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Introduction to 'JavaScript' Language

Browser Object Model

Module 2 - BOM - Window Object in JavaScript



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Definition

The window object is the global object in JavaScript, representing the browser window. It provides methods and properties to control the browser, manage events, display alerts, open/close windows, and navigate between pages.



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Key Feature: Since window is the global object, its properties and methods can be accessed without explicitly using window. (e.g., alert() is the same as window.alert()).



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Applications of window Object

Feature	Description
Open and Close Windows	Use window.open() to create new tabs/windows and window.close() to close them.
Display Alerts and Prompts	Use alert(), confirm(), and prompt() for user interaction.
Get Screen Dimensions	Use window.innerWidth and window.innerHeight to get browser size.
Navigate to Another Page	Use window.location.href to redirect to another URL.
Execute Code After a Delay	Use setTimeout() and setInterval() for timing functions.
Scroll and Resize Events	Use window.scrollTo() and window.onresize for dynamic UI behavior.

window.open() in JavaScript

Definition: window.open() is a method in JavaScript that allows you to open a new browser window or tab. It can be used to open a URL, a blank page, or a new document.

SYNTAX:
window.open(URL, name, specs, replace)



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Parameters

- URL (optional) - The web page URL to open. If omitted, a blank page opens.
- name (optional) - The name of the window. Common values:
 - `_blank` → Opens in a new tab or window.
 - `_self` → Opens in the same tab (similar to clicking a link).
 - `_parent` → Loads in the parent frame (if applicable).
 - `_top` → Loads in the full body of the window, removing frames.
- specs (optional) - A string specifying window features (e.g., width, height, resizable, etc.).
- replace (optional) - A boolean (true or false). If true, the new URL replaces the current one in the history.

Example: Opening a New Tab

```
window.open("https://www.google.com", "_blank");
```

Opens Google in a new tab.

Example: Opening a Popup with Custom Size

```
window.open("https://example.com", "popup", "width=600,height=400");
```

Opens a popup window of 600x400 pixels.

Solved Example: opens a popup window with a custom size when you click a button.

Solution:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Popup Window Example</title>
</head>
<body>
  <h2>Click the button to open a popup window</h2>
  <button onclick="openPopup()">Open Popup</button>

  <script>
    function openPopup() {
      let popup = window.open("https://google.com", "popup",
        "width=600,height=400,left=300,top=200");
    }
  </script>
</body>
```

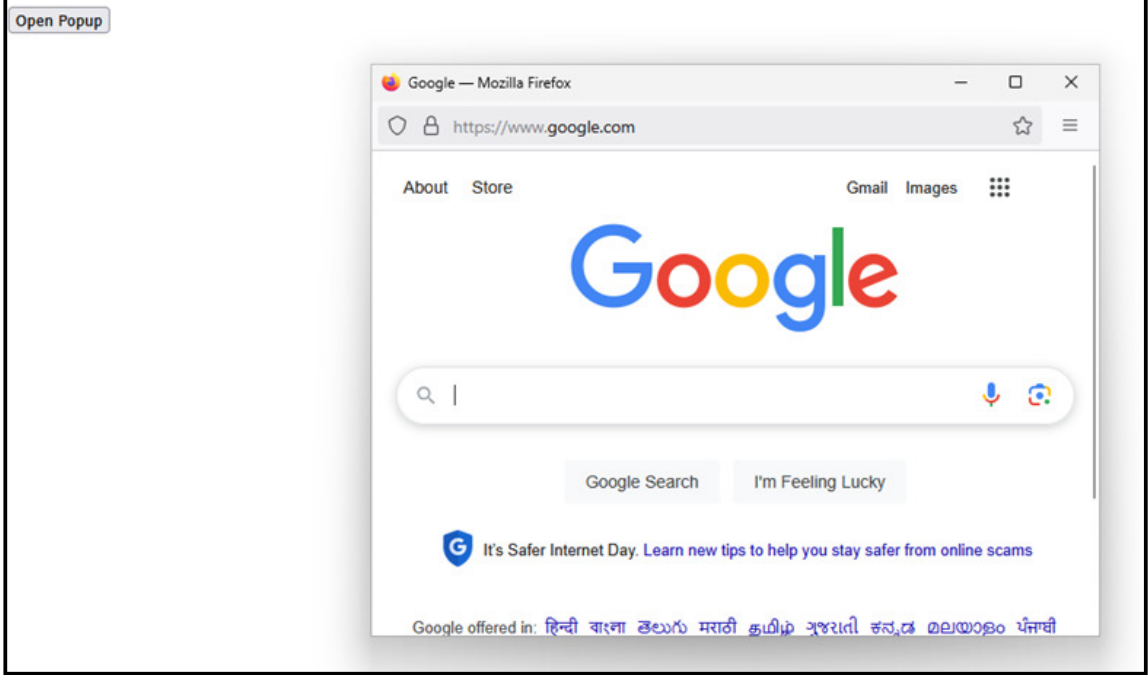
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Click the button to open a popup window



window.close() in JavaScript

Definition

window.close() is a JavaScript method used to close the current browser window or tab. However, it only works if the window was opened using window.open(). Most modern browsers do not allow scripts to close a window that was not opened by JavaScript (for security reasons).

SYNTAX:

window.close();

Solved Example: Closing a Window Opened via window.open()

Solution:

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

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```
<title>Open and Close Window</title>
</head>
<body>

<h2>Click the button to open a popup window</h2>
<button onclick="openPopup()">Open Popup</button>
<button onclick="closePopup()">Close Popup</button>

<script>
  let popupWindow;

  function openPopup() {
    popupWindow = window.open("https://example.com", "popup",
"width=600,height=400");
  }

  function closePopup() {
    if (popupWindow) {
      popupWindow.close();
    } else {
      alert("No popup window to close!");
    }
  }
</script>
</body>
</html>
```

