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# BCA – III

# CA213 – Programming the Internet - II (PI - II)

# Unit V: Java Script Programming ‐ II

# JavaScript HTML DOM (Document Object Model)

## With the HTML DOM, JavaScript can access and change all the elements of an HTML document.

When a web page is loaded, the browser creates a **D**ocument **O**bject **M**odel of the page.

The **HTML DOM** model is constructed as a tree of **Objects**:

With the object model, JavaScript gets all the power it needs to create dynamic HTML:

* JavaScript can change all the HTML elements in the page
* JavaScript can change all the HTML attributes in the page
* JavaScript can change all the CSS styles in the page
* JavaScript can remove existing HTML elements and attributes
* JavaScript can add new HTML elements and attributes
* JavaScript can react to all existing HTML events in the page
* JavaScript can create new HTML events in the page

## The HTML DOM Tree of Objects:



## What is the DOM?

The DOM is a W3C (World Wide Web Consortium) standard.

The DOM defines a standard for accessing documents:

*"The W3C Document Object Model (DOM) is a platform and language-neutral interface that allows programs and scripts to dynamically access and update the content, structure, and style of a document."*

The W3C DOM standard is separated into 3 different parts:

* Core DOM - standard model for all document types
* XML DOM - standard model for XML documents
* HTML DOM - standard model for HTML documents

## What is the HTML DOM?

The HTML DOM is a standard **object** model and **programming interface** for HTML. It defines:

* The HTML elements as **objects**
* The **properties** of all HTML elements
* The **methods** to access all HTML elements
* The **events** for all HTML elements

In other words: **The HTML DOM is a standard for how to get, change, add, or delete HTML elements.**

**JavaScript - HTML DOM Methods:**

* HTML DOM methods are **actions** you can perform (on HTML Elements)
* HTML DOM properties are **values** (of HTML Elements) that you can set or change.

## The DOM Programming Interface:

* The HTML DOM can be accessed with JavaScript (and with other programming languages).
* In the DOM, all HTML elements are defined as **objects**.
* The programming interface is the properties and methods of each object.
* A **property** is a value that you can get or set (like changing the content of an HTML element).
* A **method** is an action you can do (like add or deleting an HTML element).

## Finding HTML Elements

## Finding HTML Elements

|  |  |
| --- | --- |
| **Method** | **Description** |
| document.getElementById() | Finding an element by element id |
| document.getElementsByTagName() | Finding elements by tag name |
| document.getElementsByClassName() | Finding elements by class name |

* ElementById will retrieve a single element object with the unique id specified, whereas
* Elements ByTagName & Elements ByClassName will retrieve an array of all element objects with the specified tag name and class name respectively.

**Finding HTML Elements by Id**

* The easiest way to find HTML elements in the DOM, is by using the element id.
* This example finds the element with id="intro":
* Example

var x=document.getElementById("intro");

* If the element is found, the method will return the element as an object (in x).
* If the element is not found, x will contain null.

<body>

<h1 > Get Element By Id </h1>

<h2 id="charusat"> CHARUSAT </h2>

<h2 id="cmpica"> CMPICA </h2>

<h2 id="bca"> BCA - III </h2>

<h2 id=“pi2"> PI-II </h2>

<script>

document.getElementById("cmpica") .innerHTML = “CMPICA changes to Hello World!";

</script>

</body>

**Finding HTML Elements by Tag Name**

* document.getElementsByTagName("p");
* Referes to all <p> tags inside the HTML document.
* document.getElementsByTagName("p")[1].innerHTML=“hello”;
* Refers to the second <p> tag in an array of <p> elements and set its text to “hello”
* var x = document.getElementById("main");  
  var y = x.getElementsByTagName("p");
* Refers to the element with id="main", and then finds all <p> elements inside "main":

<body>

<h1 > Get Element By Tag Name </h1>

<h2>CHARUSAT </h2>

<h2> CMPICA </h2>

<h2> BCA - III </h2>

<h2> PI - II </h2>

<script>

document.getElementsByTagName("h2")[2].innerHTML="BCA - III change to Hello World!";

</script>

</body>

**Finding HTML Elements by Class Name**

* If you want to find all HTML elements with the same class name. Use this method:
* document.getElementsByClassName("intro");
* The example above returns a list of all elements with class="intro".

