**JavaScript: Beginner’s Guide**

**1. What is JavaScript?**

* **JavaScript** is a programming language that adds interactivity to websites.
* It runs directly in your browser (e.g., Chrome, Firefox).
* **Why JavaScript?**
  + Makes websites interactive (e.g., dropdowns, carousels, games).
  + Enables dynamic content and animations.
  + Widely used for both front-end and back-end development.

**2. Setting Up Your Environment**

To write and test JavaScript:

1. Use any **browser** (Google Chrome recommended).
2. Open **Developer Tools** (Right-click > Inspect > Console tab).
3. Use a **code editor** like **VS Code** for full projects.

**3. Writing Your First JavaScript Code**

**Inline Script:**

html

Copy code

<!DOCTYPE html>

<html>

<head>

<title>My First JS Code</title>

</head>

<body>

<h1>Welcome to JavaScript!</h1>

<script>

console.log("Hello, Deepak! This is your first JS code.");

</script>

</body>

</html>

* Open this file in a browser and check the **console** (Right-click > Inspect > Console tab).

**External Script:**

1. Create a file script.js:

javascript

Copy code

console.log("Hello from script.js!");

1. Link it in your HTML:

html

Copy code

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

**4. Variables in JavaScript**

Variables store data. Think of them as containers.

* **Declaring Variables:**

javascript

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let name = "Deepak"; // Modern way

var age = 25; // Old way

const PI = 3.14; // Constant value

* **Rules for Variables:**
  + Must start with a letter, \_, or $.
  + Cannot be a reserved keyword (e.g., var, function).
* **Example:**

javascript

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let greeting = "Hello, Deepak!";

console.log(greeting); // Output: Hello, Deepak!

**5. Data Types**

JavaScript has dynamic types. A variable can hold any type of data:

* **Primitive Types:**
  1. **String:** Text, e.g., "Deepak"
  2. **Number:** Numbers, e.g., 42, 3.14
  3. **Boolean:** true or false
  4. **Undefined:** No value assigned.
  5. **Null:** Explicitly no value.
* **Examples:**

javascript

Copy code

let name = "Deepak"; // String

let age = 25; // Number

let isStudent = true; // Boolean

let grade; // Undefined

let score = null; // Null

**6. Basic Operations**

* **Arithmetic Operators:**
  + Addition (+): 5 + 2 = 7
  + Subtraction (-): 5 - 2 = 3
  + Multiplication (\*): 5 \* 2 = 10
  + Division (/): 5 / 2 = 2.5
  + Modulus (%): 5 % 2 = 1
* **Example:**

javascript

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let a = 10, b = 20;

console.log(a + b); // Output: 30

* **String Operations:**

javascript

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let firstName = "Deepak";

let lastName = "Kumar";

console.log(firstName + " " + lastName); // Output: Deepak Kumar

**7. Practice Challenge**

1. Create a variable to store your name and print it.
2. Write code to calculate the sum of two numbers and display the result.
3. Store your age in a variable. Check if you are above 18 using a simple condition:

javascript

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let age = 25;

console.log(age > 18); // true

**8. Conditional Statements in JavaScript**

Conditional statements let your program decide what to do based on conditions.

**1. if, else if, and else**

**Syntax:**

javascript

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if (condition) {

// Code to execute if the condition is true

} else if (anotherCondition) {

// Code to execute if anotherCondition is true

} else {

// Code to execute if no condition is true

}

**Example:**

javascript

Copy code

let age = 20;

if (age < 18) {

console.log("You are a minor.");

} else if (age >= 18 && age < 60) {

console.log("You are an adult.");

} else {

console.log("You are a senior citizen.");

}

**2. switch Statement**

The switch statement is useful for multiple conditions based on a single variable.

**Syntax:**

javascript

Copy code

switch (expression) {

case value1:

// Code for value1

break;

case value2:

// Code for value2

break;

default:

// Code if no cases match

}

**Example:**

javascript

Copy code

let day = "Monday";

switch (day) {

case "Monday":

console.log("Start of the work week.");

break;

case "Saturday":

case "Sunday":

console.log("It's the weekend!");

break;

default:

console.log("It's a weekday.");

}

**3. Ternary Operator**

A shorter way to write simple if-else statements.