Brief Explanation of the Code:

HTML Structure:

- Contains a heading (<h2>) that provides instructions.

Two buttons:

- "Open Popup" button calls the openPopup() function.
- "Close Popup" button calls the closePopup() function.

JavaScript Functionality:

openPopup():

- Opens a new popup window with window.open("https://example.com", "popup", "width=600,height=400").
- Stores the reference of the popup in the popupWindow variable.

closePopup():

- Checks if popupWindow exists.
- If it exists, closes the popup using popupWindow.close().
- If there is no popup, an alert is displayed saying, "No popup window to close!"



Display Alerts and Prompts

alert() method

- The alert() method displays an alert box with a message and an OK button.
- The alert() method is used when you want information to come through to the user.

confirm() method

- The confirm() method displays a dialog box with a message, an OK button, and a Cancel button.
- The confirm() method returns true if the user clicked "OK", otherwise false.

Note:

- A confirm box is often used if you want the user to verify or accept something.
- A confirm box takes the focus away from the current window, and forces the user to read the message.

prompt() method

- The prompt() method displays a dialog box that prompts the user for input.
- The prompt() method returns the input value if the user clicks "OK", otherwise it returns null.

Note

- A prompt box is used if you want the user to input a value.
- When a prompt box pops up, the user will have to click either "OK" or "Cancel" to proceed.

Solved Example:

Ques: Write an HTML and JavaScript program that demonstrates the use of alert(), confirm(), and prompt().

Requirements:

- Create an HTML page with a button labeled "Click Me".
- When the button is clicked, a JavaScript function showPopups() should execute.

Inside the function:

- Show an alert box with the message: "Hello! This is an alert box."
- Show a confirm box asking: "Do you like JavaScript?"
- If the user clicks OK, display an alert: "Great! Keep learning."



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- If the user clicks Cancel, display an alert: "No worries! Maybe you'll like it later."

Show a prompt box asking: "What is your name?"

- If the user enters a name, greet them with: "Welcome, [Name]!"
- If they leave it blank or cancel, greet them with: "Welcome, Guest!"

