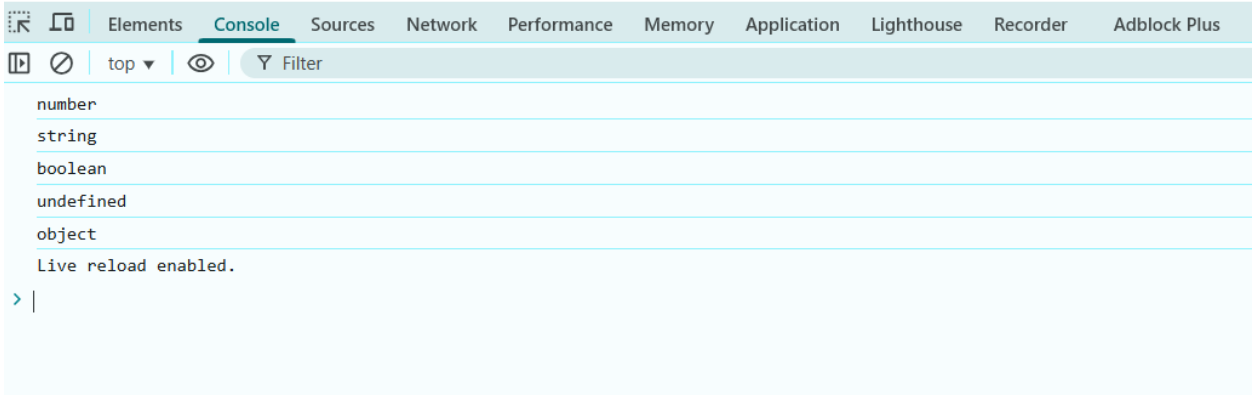
Null

Lab Assignment:-

Variable_Datatype.html > html > body > script

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Variable</title>
</head>
<body>
    <script>
        let num=123;
        console.log(typeof(num));
        let str='foram';
        console.log(typeof(str));
        bol=true;
        console.log(typeof(bol));
        let pi;
        console.log(typeof(pi));
        let nm=null;
        console.log(typeof(nm));

    </script>
</body>
</html>
```

Output:-



Operator:-

Ans(1):- Different types of javascript Operator:-

→Arithmetic Operators

→Assignment Operators

→Comparison Operators (Relational Operators)

→Logical Operators

→Ternary Operators

→Type of Operators

→String Operators

Examples:

- **Arithmetic Operators:** (+,-,*,/,%,**,++,--)
  let sum = 10 + 5; // 15

Operator	Description	Example	Result
+	Addition	5 + 3	8

- Subtraction	10 - 7	3
* Multiplication	4 * 2	8
/ Division	20 / 4	5
% Modulus (remainder)	10 % 3	1
** Exponentiation	2 ** 3	8
++ Increment	let x = 5; x++;	6
-- Decrement	let y = 3; y--;	2

Assignment Operators: (+=,-=,*=,/=,%=,**=)

```
let x = 10;
x += 5; // x = 15
```

Operator	Description	Example	Result
=	Assign	x=10	10
+=	Add and assign	x+=5 (x=x+5)	15
−=	Subtract and assign	x−=2 (x=x-2)	8
*=	Multiply and assign	x*=3 (x=x*3)	30
/=	Divide and assign	x/=2 (x=x/2)	5
%=	Modulus and assign	x%=3 (x=x% 3)	1

Comparision Operators: (<,>,<=,>=,==,===,!=,!==)

```
console.log(10 > 5); // true
```

Operator	Description	Example	Result
==	Equal to	5 == "5"	True
===	Strictly equal	5 === "5"	False
!=	Not equal	5 != "6"	True
!==	Strictly not equal	5 !== "5"	True
>	Greater than	10 > 5	True
<	Less than	5 < 10	True
>=	Greater than or equal	10 >= 10	True
<=	Less than or equal	5 <= 10	True

Logical Operators: (&&,||,!)

console.log(true && false); // false

Operator	Description	Example	Result
&&	Logical AND	true && false	false
||	Logical OR	||	
!	Logical NOT	!true	false

<u>Ans(2):- Between == and === in JS:-</u>

- ==(Equality):- Check only Value
- ===(Strict Equality):- Check Value and Data type

The == Operators Compares the value of two variables after performing type conversion.

The === Operators Compares the value of two variables Without performing type conversion.

Lab Assignment:-

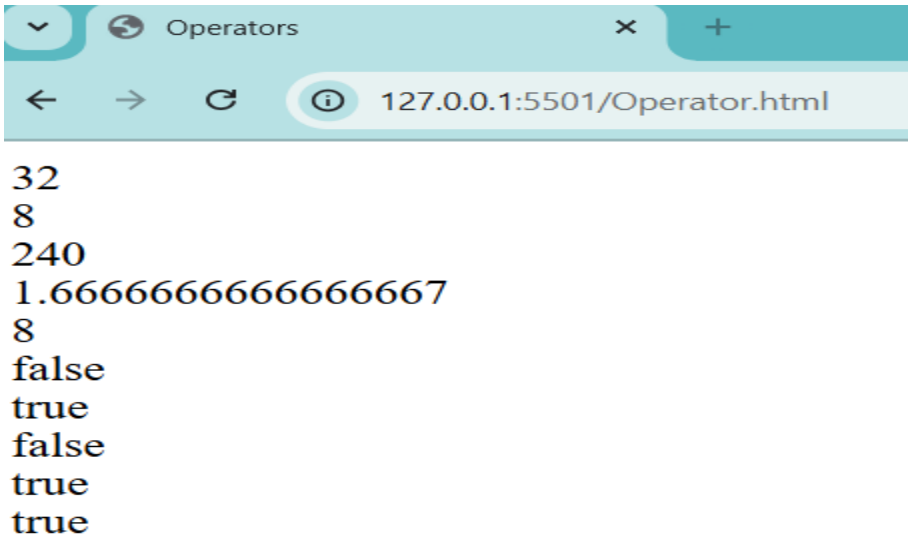
Go Run Terminal Help Assignment_Program

Operator.html

Operator.html > html > body > script

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Operators</title>
</head>
<body>
    <script>
        //Arithmetic operator
        let num1=20;
        let num2=12;
        document.write(num1+num2);
        document.write("<br>",num1-num2);
        document.write("<br>",num1*num2);
        document.write("<br>",num1/num2);
        document.write("<br>",num1%num2);

//Comparison Ope.
document.write("<br>",num1==num2);
document.write("<br>",num1>num2);

//Logical Ope.
document.write("<br>",num1>10 && num2<5);
document.write("<br>",num1>10 || num2<5);
document.write("<br>",num1>10 != num2<5);
    </script>
</body>
</html>
```