**Syntax:**

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condition ? valueIfTrue : valueIfFalse;

**Example:**

javascript

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let age = 20;

let result = age >= 18 ? "Adult" : "Minor";

console.log(result); // Output: Adult

**9. Loops in JavaScript**

Loops help you repeat tasks until a condition is met.

**1. for Loop**

**Syntax:**

javascript

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for (initialization; condition; increment) {

// Code to execute repeatedly

}

**Example:**

javascript

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for (let i = 1; i <= 5; i++) {

console.log("Number:", i);

}

**2. while Loop**

**Syntax:**

javascript

Copy code

while (condition) {

// Code to execute while condition is true

}

**Example:**

javascript

Copy code

let count = 1;

while (count <= 5) {

console.log("Count:", count);

count++;

}

**3. do-while Loop**

Executes the code block at least once before checking the condition.

**Syntax:**

javascript

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do {

// Code to execute

} while (condition);

**Example:**

javascript

Copy code

let count = 1;

do {

console.log("Count:", count);

count++;

} while (count <= 5);

**4. for...of Loop**

Used to iterate over iterable objects like arrays.

**Example:**

javascript

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

for (let fruit of fruits) {

console.log(fruit);

}

**5. for...in Loop**

Used to iterate over object properties.

**Example:**

javascript

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let person = { name: "Deepak", age: 25, city: "Delhi" };

for (let key in person) {

console.log(key + ":", person[key]);

}

**10. Practice Challenges**

1. Write a program to check if a number is odd or even.
2. Create a loop to print numbers from 1 to 10.
3. Write a program to display the multiplication table of 5.
4. Use a switch statement to output the number of days in a given month.

**11. Functions in JavaScript**

Functions are blocks of reusable code. They let you organize and reuse logic effectively.

**1. What is a Function?**

A function performs a specific task and can be executed multiple times with different inputs.

**2. Function Syntax**

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function functionName(parameters) {

// Code to be executed

return value; // Optional

}

**3. Example: Basic Function**

javascript

Copy code

function greet(name) {

return "Hello, " + name + "!";

}

let message = greet("Deepak");

console.log(message); // Output: Hello, Deepak!

**4. Types of Functions**

**a) Function Declarations:**

* Standard way to define functions.
* Example:

javascript

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function add(a, b) {

return a + b;

}

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

**b) Function Expressions:**

* A function assigned to a variable.
* Example:

javascript

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const subtract = function(a, b) {

return a - b;

};

console.log(subtract(10, 4)); // Output: 6

**c) Arrow Functions:**

* Shorter syntax for writing functions.
* Example:

javascript

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const multiply = (a, b) => a \* b;

console.log(multiply(4, 3)); // Output: 12

**5. Default Parameters**

Functions can have default values for parameters.

**Example:**

javascript

Copy code

function greet(name = "Guest") {

return "Hello, " + name + "!";

}

console.log(greet()); // Output: Hello, Guest!

console.log(greet("Deepak")); // Output: Hello, Deepak!

**6. Rest Parameters**

Allows you to handle a variable number of arguments.

**Example:**

javascript

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function sum(...numbers) {

let total = 0;

for (let num of numbers) {

total += num;

}

return total;

}

console.log(sum(1, 2, 3, 4)); // Output: 10

**7. Anonymous Functions**

Functions without a name, often used as arguments.

**Example:**

javascript

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setTimeout(function() {

console.log("This message appears after 2 seconds.");

}, 2000);

**8. Immediately Invoked Function Expressions (IIFE)**

Functions that execute immediately after being defined.

**Example:**

javascript

Copy code

(function() {

console.log("I am an IIFE!");

})();

**12. Practice Challenges**

1. Write a function that calculates the area of a rectangle.
2. Create a function to check if a number is prime.
3. Write a function to find the largest number in an array using the rest parameter.
4. Create an arrow function that converts Celsius to Fahrenheit:

javascript

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// Formula: Fahrenheit = (Celsius \* 9/5) + 32