Question 1: What is an object in JavaScript? How are objects different from arrays?

**🔹 Object in JavaScript**

An **object** in JavaScript is a **collection of key-value pairs**.  
Each key (also called a **property**) is a string, and it maps to a value (which can be a string, number, array, function, or even another object).

Objects are used to **group related data and functions** together.

**✅ Syntax to Create an Object:**

let person = {

name: "Alice",

age: 25,

isStudent: true,

greet: function() {

console.log("Hello!");

}

};

**✅ Accessing Object Properties:**

console.log(person.name); // "Alice"

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

person.greet(); // "Hello!"

**🔹 How Are Objects Different from Arrays?**

| **Feature** | **Objects** | **Arrays** |
| --- | --- | --- |
| **Structure** | Key-value pairs ({ key: value }) | Ordered list of values ([value1, ...]) |
| **Accessed By** | Keys (property names) | Index numbers |
| **Best For** | Representing complex data or entities | Lists, sequences, or collections |
| **Order of Items** | Not guaranteed (unordered) | Ordered (starts at index 0) |
| **Example** | {name: "John", age: 30} | ["apple", "banana", "cherry"] |
| **Can Hold Functions?** | ✅ Yes | ❌ Not directly (though arrays can store functions as values) |

**✅ Example Comparison:**

**Object:**

*let car = {*

*brand: "Toyota",*

*model: "Camry",*

*year: 2022*

*};*

**Array:**

*let car = ["Toyota", "Camry", 2022];*

Question 2: Explain how to access and update object properties using dot notation and bracket notation.

**🔹 Accessing and Updating Object Properties in JavaScript**

JavaScript provides **two ways** to access and update object properties:

1. **Dot Notation**
2. **Bracket Notation**

**✅ 1. Dot Notation (.)**

* Most commonly used.
* You use the **property name directly** after a dot.
* Property name **must be a valid identifier** (no spaces or special characters).

**🔸 Syntax:**

object.property

**🔸 Example:**

*let person = {*

*name: "Alice",*

*age: 25*

*};*

*console.log(person.name); // Access: "Alice"*

*person.age = 26; // Update*

*console.log(person.age); // 26*

**✅ 2. Bracket Notation ([])**

* Useful when the **property name is dynamic** (stored in a variable) or **not a valid identifier** (e.g., contains spaces).
* Property name is passed as a **string**.

**🔸 Syntax:**

object["property"]

**🔸 Example:**

*let person = {*

*name: "Alice",*

*age: 25,*

*"home address": "New York"*

*};*

*console.log(person["name"]); // Access: "Alice"*

*person["age"] = 30; // Update*

*console.log(person["age"]); // 30*

*console.log(person["home address"]); // Access property with space*