# 1. Introduction to JavaScript

📌 What is JavaScript?

- A **scripting language** used to create dynamic web content.
- Runs **in the browser** (client-side) and **on servers** (Node.js).
- Can manipulate HTML, CSS, and control multimedia.

📌 How to Add JavaScript to HTML:

```html
<!-- Inline -->
<button onclick="alert('Hello!')">Click Me</button>

<!-- Internal -->
<script>
  console.log('Hello, World!');
</script>

<!-- External -->
<script src="script.js"></script>
```

---

# ☑ 2. JavaScript Basics

📌 Variables

```javascript
var name = "John"; // Old way (Avoid)
let age = 30;      // Block-scoped
const PI = 3.14;   // Constant
```

📌 Data Types

- String, Number, Boolean, Null, Undefined, Object, Symbol

📌 Operators

```javascript
+ - * / % ++ -- && || ! == === != !==
```

📌 Conditional Statements

```javascript
if (age > 18) {
  console.log('Adult');
} else {
```

```
  console.log('Minor');
}
```

## 📎 Loops

```
for (let i = 0; i < 5; i++) { console.log(i); }
while (age < 35) { age++; }
```

## 📎 Functions

```
function greet(name) {
  return `Hello, ${name}`;
}
console.log(greet('Alice'));
```

# ☑ 3. Arrays in JavaScript

## 📎 Creating Arrays

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

## 📎 Common Array Methods

```
fruits.push("Mango");     // Add at end
fruits.pop();             // Remove last
fruits.shift();           // Remove first
fruits.unshift("Grapes"); // Add at beginning
console.log(fruits.indexOf("Banana")); // Find index
console.log(fruits.includes("Orange")); // Check existence
```

## 📎 Iterating Arrays

```
fruits.forEach(fruit => console.log(fruit));
let upperFruits = fruits.map(fruit => fruit.toUpperCase());
```

# ☑ 4. Objects in JavaScript

## 📎 Creating Objects

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

## 🏹 Accessing / Modifying

```
console.log(person.name);
person.age = 30;
person.name = "Narasimha Rao";
```

## 🏹 Loop through Object

```
for (let key in person) {
  console.log(`${key}: ${person[key]}`);
}
```

## 🏹 Creating and Accessing Array of Objects

```
var studentsArray = [
      { sid: 454545, sname: "Swapna", skillset: "Angular" },
      { sid: 454546, sname: "Isha", skillset: "React" },
      { sid: 454547, sname: "Manika", skillset: "Node JS" },
      { sid: 454548, sname: "Riya", skillset: "HTML5" }
  ];


for(let student of studentsArray)
{
    console.log(`Id : ${student.id}, Name :  ${student.sname}`);
}
```

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# ☑ 5. DOM (Document Object Model) Concepts

## 🏹 What is the DOM?

- The structure of an HTML document represented as a tree.
- JavaScript can manipulate HTML and CSS through the DOM.

## 🏹 Selecting Elements

```javascript
document.getElementById("myId");
document.getElementsByClassName("myClass");
document.getElementsByTagName("p");

// Special method based on css selector technique
document.querySelector(".myClass");
document.querySelectorAll("p");
```

## 🔨 Manipulating Elements

```javascript
let elem = document.getElementById("demo");
elem.innerText = "Hello World!";
elem.style.color = "red";
```

## 🔨 Events

### a. Using event attribute

```javascript
// Define the function in script block
function buttonClick() {
  alert("Button Clicked!");
}
```

```html
<!-- Invoke the function using onclick attribute -->
<input type='button' onclick="buttonClick()"  value="ShowData" />
```

### b. Using addEventListener method (dynamic)

```html
<!-- Invoke the function using onclick attribute -->
<input type='button' id="btn"  value="ShowData" />
```

```javascript
document.getElementById("btn").addEventListener("click", function() {
  alert("Button Clicked!");
});
```

---

# ☑ 6. Advanced JavaScript Concepts

## 🔨 ES6 Features

- **Arrow Functions**

```
const add = (a, b) => a + b;
```

- **Destructuring**

```
const {name, age} = person;
```

- **Spread / Rest Operator**

```
const newFruits = [...fruits, "Kiwi"];
```

- **Template Literals**

```
console.log(`My name is ${name} and I am ${age} years old.`);
```

## 📌 JSON (JavaScript Object Notation)

```
const jsonData = '{"name": "John", "age": 30}';
const obj = JSON.parse(jsonData);
console.log(obj.name);
```