

JavaScript Functions and Events

Module 6 - Introduction to Events and Event Handling in JavaScript



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JavaScript Events are the building blocks of an interactive webpage. In JavaScript, events refer to the actions that are detected by a web browser whenever it detects any user movement on the browser screen.



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So, everything starting from the movement of the mouse, keyboard click, hover over any particular HTML element, form submission, click on any input field, selection of a value from a dropdown, and everything else you do on a webpage, the browser generates an event for it which can be handled using JavaScript.



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JavaScript enables us to write scripts to be executed when any of these events occur. For example, the onclick event is detected by the browser whenever you click the mouse button and using JavaScript we can perform any action on mouse click like we can set a counter and keep a track of mouse clicks to see how many times the user used the mouse click.



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What Are Events in JavaScript?

In JavaScript, events are actions or occurrences that happen in the browser, which the browser recognizes. Examples include clicking a button, hovering over an element, resizing the window, pressing a key, or submitting a form.



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Events allow web pages to become interactive by responding to user actions.



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Common Types of Events

Mouse Events:

- click: Triggered when an element is clicked.
- dblclick: Triggered on a double-click.
- mouseover: Triggered when the mouse is moved over an element.
- mouseout: Triggered when the mouse is moved out of an element.



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Keyboard Events:

- keydown: Triggered when a key is pressed.
- keyup: Triggered when a key is released.



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Form Events:

- submit: Triggered when a form is submitted.
- change: Triggered when a form input value changes.
- focus: Triggered when an input field is focused.



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Window Events:

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- load: Triggered when the webpage is fully loaded.
- resize: Triggered when the browser window is resized.

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**What is Event Handling?**

Event handling refers to detecting these events and executing specific code in response. This code is called an event handler.

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**Three Ways to Handle Events**

You can handle events in three primary ways in JavaScript:

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**a) Inline Event Handling (Directly in HTML)**

You add the event handler directly inside the HTML element using the onclick, onmouseover, etc., attributes.

Example:

```
<button onclick="alert('Button clicked!')">Click Me</button>
```

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**b) Event Handlers in JavaScript**

Assign an event handler to an element in JavaScript using properties like onclick. Example:

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```
<button id="myButton">Click Me</button>
```

```
<script>
  let button = document.getElementById("myButton");
  button.onclick = function() {
    alert("Button clicked!");
  };
</script>
```

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**c) Using addEventListener()**

This is the most modern and flexible way. It allows you to attach multiple event handlers to the same element without overwriting existing ones.

Example:

```
<button id="myButton">Click Me</button>
<script>
  let button = document.getElementById("myButton");
  button.addEventListener("click", function() {
    alert("Button clicked!");
  });
</script>
```

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**Syntax of addEventListener()**

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element.addEventListener(event, handler, options);

Parameters:

1. event: The name of the event you want to listen for (e.g., "click", "mouseover", "keydown").
2. handler: The function to execute when the event occurs. This can be:
  - A named function like sum().
  - An anonymous function (inline function).
3. options (optional): An object that specifies additional settings:

Creating a Button in HTML

**What is a Button?**

A button in web development is a clickable element used to perform an action, like submitting a form, triggering a function, or interacting with the user in some way. Buttons are part of the HTML <button> element and can also be styled to look attractive or fit the website's design.

Syntax:

<button>Click Me</button>

Uses of Buttons:

1. Submit Forms: Send data entered by the user to a server.  
<button type="submit">Submit</button>
2. Reset Forms: Clear all form inputs.  
<button type="reset">Reset</button>
3. Trigger Actions: Run JavaScript functions for tasks like showing alerts or updating a webpage.  
<button onclick="alert('Button Clicked!')">Click Me</button>

Commonly used attributes of the <button> element:

1. id

A unique identifier for the button.

Allows JavaScript to target and manipulate the button.

Example:

<button id="myButton">Click Me</button>

<script>

document.getElementById("myButton").textContent = "New Text";

</script>

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2. type

Specifies the type of button. Common values are:

- button: A simple button.
- submit: Submits the form.
- reset: Resets the form fields.