Solution:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Simple Popups</title>
</head>
<body>

  <h2>Click the button to see popups</h2>
  <button onclick="showPopups()">Click Me</button>

  <script>
    function showPopups() {
      // Alert box
      alert("Hello! This is an alert box.");

      // Confirm box
      let confirmResult = confirm("Do you like JavaScript?");
      if (confirmResult) {
        alert("Great! Keep learning.");
      } else {
        alert("No worries! Maybe you'll like it later.");
      }

      // Prompt box
      let userName = prompt("What is your name?", "Guest");
      alert("Welcome, " + (userName ? userName : "Guest") + "!");
    }
  </script>

</body>
</html>
```

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window.innerWidth and window.innerHeight in JavaScript

Definition:

- window.innerWidth returns the width of the browser's viewport (visible area) in pixels.
- window.innerHeight returns the height of the browser's viewport in pixels.
- These properties exclude the browser's toolbars and scrollbars.

Syntax:

- let width = window.innerWidth;
- let height = window.innerHeight;

Application (Use Cases):

1. Responsive Web Design:
 - Adjust elements dynamically based on screen size.
 - Example: Show a mobile menu if width is less than 768px.
2. Custom Layout Adjustments:
 - Resize elements based on viewport size (e.g., adjust sidebar width).
3. Handling Window Resize Events:
 - Update content when the user resizes the browser.

Solved Example:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Browser Size Detector</title>
</head>
<body>

  <script>
    document.write("Width: " + window.innerWidth + "px, Height: " +
window.innerHeight + "px");
  </script>

</body>
</html>
```

OUTPUT: (Output may vary according to screen size)

Width: 1920px, Height: 947px

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window.location.href in JavaScript

Definition:

window.location.href returns the current URL of the webpage. It can also be used to redirect the user to a different webpage by changing its value.

Syntax:

```
// Get the current URL
let currentURL = window.location.href;

// Redirect to a new URL
window.location.href = "https://example.com";
```

Application (Use Cases):

1. Getting the Current URL:
 - Useful when logging or displaying the page URL.
2. Redirecting Users to Another Page:
 - Can be used to navigate users to another website or internal page.
3. Conditional Redirection:
 - Redirect users based on conditions (e.g., login status).

Solved Example:

Ques: Write an HTML and JavaScript program that:

- Displays the current URL of the webpage using document.write().
- Has a button labeled "Go to Google".
- When the button is clicked, it should redirect the user to Google using window.location.href.

Write the complete HTML and JavaScript code to achieve this functionality.

Solution:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Window Location Example</title>
</head>
<body>

<script>
  // Display the current URL using document.write
  document.write("Current URL: " + window.location.href + "<br><br>");
```

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```
// Function to redirect the user
function redirect() {
    window.location.href = "https://www.google.com";
}
</script>

<button onclick="redirect()">Go to Google</button>
```

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

Explanation of the Code

1. document.write() to Display the URL
window.location.href gets the URL of the current page.
2. Function to Redirect to Google
 - When the redirect() function runs, window.location.href changes the page URL.
 - The browser then navigates to Google.
3. Button to Trigger Redirection
 - When clicked, this calls redirect(), and the user is sent to Google.

setTimeout() and setInterval() in JavaScript

setTimeout() in JavaScript

Definition: setTimeout() executes a function once after a specified delay (in milliseconds).

Syntax:

```
setTimeout(function, delay);
OR
let timer = setTimeout(() => {
    // Code to execute after delay
}, delay);
```

Application:

- Delaying execution of a function.
- Showing messages after some time (e.g., popups, notifications).
- Simulating a loading screen before executing a task.

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Solved Example:

Ques: Write an HTML and JavaScript program that:
Waits for 3 seconds after the page loads.
Then displays a message "Hello! This message appeared after 3 seconds."
Use setTimeout() to delay the message.
Instead of modifying an HTML element, use document.write() to display the message.

