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Lecture 11: Objects and Maps

What is an Object?

In JavaScript, an **object** is a collection of **key-value pairs**. It is used to represent real-world entities with properties and behaviors.

☑ Think of an object as a **dictionary** — you look up a "key" and get its associated "value".

• Example:

```
javascript
CopyEdit
let person = {
  name: "John",
  age: 25,
  isStudent: true
};
```

Why Use Objects?

- To store structured data
- To model real-world entities
- To group related data and behavior
- To improve code readability and organization

★ Object Syntax

```
javascript
CopyEdit
let objectName = {
  key1: value1,
  key2: value2,
  ...
}
```

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```
Example:
javascript
CopyEdit
let car = {
 brand: "Tesla",
 model: "Model 3",
year: 2022
};
Accessing Object Properties
Using Dot Notation:
javascript
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console.log(car.brand); // Tesla
Using Bracket Notation:
javascript
CopyEdit
console.log(car["model"]); // Model 3
Use bracket notation when the key is stored in a variable.
Modifying Object Properties
javascript
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car.year = 2023;
```

X Deleting Properties

car["color"] = "white";

javascript

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delete car.color;

for...in Loop:

Looping Through Objects

```
javascript
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for (let key in car) {
  console.log(key + ": " + car[key]);
```

% Built-in Object Methods

Object.keys() — returns array of keys

javascript

}

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console.log(Object.keys(car)); // ["brand", "model", "year"]

Object.values() — returns array of values

javascript

CopyEdit

console.log(Object.values(car)); // ["Tesla", "Model 3", 2023]

Object.entries() — returns array of [key, value] pairs

javascript

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console.log(Object.entries(car));

What is a Map?

A **Map** is a built-in JavaScript object that allows you to store key-value pairs with keys of any type.

Unlike objects:



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- Map keys can be of any type (objects, functions, etc.)
- Preserves insertion order
- Easier iteration and size checking

Creating a Map javascript CopyEdit let map = new Map(); **Adding Values:** javascript CopyEdit map.set("name", "Alice"); map.set("age", 30); **Getting Values:** javascript CopyEdit console.log(map.get("name")); // Alice **Checking Existence:** javascript CopyEdit console.log(map.has("age")); // true **Removing Values:** javascript CopyEdit map.delete("age");

Looping Through a Map

Using for...of:

javascript

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```
CopyEdit
for (let [key, value] of map) {
  console.log(key, value);
}
```

Object vs Map: When to Use

Feature	Object	Мар
Key Types	Strings and Symbols only	Any type (objects, functions)
Insertion Order	Not guaranteed	Preserved
Iteration	Requires manual methods	Built-in and easier
Performance	Slower with frequent insertions	Better for frequent additions
Size Property	Not available (Object.keys().length)	Available as map.size

Nested Objects

You can nest one object inside another:

```
javascript
CopyEdit
let user = {
  name: "Jane",
  address: {
    city: "Mumbai",
    zip: 400001
  }
};
```



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console.log(user.address.city); // Mumbai

Real-Life Analogy

An object is like a person's profile:

- name → "Alice"
- age \rightarrow 25
- isStudent → true

A map is like a contacts app, where:

- you can look up a person (key) and get their details (value),
- you can use different types of keys (ID, phone number, object references, etc.)

Practice Tasks

- 1. Create an object for a student with properties: name, rollNo, marks.
- 2. Update and delete some properties.
- 3. Loop through the object and print keys and values.
- 4. Create a Map to store country names as keys and their capitals as values.
- 5. Iterate through the Map and display key-value pairs.

* Summary

Feature	Description
Object	Unordered key-value pairs (keys are strings/symbols)
Мар	Ordered key-value pairs (keys can be any type)
Dot/Bracket Notation	Used to access object properties
Object.keys/values/entries()	Methods to extract data from object



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map.set/get/has/delete()	Common Map operations