```
<button type="submit">Submit</button>
```

```
<button type="reset">Reset</button>
```

3. disabled

Disables the button, making it unclickable.

```
<button id="disableButton" disabled>Can't Click</button>
```

4. onclick

Specifies the JavaScript code to run when the button is clicked.

```
<button onclick="alert('Button Clicked!')">Click Me</button>
```

**How to Style a Button?**

Buttons can be styled using CSS to make them more appealing. Here are common styling options:

1. Background Color: Change the button's color.

```
button {
    background-color: #4CAF50; /* Green */
}
```

2. Text Color: Set the color of the text.

```
button {
    color: white;
}
```

3. Padding and Margin: Adjust spacing inside and outside the button.

```
button {
    padding: 10px 20px;
    margin: 10px;
}
```

4. Borders: Add or remove button borders.

```
button {
    border: none; /* Removes border */
    border-radius: 5px; /* Rounds the edges */
}
```

5. Hover Effect: Add a style when the user hovers over the button.

```
button:hover {
    background-color: #45a049; /* Darker green */
}
```

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**Solved Example 1: Creating a Button with Hover effect and Alert Message**

Ques: Write an HTML document to display a button on a webpage. Style the button with the following requirements:

1. Green background with white text.
2. Rounded corners with a 5px radius.
3. On hover, the background color should change to red color.
4. Add functionality to the button such that clicking it shows an alert message: "You clicked the button!"

**Solution:**

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Styled Button Example</title>
  <style>
    /* Basic Button Styling */
    button {
      background-color: #4CAF50; /* Green background */
      color: white; /* White text */
      padding: 10px 20px; /* Spacing inside button */
      border: none; /* No border */
      border-radius: 5px; /* Rounded corners */
      cursor: pointer; /* Pointer cursor on hover */
      font-size: 16px; /* Text size */
    }

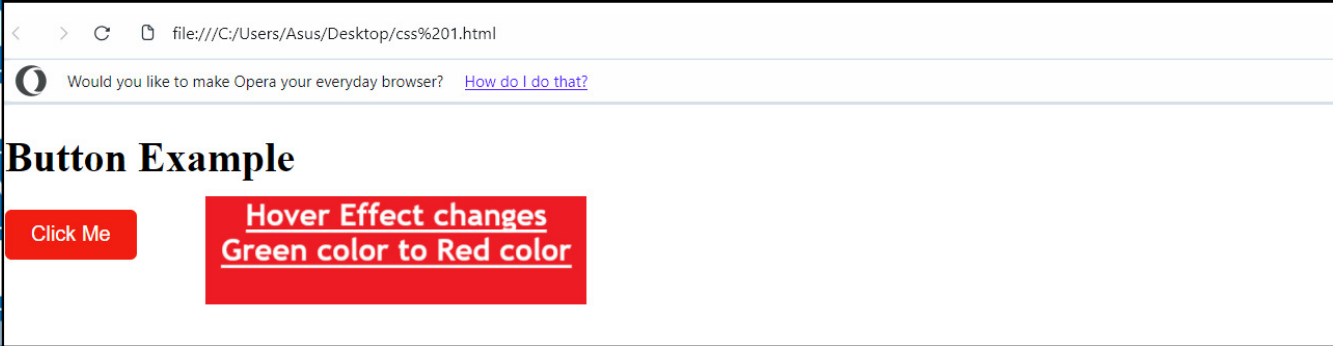
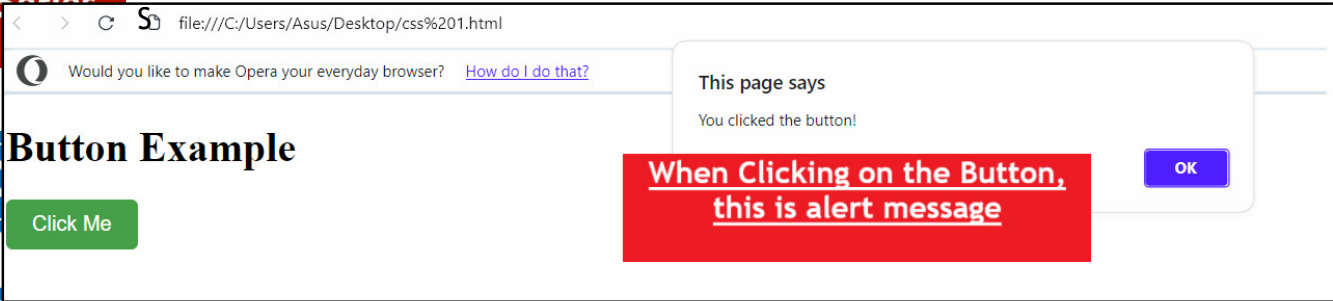
    /* Hover Effect */
    button:hover {
      background-color: #f11d10; /* Red on hover */
    }
  </style>
</head>
<body>
  <h1>Button Example</h1>
  <button onclick="alert('You clicked the button!')">Click Me</button>
</body>
</html>
```