<body>

<h1> Get Element By Class Name </h1>

<h2 class="class\_name1"> CHARUSAT </h2>

<h2 class="class\_name1"> CMPICA </h2>

<h2 class="class\_name1"> BCA -III </h2>

<h2 class="class\_name1"> PI-II </h2>

<script>

document.getElementsByClassName("class\_name1")[1].innerHTML="CMPICA changes to Hello World!";

document.getElementsByClassName("class\_name1")[3].innerHTML=“PI-II changes to Hello World!";</script>

</body>

## Changing HTML Elements

## Changing HTML Elements

|  |  |
| --- | --- |
| **Method** | **Description** |
| document.write(text) | Writing into the HTML output stream |
| document.getElementById(*id*).innerHTML= | Changing the inner HTML of an element |
| document.getElementById(id).attribute= | Changing the attribute of an element |
| document.getElementById(id).style.attribute= | Changing the style of an HTML element |

## The innerHTML Property

## The easiest way to get the content of an element is by using the innerHTML property.

## The innerHTML property is useful for getting or replacing the content of HTML elements.

## Example: document.getElementById("elementID").innerHTML = "New Value";

## Example:

The following code gets the content (the innerHTML) of the <p> element with id="intro":

<html>  
<body>  
<p id="intro">Hello World!</p>  
<script>  
var txt=document.getElementById("intro").innerHTML;  
document.write(txt);  
</script>  
  
</body>  
</html>

In the example above, getElementById is a **method**, while innerHTML is a **property**.

## Changing HTML Style

* To change the style of an HTML element, use this syntax:
* **document.getElementById(*id*).style.*property*=*new style***
* The following example changes the style of a <p> element:

## Example:

<html>  
<body>  
  
<p id="p2">Hello World!</p>  
  
<script>  
document.getElementById("p2").style.color="blue";  
</script>  
  
<p>The paragraph above was changed by a script.</p>  
  
</body>  
</html>

* **Changing HTML Element attribute**
  + To change the attribute of an HTML element, use this syntax:
  + **document.getElementById(*id*).attribute=*new value***
  + The following example changes the style of a <p> element:
  + Example
  + <html>  
    <body>  
      
    <p id="p2">Hello World!</p>  
      
    <script>  
     document.getElementById("p2").align=“right";  
    </script>  
      
    <p>The paragraph above was changed by a script.</p>  
      
    </body>  
    </html>
* **Dynamic HTML**
* DHTML is NOT a language. DHTML is a TERM describing the art of making dynamic and interactive web pages. DHTML combines HTML, JavaScript, the HTML DOM, and CSS.
* DHTML is the art of combining HTML, JavaScript, DOM, and CSS. Dynamic Hyper Text Markup Language is a technique in which HTML elements move across the page.
* DHTML stands for Dynamic HTML.
* According to the World Wide Web Consortium (W3C):  
  *"Dynamic HTML is a term used by some vendors to describe the combination of HTML, style sheets and scripts that allows documents to be animated."*
* **Difference between Static vs. Dynamic HTML**
* Static HTML means when we put HTML elements (images, paragraphs etc.) in a specific order in the source code. The browser always showed all elements in this order. Styling and Positioning was done by tables, div's and such aids. If we wanted to change the positioning or order of the elements, we had to again write the HTML.
* DHTML gives a way to re-organize our pages on the fly. We can take some elements out of the natural flow of the page, put them somewhere and change its position again and again by clicking a link.
* The natural flow of the page is the page as the browser shows it one by one and displays them in the best possible way from the beginning to the end of the HTML document.
* Now take an image, and put it somewhere on the page without regard to this natural flow. We can force the image to be in the extreme upper left corner of the page, while the rest of the content is still distributed by the natural flow.
* **HTML DOM Events**
  + HTML DOM events allow JavaScript to register different event handlers on elements in an HTML document.
  + Events are normally used in combination with functions, and the function will not be executed before the event occurs (such as when a user clicks a button).
  + **Examples of HTML events:**
  + When a user clicks the mouse
  + When a web page has loaded
  + When the mouse moves over an element
  + When an input field is changed
  + When an HTML form is submitted