Output:-



Control Flow (If-Else, Switch):-

Ans(1):-

What is control flow in JS:-

Control flow is the order in which JavaScript executes your code. It helps the program decide what to do next based on conditions or logic.

How if-else Works: An **if-else** statement checks a condition. If the condition is **true**, it runs one block of code. If it's **false**, it runs another block.

Example:

```
let age = 20;

if (age >= 18) {

console.log("You are eligible to vote.");

} else {
```

```
console.log("You are not eligible to vote.");
}
```

Output:-

You are eligible to vote.

Ans(2):-

How switch statements work :-

A **switch** statement is used to perform different actions based on different conditions. It compares a value against multiple cases and runs the code for the matching case. If no case matches, it runs the **default** block.

Syntax:

```
switch (expression) {
  case value1:
    // Code for value1
    break;
  case value2:
    // Code for value2
    break;
  default:
    // Code if no case matches
}
```

Example:

```
let day = "Monday";
switch (day) {
  case "Monday":
console.log("Start of the work week.");
    break;
  case "Friday":
console.log("End of the work week.");
    break;
  default:
console.log("It's a regular day.");
}
```

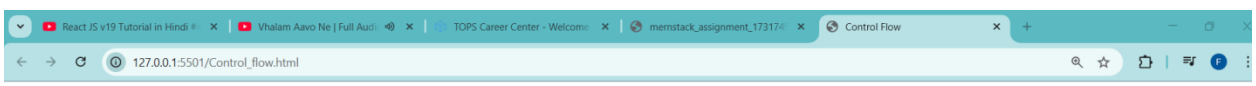
Output:-

Start of the work week

Lab Assignment :-

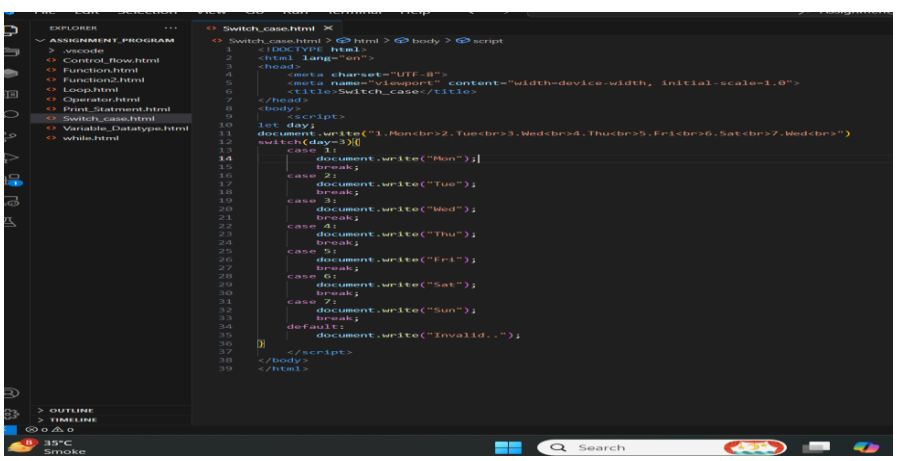
```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Control Flow</title>
</head>
<body>
    <script>
        // program to check if a number is positive, negative, or zero
let number=parseInt(prompt("Enter The First Number:-"));
if(number>0){
    document.write("Number Is Positive");
}else if(number<0){
    document.write("Number Is Negative");
}else{
    document.write("Number Is Zero");

}
    </script>
</body>
</html>
```

Output:-

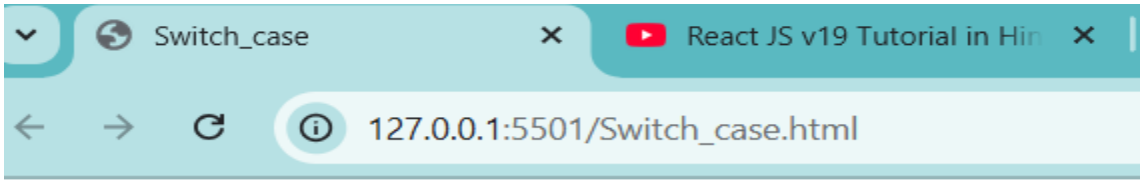


Number Is Positive

Task – 2:-



Output:-



1.Mon
2.Tue
3.Wed
4.Thu
5.Fri
6.Sat
7.Wed
Wed

Loops (For, While, Do-While) :-

Ans(1):-

Loops are used to run a block of code multiple times. In JavaScript, there are three main types of loops: **for**, **while**, and **do-while.**

1. For Loop:

- A **for** loop runs a specific number of times, based on a condition. **Structure:**

for (initialization; condition; increment/decrement) {

```
  // Code to run
}
```

Example:

```
for (let i = 1; i<= 5; i++) {
  console.log(i);
}
```

<u>Output:-</u>

1, 2, 3, 4, 5

2. While Loop:

- A **while** loop runs as long as a condition is **true**.