Solution:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>setTimeout Example</title>
</head>
<body>

  <h2>Message will appear after 3 seconds</h2>

  <script>
    setTimeout(() => {
      document.write("Hello! This message appeared after 3 seconds.");
    }, 3000);
  </script>

</body>
</html>
```

setInterval() in JavaScript

Definition: setInterval() executes a function repeatedly at a fixed time interval (in milliseconds).

Syntax:

```
setInterval(function, interval);
OR
let interval = setInterval(() => {
  // Code to execute repeatedly
}, interval);
```

Application:

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- Updating time-based elements (e.g., clocks, countdowns).
- Animating elements continuously.
- Refreshing data at regular intervals (e.g., stock prices, live sports scores).

Solved Example:

Ques: Write an HTML and JavaScript program that:

- Displays the current time on the webpage.
- Updates the time every second using setInterval().
- Instead of modifying an HTML element, use document.write() to display the updated time.

Solution:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>setInterval Example</title>
</head>
<body>

  <h2>Updating Time Every Second</h2>

  <script>
    setInterval(() => {
      let now = new Date();
      document.write("Current Time: " + now.toLocaleTimeString() + "<br>");
    }, 1000);
  </script>

</body>
</html>
```

Explanation of the Code

setInterval() Function Usage

```
setInterval(() => {
  let now = new Date();
  document.write("Current Time: " + now.toLocaleTimeString() + "<br>");
}, 1000);
```

- setInterval() repeats the function every second (1000 ms).

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- new Date() gets the current date and time.
- toLocaleTimeString() formats the time in a readable format.
- document.write() overwrites the page with each update, so only the latest time is shown.

window.scrollTo() and window.onresize in JavaScript

window.scrollTo() in JavaScript

Definition: window.scrollTo() scrolls the page to a specific position.

Syntax:

window.scrollTo(x, y);

OR

window.scrollTo({ left: x, top: y, behavior: "smooth" });

Application:

- Scroll to the top or to a specific section on the page.
- Smooth scrolling for better user experience.

Solved Example:

Ques: Write an HTML and JavaScript program that:

Displays a passage about computers 50 times using a loop.

Uses document.write() to display the repeated text.

Includes a "Scroll to Bottom" button that, when clicked, smoothly scrolls to the bottom of the page using window.scrollTo().

Solution:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>>window.scrollTo() Example</title>
  <style>
    body { height: 2000px; } /* Making page scrollable */
  </style>
</head>
<body>

  <button onclick="scrollToBottom()">Scroll to Bottom</button>

  <script>
    // The passage to repeat
```

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let passage = "It is an electronic gadget that is used to store and process data. The features which are found in a computer are a notepad, calculator, paint tool, etc. A computer can be used to store, receive, or send information via different mediums.

";

```
// Loop to print the passage 50 times
for (let i = 0; i < 50; i++) {
    document.write(passage);
}
```

```
// Function to scroll to the bottom
function scrollToBottom() {
    window.scrollTo({ top: document.body.scrollHeight, behavior: "smooth" });
}
</script>
```

</body>
</html>

window.onresize in JavaScript

Definition: window.onresize is an event that triggers when the window is resized.

Syntax:

```
window.onresize = function() {
    // Code to execute on resize
};
```

OR

```
window.addEventListener("resize", function() {
    // Code to execute on resize
});
```

Application:

- Detect screen size changes for responsive design.
- Adjust layout dynamically when window resizes.

Solved Example:

Ques: Write an HTML and JavaScript program that:

- Displays a passage about computers 50 times using a loop.
- Uses document.write() to output the repeated text.
- Shows the current window size (width and height) when the page loads.

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- Updates and displays the window size dynamically whenever the browser window is resized using window.onresize.

Solution:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>>window.onresize Example</title>
</head>
<body>

  <script>
    // The passage to repeat
    let passage = "A computer is an electronic device used for storing and
    processing data. It includes features like a notepad, calculator, and paint tool.
    Computers help in storing, receiving, and sending information via different
    mediums.<br><br>";

    // Loop to print the passage 50 times
    for (let i = 0; i < 50; i++) {
      document.write(passage);
    }

    // Function to display browser size
    function updateSize() {
      document.write("<br><strong>Current Window Size:</strong> " +
      window.innerWidth + "px (Width) × " + window.innerHeight + "px (Height)");
    }

    // Run updateSize() when the window resizes
    window.onresize = updateSize;

    // Show size on page load
    updateSize();
  </script>

</body>
</html>
```