

JavaScript Objects

Module 1 - Objects and Its Properties in JavaScript



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JavaScript is an Object Oriented Programming (OOP) language. A programming language can be called object-oriented if it provides four basic capabilities to developers:

- Encapsulation: the capability to store related information, whether data or methods, together in an object.
- Aggregation: the capability to store one object inside another object.
- Inheritance: the capability of a class to rely upon another class (or number of classes) for some of its properties and methods.
- Polymorphism: the capability to write one function or method that works in a variety of different ways.

Objects are composed of attributes. If an attribute contains a function, it is considered to be a method of the object; otherwise the attribute is considered a property.

JavaScript Objects

In JavaScript, we can define an object as a collection of properties that are defined as a key-value pair, where the key is the generic name of the object feature which can be assigned a value.

**NOTE: Don't confuse this object with class objects, where we define a class and then create an object for it.**

In JavaScript, an **object** is a standalone entity where the properties of the object define the characteristics of the object.

For example, if we consider a **mobile phone** as an object then its properties are its color, screen size, brand name, operating system, RAM, Memory, etc. All these properties define the characteristics of a mobile phone.

The **property of an object** is a **key:value pair**, where **key** refers to a variable, and **value** refers to any type of value associated with the key. The value can be of any type like a number, string, or even an array, or another object.

We can create an object in JavaScript either by using the constructor function or the object literal.



Creating a JavaScript Object

We can create a JavaScript object either by using the Object constructor or using the object literal syntax. Below we have the basic syntax for creating an object is JavaScript using both ways:

Method 1: Creation Using Object Literal

The object literal syntax allows you to define and initialize an object with curly braces {}, setting properties as key-value pairs.

Example:

```
let obj = {  
  name: "Sourav",  
  age: 23,  
  job: "Developer"  
};  
console.log(obj);
```

Rules for creating Object using Object Literal:

1. Make sure we enclose our object in curly braces.
2. Separate the property name and property value with a colon (:).
3. No two properties in an object can have the same name.
4. Separate each property name and values pair with a comma.
5. Don't use a comma after the last property value.

Method 2: JavaScript Object Using Object Constructor

The new Object() method will make a new JavaScript object whose properties can be initialized using dot or bracket notation.

Example:

We can create a direct instance of an object by using the new keyword:  
let mobile = new Object();

and then can assign properties to it using the dot operator(.) as shown below:

```
mobile.name = 'Blackberry';  
mobile.color = 'Black';  
mobile.price = 40000;
```

Basic Operations on JavaScript Objects

1. Accessing Object Properties

You can access the properties of an object in two ways:

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- Dot Notation: `objectName.propertyName`
- Bracket Notation: `objectName["propertyName"]` (useful when property names are dynamic or contain special characters).

Solved Example 1: Accessing Object Properties

Ques: Write a JavaScript program that defines two objects, person1 and person2, each with properties name, age, and occupation. Display the details of both persons using `document.write()`.

Solution:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Two Person Objects</title>
</head>
<body>
  <script>
    // Define the first person object
    const person1 = {
      name: "Alice",
      age: 25,
      occupation: "Engineer"
    };

    // Define the second person object
    const person2 = {
      name: "Bijoy",
      age: 30,
      occupation: "Teacher"
    };

    // Display properties of both objects
    document.write("<b>Person 1:</b><br>");
    document.write("Name: " + person1.name + "<br>");
    document.write("Age: " + person1.age + "<br>");
    document.write("Occupation: " + person1.occupation + "<br><br>");

    document.write("<b>Person 2:</b><br>");
    document.write("Name: " + person2.name + "<br>");
    document.write("Age: " + person2.age + "<br>");
    document.write("Occupation: " + person2.occupation + "<br>");
```

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```
</script>  
</body>  
</html>
```

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### Code Explanation

#### Two Objects Created:

- person1 represents the first person with name, age, and occupation as properties.
- person2 represents the second person with similar properties.

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**Displaying Properties:** The document.write() method is used to display the properties of each person on the webpage.

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### OUTPUT:

```
Person 1:  
Name: Alice  
Age: 25  
Occupation: Engineer
```

```
Person 2:  
Name: Bijoy  
Age: 30  
Occupation: Teacher
```

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### 2. Modifying Object Properties

You can modify the value of an existing property by assigning it a new value. Modifying an object property means changing its value. This can be done by assigning a new value to the property using dot or bracket notation.

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### Solved Example 2: Modifying Object Properties

Ques: Write a JavaScript program that defines a laptop object with properties brand and model. Initially, set the brand to "Dell" and the model to "Inspiron 15". Then, modify the model property to "XPS 13". Display the updated properties on a webpage with a light blue background, centered text, and proper formatting using document.write().