Structure:

```
while (condition) {
  // Code to run
}
```

Example:

```
let i = 1;
while (i<= 5) {
  console.log(i); i++;}
```

Output:-

1, 2, 3, 4, 5

3. Do-While Loop

- A **do-while** loop runs the code **at least once** before checking the condition.

Structure:

```
do {// Code to run

} while (condition);
```

Example:

```
let i = 1;

do {

  console.log(i); i++;

} while (i<= 5);
```

Output:-

1, 2, 3, 4, 5

Ans(2):-

Difference Between While and Do-While Loops:

While loop:-

→ Checks the condition **before** the loop runs. May **not run at all** if the condition is false initially.

Do-While loop:-

->Checks the condition **after** the loop runs. Always runs the code **at least once**, even if the condition is false.

Example:-

let count = 0;

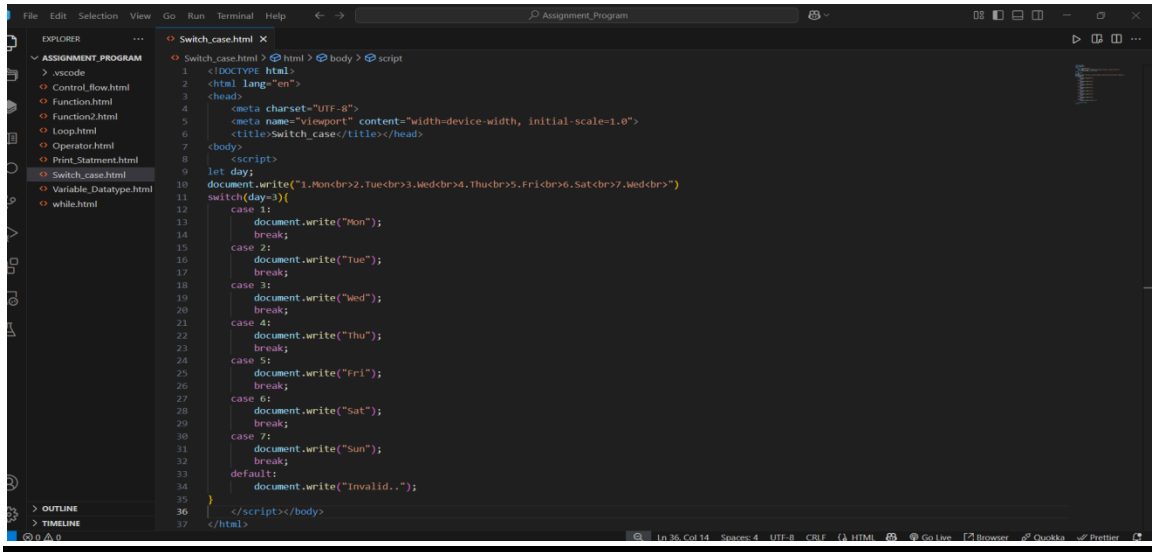
do {console.log(count);

} while (count > 0);

Output:-

Prints 0 once, even though the condition is false.

Lab Assisnment:-



Output:-

Function:-

→ Functions are **reusable blocks of code** designed to perform a specific task. They help make code modular, organized, and easy to maintain.

→ To declare a function, use the **function** keyword, followed by a name, parentheses, and a code block.

→ To call (or execute) a function, use its name followed by parentheses. Pass any required arguments inside the parentheses.

Syntax:

```
function functionName(parameters) {

  // Code to run

}
```

Example:

```
function great(name) {

console.log("Hello, " + name + "!");

}
```

Ans(2):-

Difference Between :-

→A named function defined using the `function` keyword.
`function functionName() { ... }`

→Function Expression-

A function assigned to a variable, can be anonymous.

→ `constfunctionName = function() { ... };`

→ Can be called **before its declaration** due to hoisting.

→ Cannot be called before its definition.

Examples:

Function Declaration:

```
greet(); // Works due to hoisting

function greet() {

  console.log("Hello!");

}
```

Function Expression:

```
greet(); // Error: greet is not defined yet

const greet = function() {

  console.log("Hello!");
```

```
};
```

Ans(3):-

1. **Parameters:**

   - Parameters are **placeholders** for values you pass into a function.
   - They allow the function to work with different inputs.
   - You define parameters in the parentheses when declaring a function.

   Example:

   ```
   function add(a, b) { // 'a' and 'b' are parameters

     return a + b;

   }

   console.log(add(3, 5)); // Output: 8
   ```

2. **Return Values:**

   - A **return value** is the result a function sends back after it finishes running.
   - You use the `return` keyword to specify the value to be returned.
   - If there's no `return`, the function returns `undefined` by default.

   Example:

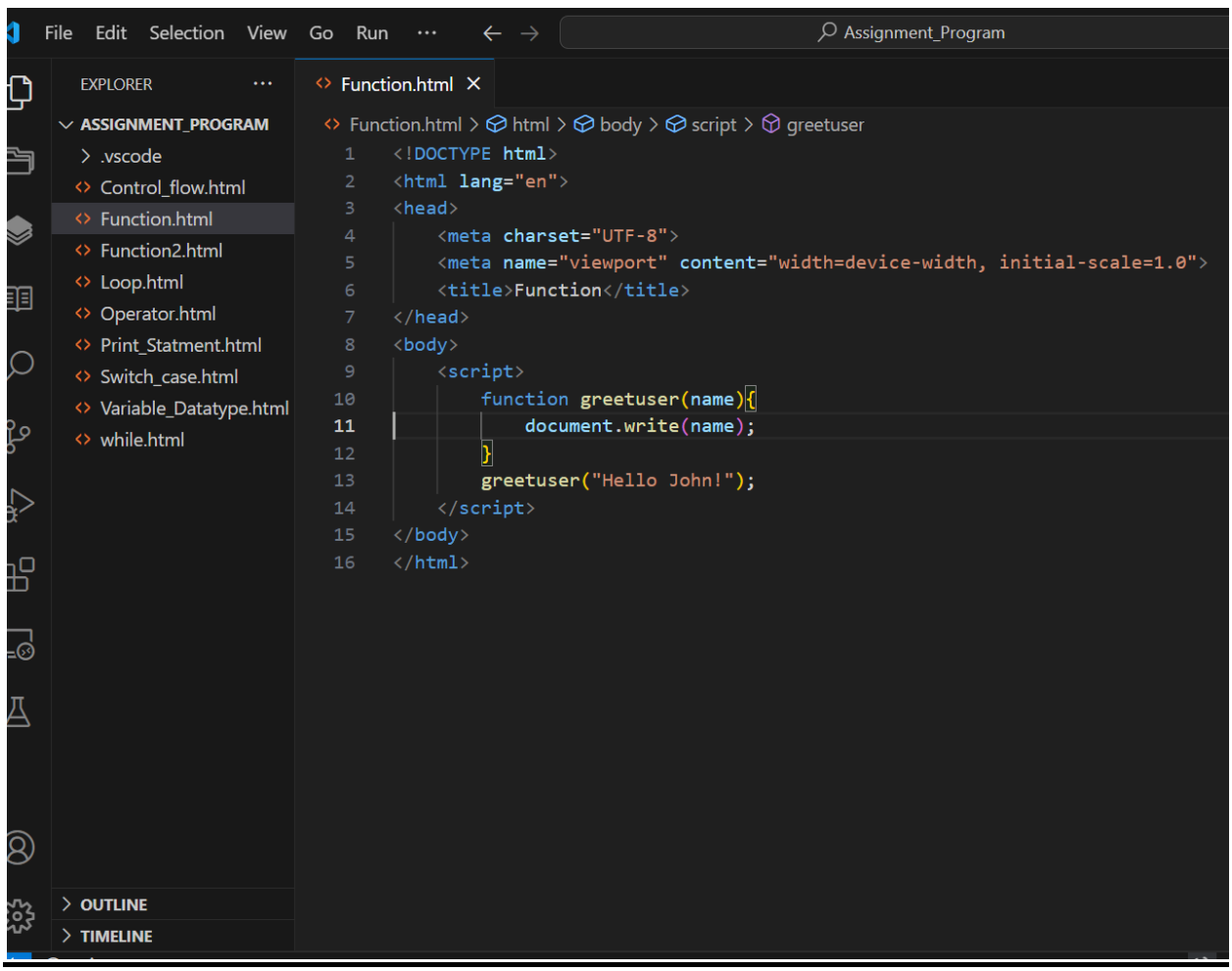
   ```
   function multiply(x, y) {

     return x * y; // Returns the product of x and y
   ```

```
}

let result = multiply(4, 6); // result = 24

console.log(result); // Output: 24
```

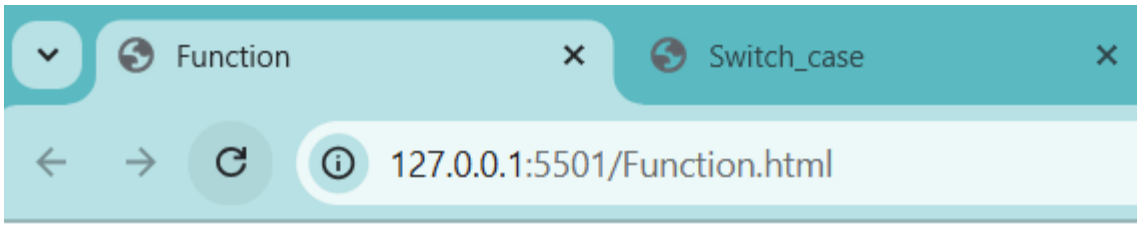
Explanation:

Parameters: Input values for the function (e.g., `a`, `b` in `add(a, b)`).
Return Values: Output of the function sent back to the caller using `return`.

<u>Lab Assignment:-</u>

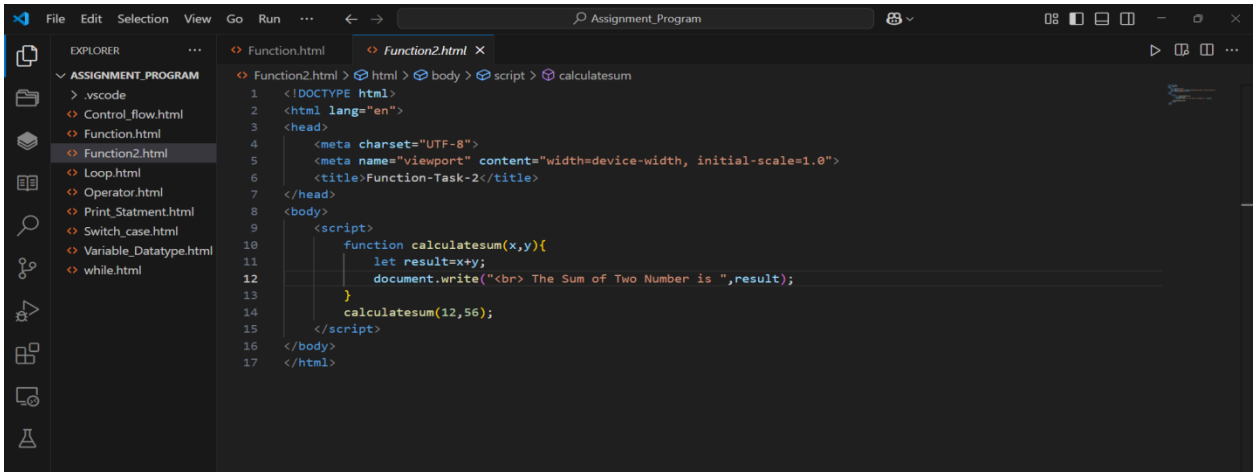


Output:-

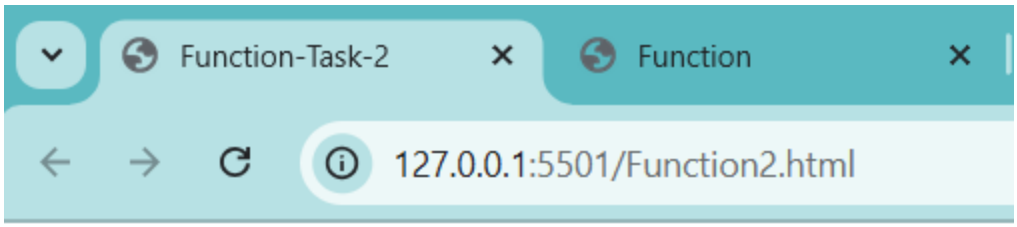


Hello John!