## Input Events:

[onblur - When a user leaves an input field](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_onblur)  
[onchange - When a user changes the content of an input field](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_onchange)  
[onchange - When a user selects a dropdown value](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_dropdown)  
[onfocus - When an input field gets focus](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_onfocus)  
[onselect - When input text is selected](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_onselect)  
[onsubmit - When a user clicks the submit button](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_onsubmit)  
[onreset - When a user clicks the reset button](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_onreset)  
[onkeydown - When a user is pressing/holding down a key](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_onkeydown)  
[onkeypress - When a user is pressing/holding down a key](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_onkeypress)  
[onkeyup - When the user releases a key](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_onkeyup)  
[onkeyup - When the user releases a key](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_onkeyup2)  
[onkeydown vs onkeyup - Both](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_onkeydownup)

## Mouse Events:

[onmouseover/onmouseout - When the mouse passes over an element](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_onmouse)  
[onmousedown/onmouseup - When pressing/releasing a mouse button](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_onmousedown)  
[onmousedown - When mouse is clicked: Alert which element](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_srcelement)  
[onmousedown - When mouse is clicked: Alert which button](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_onmousedown2)  
[onmousemove/onmouseout - When moving the mouse pointer over/out of an image](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_onmousemove)  
[onmouseover/onmouseout - When moving the mouse over/out of an image](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_onmouseover)  
[onmouseover an image map](https://www.w3schools.com/js/tryit.asp?filename=tryjs_imagemap)

## Click Events:

[onclick - When button is clicked](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_onclick)  
[ondblclick - When a text is double-clicked](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_ondblclick)

## Load Events:

[onload - When the page has been loaded](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_body_onload)  
[onload - When an image has been loaded](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_img_onload)  
[onerror - When an error occurs when loading an image](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_onerror)  
[onunload - When the browser closes the document](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_onunload)  
[onresize - When the browser window is resized](https://www.w3schools.com/js/tryit.asp?filename=tryjs_events_onresize)

## Using Events:

The HTML DOM allows you to execute code when an event occurs.

Events are generated by the browser when "things happen" to HTML elements:

* An element is clicked on
* The page has lo
* aded
* Input fields are changed

This example changes the style of the HTML element with id="id1", when the user clicks a button:

## Example:

<!DOCTYPE html>  
<html>  
<body>  
  
<h1 id="id1">My Heading 1</h1>  
<button type="button"   
onclick="document.getElementById('id1').style.color='red'">  
Click Me!</button>  
  