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**Solved Example 2: Creating two Buttons with different Alert Messages**

Ques: Displays two buttons.

1. When the first button is clicked, it shows a message about positive numbers.
2. When the second button is clicked, it shows a message about negative numbers.
3. Adds a light-colored background to the page, styled buttons, and uses inline event handling.

Solution:

```
<!DOCTYPE html>
<html lang="en">
<head>
<title>Inline Event Handling</title>
<style>
  body {
    background-color: #e8f4fa; /* Light blue background */
    font-family: Arial, sans-serif;
    text-align: center;
    padding: 50px;
  }
  button {
    font-size: 16px;
```

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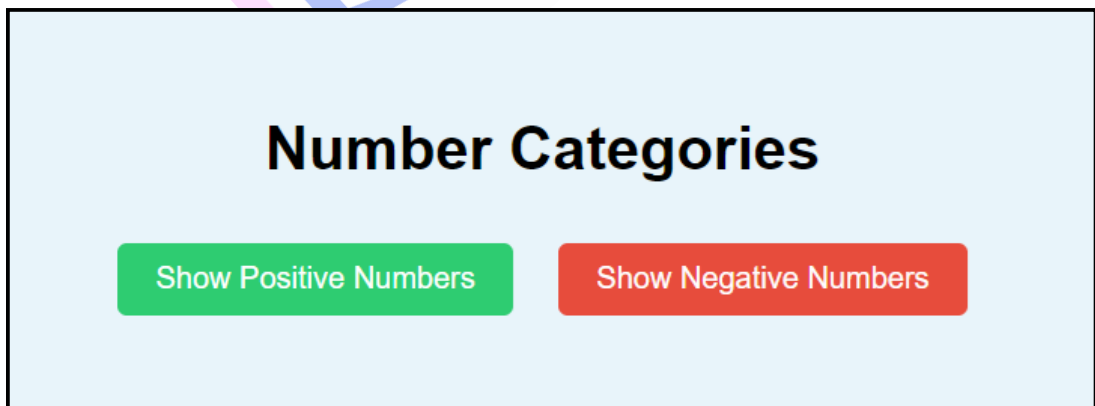
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```
padding: 10px 20px;
margin: 10px;
border: none;
border-radius: 5px;
cursor: pointer;
}
.btn-positive {
background-color: #2ecc71; /* Green */
color: white;
}
.btn-negative {
background-color: #e74c3c; /* Red */
color: white;
}
}
</style>
</head>
<body>
<h1>Number Categories</h1>
<button class="btn-positive" onclick="alert('Positive numbers include 4, 7, 9, etc.')">Show Positive Numbers</button>
<button class="btn-negative" onclick="alert('Negative numbers include -4, -6, etc.')">Show Negative Numbers</button>
</body>
</html>
```

OUTPUT:



Solved Example 3: Creating two Buttons with Event Handling

Ques: Write an HTML and JavaScript program with the following requirements:

1. Create a webpage with two buttons labeled "Red Button" and "Blue Button."
2. When the "Red Button" is clicked, the background color of the webpage should change to red.
3. When the "Blue Button" is clicked, the background color of the webpage should change to blue.

Solution:

```
<!DOCTYPE html>
<html>
<head>
  <title>Event Handling with Multiple Buttons</title>
</head>
<body>
  <button id="btn1">Red Button</button>
  <button id="btn2">Blue Button</button>

  <script>
    document.getElementById("btn1").addEventListener("click", function() {
      document.body.style.backgroundColor = "red";
    });

    document.getElementById("btn2").addEventListener("click", function() {
      document.body.style.backgroundColor = "blue";
    });
  </script>
</body>
</html>
```

Explanation of the Code

HTML Section

Structure: The <html> tag starts the document, and the <head> section defines the title of the page. The <body> contains the main content, including the buttons.

Buttons:

- Two buttons are created using the <button> tag.
- Each button has an id attribute for unique identification:

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- id="btn1" for the Red Button.
- id="btn2" for the Blue Button.

JavaScript Section

**Selecting Buttons:**

The document.getElementById() method is used to target each button by its unique id (btn1 and btn2).

**Event Listeners:**

The addEventListener() method is attached to each button to listen for a "click" event.

**Anonymous Functions:**

**For btn1:**

```
document.body.style.backgroundColor = "red";
```

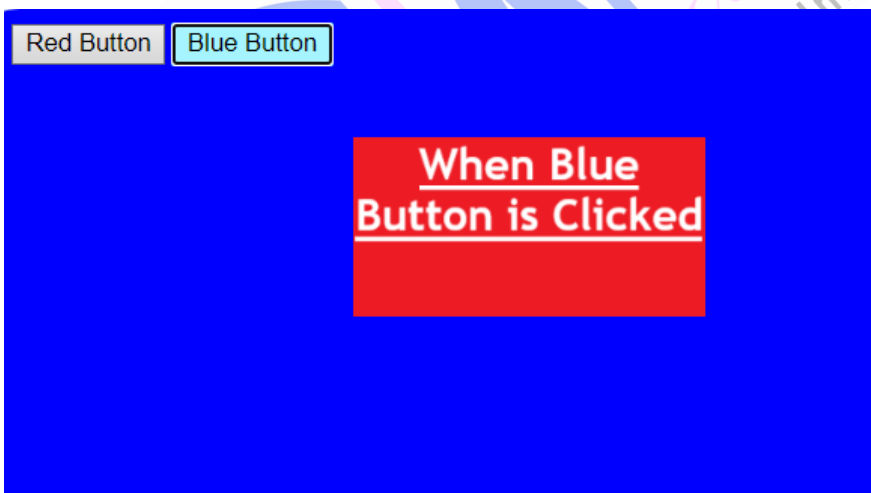
- Changes the backgroundColor of the <body> to red when the Red Button is clicked.

**For btn2:**

```
document.body.style.backgroundColor = "blue";
```

- Changes the backgroundColor of the <body> to blue when the Blue Button is clicked.

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Assignment

Ques 1: Toggle Background Color

- Create an HTML and JavaScript program with the following requirements:
- Create a webpage with two buttons labeled "Light Mode" and "Dark Mode."
- When the "Light Mode" button is clicked, the background color of the webpage changes to white with black text.
- When the "Dark Mode" button is clicked, the background color of the webpage changes to black with white text.
- Style the buttons with rounded corners and a hover effect.

Ques 2: Favorite Color Selector

- Create an interactive webpage with the following requirements:
- Create three buttons labeled "Red," "Green," and "Blue."
- When a button is clicked, display a message like "Your favorite color is Red" (or the selected color) using an alert box.
- Style the buttons with unique background colors matching their labels.
- Add a hover effect that slightly lightens the color of the button.

Ques 3: Random Number Generator

- Create a webpage with the following requirements:
- Include a button labeled "Generate Random Number."
- When the button is clicked, display a random number between 1 and 100 on the webpage.
- Style the button with a blue background, white text, and rounded corners.
- Add a hover effect that changes the background color to a darker shade of blue.

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