Task – 2:-



Output:-



The Sum of Two Number is 68

Array:-

Ans(1):-

An **array** is a special data structure in JavaScript used to store multiple values in a single variable. The values (called elements) are stored in an ordered way, and each element has an index starting from `0`.

Declaring and Initializing an Array:

1. **Declare an Array:**
   Use square brackets `[]` to create an array.

   Syntax:
   let arrayName = [];

2. **Initialize an Array with Values:**

You can add elements to the array when you declare it.

Syntax:
let arrayName = [value1, value2, value3];

Examples:

Empty Array:

let fruits = [];

Array with Values:

let fruits = ["Apple", "Banana", "Cherry"];

console.log(fruits); // Output: ["Apple", "Banana", "Cherry"]

Accessing Elements:

console.log(fruits[0]); // Output: "Apple" (first element)

console.log(fruits[1]); // Output: "Banana"

Ans(2):-

1. **Push()**

- Adds one or more elements **to the end** of the array.
- The new length of the array.
- **Example:**

```
let fruits = ["Apple", "Banana"];

fruits.push("Cherry");
```

```
console.log(fruits); // Output: ["Apple", "Banana", "Cherry"]
```

2. Pop()

- Removes the **last element** from the array.
- The removed element.
- **Example:**

```
let fruits = ["Apple", "Banana", "Cherry"];

let removed = fruits.pop();

console.log(fruits); // Output: ["Apple", "Banana"]

console.log(removed); // Output: "Cherry"
```

3. Shift()

- Removes the **first element** from the array.
- The removed element.
- **Example:**

```
let fruits = ["Apple", "Banana", "Cherry"];

let removed = fruits.shift();

console.log(fruits); // Output: ["Banana", "Cherry"]

console.log(removed); // Output: "Apple"
```

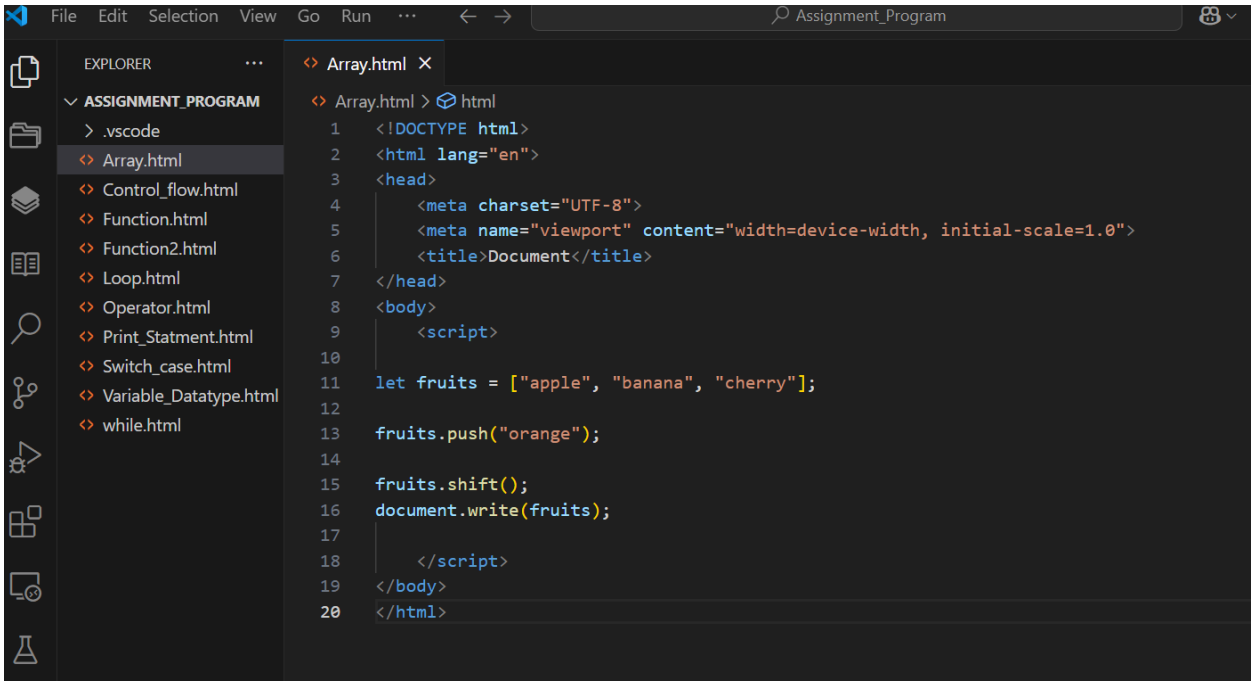
4. Unshift()

- Adds one or more elements **to the beginning** of the array.
- The new length of the array.

