Question 1: What is the DOM (Document Object Model) in JavaScript? How does JavaScript interact with the DOM?

**🔹 DOM in JavaScript**

The **DOM (Document Object Model)** is a **programming interface** provided by the browser that represents the **structure of an HTML or XML document** as a tree of **objects (nodes)**.

* It allows **JavaScript to access and manipulate** HTML elements, attributes, and content dynamically.
* Each element, attribute, and piece of text is treated as a **node** in this tree.

**✅ Visual Example of DOM:**

Given this HTML:

*<!DOCTYPE html>*

*<html>*

*<head><title>My Page</title></head>*

*<body>*

*<h1>Hello World</h1>*

*<p>This is a paragraph.</p>*

*</body>*

*</html>*

JavaScript sees it as a **tree-like structure**:

Document

└── html

├── head

│ └── title

└── body

├── h1

└── p

**🔹 How JavaScript Interacts with the DOM**

JavaScript uses the DOM to:

| **Action** | **Description** |
| --- | --- |
| **Select elements** | Find elements using methods like getElementById() |
| **Change content** | Modify text using innerText or innerHTML |
| **Change styles** | Update CSS styles using .style |
| **Handle events** | React to user actions with addEventListener() |
| **Create/remove elements** | Add or delete elements dynamically |

**✅ Common DOM Methods & Examples**

**1. Selecting Elements**

let heading = document.getElementById("myHeading");

**2. Changing Content**

heading.innerText = "Welcome to JavaScript!";

**3. Changing Styles**

heading.style.color = "blue";

**4. Adding Event Listener**

heading.addEventListener("click", function() {

alert("Heading was clicked!");

});

**5. Creating a New Element**

let newPara = document.createElement("p");

newPara.innerText = "This is new!";

document.body.appendChild(newPara);

Question 2: Explain the methods getElementById(), getElementsByClassName(), and querySelector() used to select elements from the DOM.

**🔹 1. getElementById()**

**Description**:  
Selects a **single element** by its **id** attribute.

**Syntax**:

document.getElementById("idName");

**Returns**: A **single element node** (or null if not found).

**Example**:

*<p id="demo">Hello</p>*

*<script>*

*let element = document.getElementById("demo");*

*element.style.color = "blue";*

*</script>*

**🔹 2. getElementsByClassName()**

**Description**:  
Selects **all elements** that have a specific **class name**.

**Syntax**:

document.getElementsByClassName("className");

**Returns**: A **live HTMLCollection** (like an array, but not exactly).

**Example**:

*<p class="greet">Hi</p>*

*<p class="greet">Hello</p>*

*<script>*

*let elements = document.getElementsByClassName("greet");*

*elements[0].style.color = "green"; // First element*

*</script>*

**🔹 3. querySelector()**

**Description**:  
Selects the **first matching element** using a **CSS selector** (like .class, #id, tag, etc.).

**Syntax**:

document.querySelector("cssSelector");

**Returns**: The **first matching element** (or null if none found).

**Example**:

*<div class="box">One</div>*

*<div class="box">Two</div>*

*<script>*

*let box = document.querySelector(".box"); // Selects the first `.box`*

*box.style.fontWeight = "bold";*

*</script>*