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### Solution:

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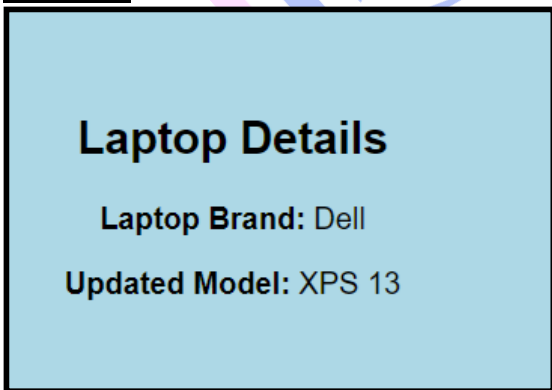
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```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Modify Object Property</title>
  <style>
    body {
      background-color: lightblue; /* Set background color */
      font-family: Arial, sans-serif; /* Set a readable font */
      text-align: center; /* Center-align text */
      padding-top: 50px; /* Add some spacing from the top */
    }
  </style>
</head>
<body>
  <script>
    // Define a laptop object
    const laptop = {
      brand: "Dell",
      model: "Inspiron 15"
    };

    // Modify the model property
    laptop.model = "XPS 13";

    // Display updated property
    document.write("<h2>Laptop Details</h2>");
    document.write("<p><b>Laptop Brand:</b> " + laptop.brand + "</p>");
    document.write("<p><b>Updated Model:</b> " + laptop.model + "</p>");
  </script>
</body>
</html>
```

**OUTPUT:**



**3. Adding Properties to an Object**

You can add new properties dynamically using dot or bracket notation. Adding a property means introducing a new label (key-value pair) to the object that didn't exist before. You simply assign a value to a new property.

**Solved Example 3: Adding Properties to an Object**

Ques: Write a JavaScript program that defines a smartphone object with an initial property brand set to "Apple". Then, dynamically add two more properties:

- model (set to "iPhone 13") using dot notation
- year (set to 2021) using bracket notation

Finally, display all properties (brand, model, and year) on a webpage using document.write(). The webpage should have:

- A light green background
- Centered text
- Proper formatting with headings and bold labels.

**Solution:**

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Modify Object - Add Properties</title>
  <style>
    body {
      background-color: lightgreen; /* Set background color */
      font-family: Arial, sans-serif; /* Set a readable font */
      text-align: center; /* Center-align text */
      padding-top: 50px; /* Add some spacing from the top */
    }
  </style>
</head>
<body>
  <script>
    // Define a smartphone object
    const smartphone = {
      brand: "Apple"
    };

    // Add a new property using dot notation
    smartphone.model = "iPhone 13";
```

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```
// Add another property using bracket notation
smartphone["year"] = 2021;

// Display all properties
document.write("<h2>Smartphone Details</h2>");
document.write("<p><b>Brand:</b> " + smartphone.brand + "</p>");
document.write("<p><b>Model:</b> " + smartphone.model + "</p>");
document.write("<p><b>Year:</b> " + smartphone.year + "</p>");

</script>
</body>
</html>
```

OUTPUT:



4. Removing Properties from an Object

You can remove properties using the delete operator. Removing a property from an object means deleting a key-value pair. This can be done using the delete operator, which removes the property from the object entirely.

Solved Example 4: Removing Properties from an Object

Ques: Write a JavaScript program that creates an object with three properties: name, age, and grade. Use the delete operator to remove the age property and display the remaining properties using document.write. Also, show what happens when you try to access the deleted property."

Solution:

```
<!DOCTYPE html>
<html lang="en">
<head>
```

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```
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<title>JavaScript Object Property Deletion</title>
<style>
  body {
    background-color: lightblue;
    font-family: Arial, sans-serif;
    padding: 20px;
  }
</style>
</head>
<body>

<h2>JavaScript Object Property Deletion</h2>

<script>
  // Define student object
  const student = {
    name: "Surdas",
    age: 20,
    grade: "A"
  };

  // Remove the 'age' property
  delete student.age;

  // Display remaining properties using document.write
  document.write("<strong>Name:</strong> " + student.name + "<br>");
  document.write("<strong>Grade:</strong> " + student.grade + "<br>");
  document.write("<strong>Age:</strong> " + student.age + "<br>"); //
  Undefined
</script>

</body>
</html>
```

OUTPUT:

JavaScript Object Property Deletion

Name: Surdas  
Grade: A  
Age: undefined



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Assignment

Ques 1: Create an object car with the properties: make, model, and year. Write a program that accesses and prints the make and year properties of the object using both dot notation and bracket notation.

Ques 2: Create an object person with properties: name, age, and city. Write a program that modifies the age property to 30 and the city property to New York, then print the updated object.

Ques 3: Create an object book with the properties: title, author, year, and price. Write a program that removes the price property from the object, and then prints the object to show the updated properties.



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