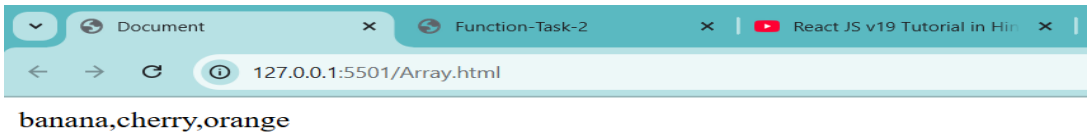
Example:

```
let fruits = ["Banana", "Cherry"];

fruits.unshift("Apple");

console.log(fruits); // Output: ["Apple", "Banana", "Cherry"]
```

Lab Assignment:-

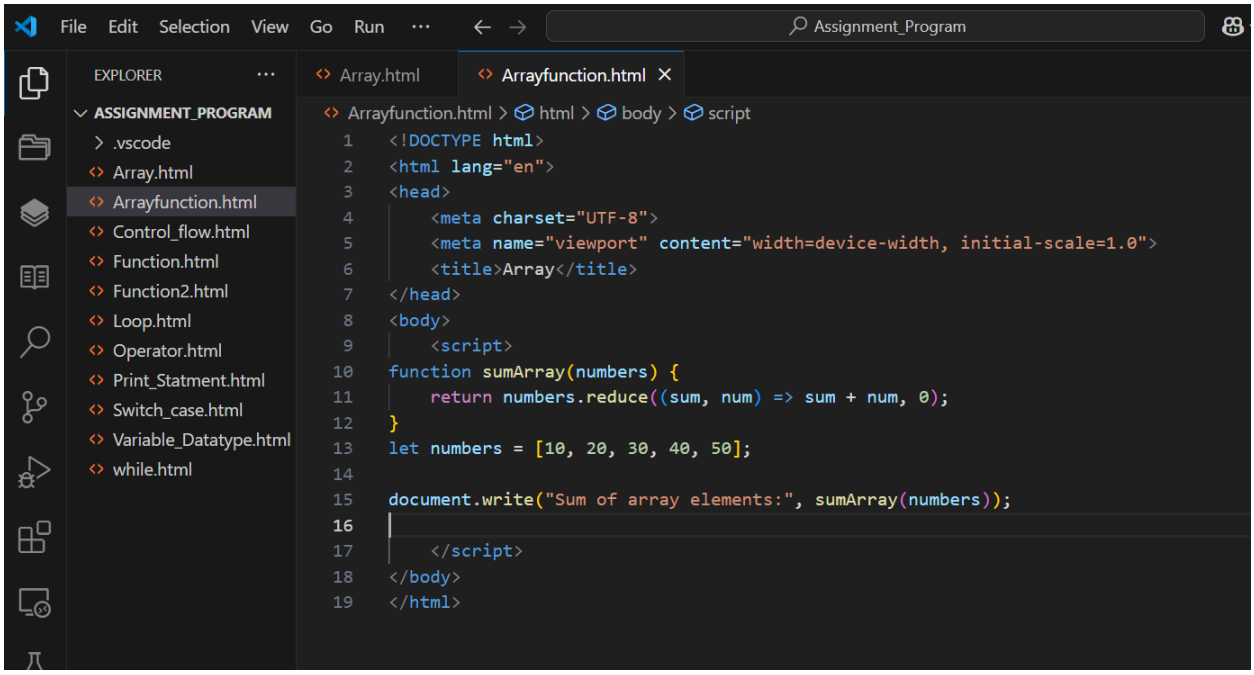


Output:-

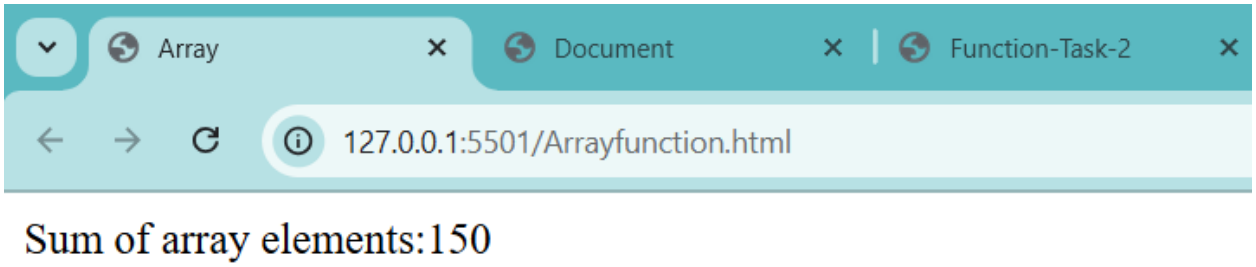


Task-(2)

:-



Output:-



Objects:-

Ans(1):-

An **object** in JavaScript is a data structure that stores data in the form of **key-value pairs**. Objects are used to represent real-world entities with properties and behaviors.

Syntax:

```
let objectName = {
    key1: value1,    key2: value2,
};
```

Example:

```
let person = {
    name: "Alice",
    age: 25,
    greet: function () {
        console.log("Hello!");
    },
};
console.log(person.name); // Output: Alice
person.greet(); // Output: Hello!
```

Ans(2):-

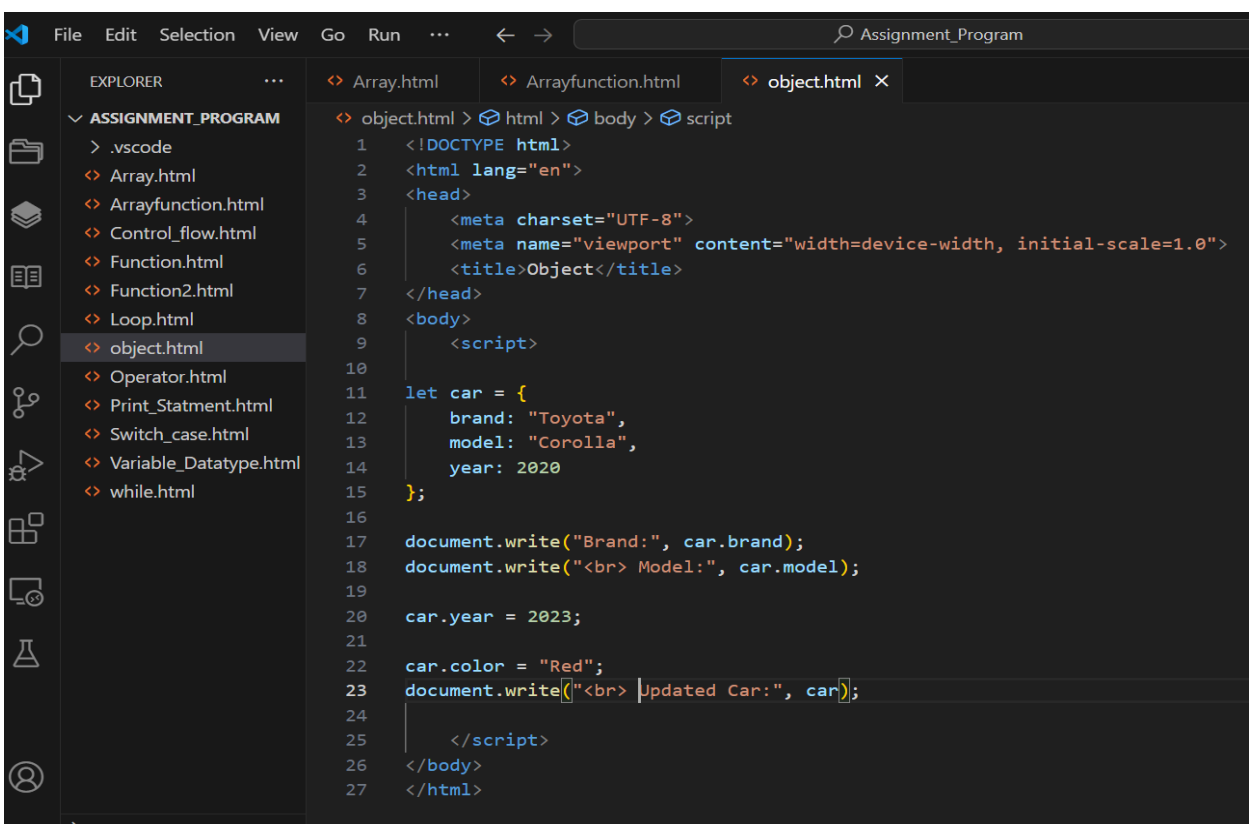
→ You can access and update object properties using **dot notation** or **bracket notation.**

→ When the property name is a simple string (e.g., no spaces or special characters).

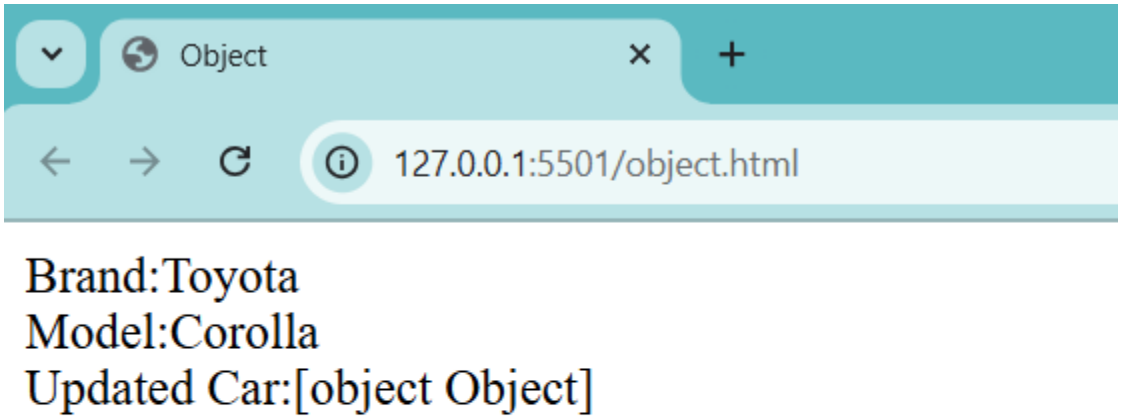
Example:-

```
let person = { "first name": "Alice", age: 25 };

console.log(person["first name"]); // Output: Alice

console.log(person["age"]);        // Output: 25
```

Lab Assignment:-



Output:-



JavaScript Event:-

Ans(1):-

Events in JavaScript are actions or occurrences that happen in the browser, like:

- A user clicking a button.
- Typing in an input field.
- Hovering over an element.

JavaScript can respond to these events to make web pages interactive.

An **event listener** is a way to tell the browser to watch for a specific event on an element and run a function when that event occurs.

Role of Event Listeners:

- They connect actions (like clicking) with the code you want to run.
- Allow dynamic and responsive behavior without modifying the HTML.

Ans(2):-

The `addEventListener()` method in JavaScript is used to attach an event to an element. When the event occurs, a specified function is executed.

Syntax:
JAVASCRIPT:

```
element.addEventListener(eventType, function);
```

→**element**: The HTML element (e.g., button).

→**eventType**: The type of event (e.g., "click").

→**function**: The function to execute when the event occurs.

Example:

- **HTML:**
  ```
  <button id="myButton">Click Me</button>
  ```
- **JAVASCRIPT:**
  ```
  let button = document.getElementById("myButton");
  button.addEventListener("click", function() {
  console.log("Button clicked!");
  });
  ```

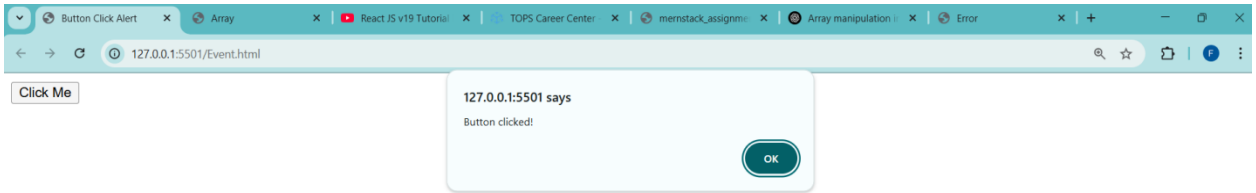
Lab Assignment

event.html

event.html > html > body > script

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Button Click Alert</title>
</head>
<body>
    <button id="myButton">Click Me</button>

    <script>

        let button = document.getElementById("myButton");

        button.addEventListener("click", function() {
            alert("Button clicked!");
        });
    </script>

</body>
</html>
```

Output:-



DOM Manipulation:-

Ans(1):-

The **DOM** is a programming interface for web documents. It represents the HTML structure of a webpage as a tree of objects, where each element is an object that can be manipulated.

Interact with the DOM: JavaScript can **access**, **modify**, **add**, or **remove** HTML elements and their content using the DOM. This allows dynamic changes to the webpage without reloading it.

Example:

```
<p id="demo">Hello, World!</p>

<button onclick="changeText()">Click Me</button>

<script>

    function changeText() {

        document.getElementById("demo").innerText = "Text
        changed!";}

</script>
```

<u>Ans(2):-</u>

Methods to Select DOM Elements in JavaScript:

1. **getElementById():**

   - Selects an element by its **ID**.
   - Returns **one element**.
   - **Example:**

```
let element = document.getElementById("myId");
```

2. **getElementsByClassName():**

   - Selects elements by their **class name**.
   - Returns a **live HTMLCollection** of elements.
   - **Example:**let elements = document.getElementsByClassName("myClass");

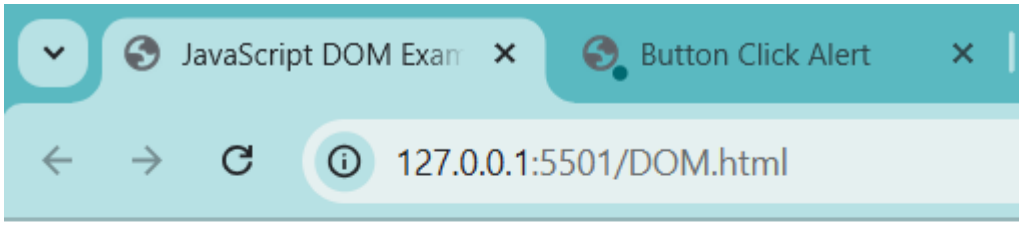
3. **querySelector():**

   - Selects the **first element** that matches the CSS selector (ID, class, tag, etc.).
   - Returns **one element**.
   - **Example:**let element = document.querySelector(".myClass"); // or #myId, p, etc.

Lab Assignment:-

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>JavaScript DOM Example</title>
    <style>
        /* Initial styling */
        p {
            font-size: 20px;
            font-weight: bold;
        }
    </style>
</head>
<body>
    <p id="myParagraph">Hello, World!</p>

    <script>
        let paragraph = document.getElementById("myParagraph");
        paragraph.textContent = "JavaScript is fun!";
        paragraph.style.color = "blue";
    </script>

</body>
</html>
```

Output:-



JavaScript is fun!

---

1. **setTimeout():-**Executes a function **once** after a specified delay (in milliseconds). It is used to **delay** the execution of a function for a specific period.
   - **Example**: If you want to show a message after 3 seconds, you can use setTimeout():
     - setTimeout(() => {
       - console.log("This runs after 3 seconds");
     - }, 3000);
2. **setInterval():-**Executes a function **repeatedly** at a specified interval (in milliseconds).It is used to **repeat** the execution of a function at regular intervals.
   - **Example**: If you want to log a message every 2 seconds, you can use setInterval():
     - setInterval(() => {
       - console.log("This runs every 2 seconds");
     - }, 2000);

Ans(2):-

Example of setTimeout() to Delay an Action by 2 Seconds:

```
setTimeout(function() {
        console.log("This runs after 2 seconds");
}, 2000);
```

JavaScript Error Handling:-

Ans(1):-

→ Error handling in JavaScript helps manage and control errors that may occur in a program. Instead of stopping the program completely, error handling allows us to "catch" the error and handle it properly.

→**`try` Block** → Code that may cause an error is written inside `try`.

→**`catch` Block** → If an error occurs in `try`, `catch` handles the error.

→**`finally` Block** (optional) → Always runs, whether there was an error or not.

Example:-

```
try {    let num = 10;
   console.log(num.toUpperCase()); // This will cause an error
} catch (error) {
   console.log("An error occurred:", error.message);
} finally {
   console.log("This runs no matter what.");
}
```

Ans(2):-

→ Error handling is important because it helps keep JavaScript

application,**running smoothly** even when something goes wrong.

→ If an error occurs, the whole app **doesn't stop working**—we can handle the error and continue.

→ Catching errors helps developers **find and fix bugs** faster. If a website tries to **fetch data from an API** but the internet is slow, error handling ensures the page **doesn't break**.

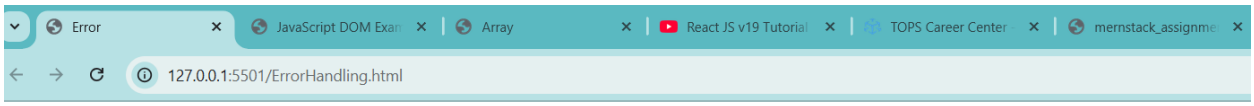
Lab Assignment:-

ErrorHandling.html

ErrorHandling.html > html > body > script

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Error</title>
</head>
<body>
    <script>
        try {
    let num = 10;
    let result = num / 0;

    if (!isFinite(result)) {
        throw new Error("Division by zero is not allowed!");
    }

    document.write("Result:", result);
} catch (error) {
    document.write("Error:", error.message);
}

    </script>
</body>
</html>
```

Output:-



Error:Division by zero is not allowed!