</body>  
</html>

**Examples**

|  |  |
| --- | --- |
| **1.** | [Visibility](http://www.w3schools.com/dhtml/tryit.asp?filename=trydhtml_visibility)  <html>  <body>  <p id="p1">This is a text. This is a text. This is a text. This is a text. This is a text. This is a text. This is a text.</p>  <input type="button" value="Hide text" onclick="document.getElementById('p1').style.visibility='hidden'" />  <input type="button" value="Show text" onclick="document.getElementById('p1').style.visibility='visible'" />  </body>  </html> |
| **2.** | [Change background color](http://www.w3schools.com/dhtml/tryit.asp?filename=trydhtml_css_bgcolor)  **<html>**  **<head>**  **<script type="text/javascript">**  **function bgChange(bg)**  **{**  **document.body.style.background=bg;**  **}**  **</script>**  **</head>**  **<body>**  **<b>Mouse over the squares and the background color will change!</b>**  **<table width="300" height="100">**  **<tr>**  **<td onmouseover="bgChange('red')"**  **onmouseout="bgChange('transparent')"**  **bgcolor="red">**  **</td>**  **<td onmouseover="bgChange('blue')"**  **onmouseout="bgChange('transparent')"**  **bgcolor="blue">**  **</td>**  **<td onmouseover="bgChange('green')"**  **onmouseout="bgChange('transparent')"**  **bgcolor="green">**  **</td>**  **</tr>**  **</table>**  **</body>**  **</html>** |
| **6.** | [Inset borders](http://www.w3schools.com/dhtml/tryit.asp?filename=trydhtml_menu5) <html>  <head>  <script type="text/javascript">  function inset(elmnt)  {  elmnt.style.borderStyle="inset";  }  function outset(elmnt)  {  elmnt.style.borderStyle="outset";  }  </script>  <style>  td  {  background:C0C0C0;  border:2px outset;  }  </style>  </head>  <body>  <table width="80">  <tr><td onmouseover="inset(this)" onmouseout="outset(this)"><a href="/default.asp">HOME</a></td></tr>  <tr><td onmouseover="inset(this)" onmouseout="outset(this)"><a href="/js/default.asp">JavaScript</a></td></tr>  <tr><td onmouseover="inset(this)" onmouseout="outset(this)"><a href="/html/default.asp">HTML</a></td></tr>  <tr><td onmouseover="inset(this)" onmouseout="outset(this)"><a href="http://www.google.com">Google</a></td></tr>  </table>  </body>  </html> |
| **16.** | [Change the background image](http://www.w3schools.com/dhtml/tryit.asp?filename=trydhtml_image_bg)  <html>  <head>  <script type="text/javascript">  function bgChange(bg)  {  document.body.background=bg;  }  </script>  </head>  <body>  <b>Mouse over these images, and the background will change</b>  <table width="300" height="100">  <tr>  <td onmouseover="bgChange('paper.jpg')"  background="paper.jpg">  </td>  <td onmouseover="bgChange('bluesilk.jpg')"  background="bluesilk.jpg">  </td>  <td onmouseover="bgChange('bgdesert.jpg')"  background="bgdesert.jpg">  </td>  </tr>  </table>  </body>  </html> |
| **17.** | [Change the size of an image](http://www.w3schools.com/dhtml/tryit.asp?filename=trydhtml_imagesize)  <html>  <head>  <script type="text/javascript">  function moveover()  {  document.getElementById('image').width="200";  document.getElementById('image').height="360";  }  function moveback()  {  document.getElementById('image').width="100";  document.getElementById('image').height="180";  }  </script>  </head>  <body>  <b>Mouse over the image:</b><br />  <img id="image" src="bulbon.gif"  onmouseover="moveover()"  onmouseout="moveback()"  width="100" height="180" />  </body>  </html> |
| **18.** | [Select all check-boxes](http://www.w3schools.com/dhtml/tryit.asp?filename=trydhtml_form_selectall)  <html>  <head>  <script type="text/javascript">  function makeCheck(thisForm)  {  for (i = 0; i < thisForm.option.length; i++)  {  thisForm.option[i].checked=true;  }  }  function makeUncheck(thisForm)  {  for (i = 0; i < thisForm.option.length; i++)  {  thisForm.option[i].checked=false;  }  }  </script>  </head>  <body>  <form name="myForm">  <input type="button" value="Check" onclick="makeCheck(this.form)">  <input type="button" value="Uncheck" onclick="makeUncheck(this.form)">  <br />  <input type="checkbox" name="option">Apples<br />  <input type="checkbox" name="option">Oranges<br />  <input type="checkbox" name="option">Bananas<br />  <input type="checkbox" name="option">Melons  </form>  </body>  </html> |
| **19.** | [Change text color of an input field](http://www.w3schools.com/dhtml/tryit.asp?filename=trydhtml_form_color2)  <html>  <head>  <script type="text/javascript">  function changeColor(color)  {  document.getElementById('x').style.color=color;  }  </script>  </head>  <body>  <p>This example demonstrates how to change the text color of an input field.</p>  <p>Mouse over the three colored table cells, and the text will change color:</p>  <table width="100%"><tr>  <td bgcolor="red" onmouseover="changeColor('red')"> </td>  <td bgcolor="blue" onmouseover="changeColor('blue')"> </td>  <td bgcolor="green" onmouseover="changeColor('green')"> </td>  </tr></table>  <form>  <input id="x" type="text" value="Mouse over the colors" size="20">  </form>  </body>  </html> |
| **25.** | [Element access](http://www.w3schools.com/dhtml/tryit.asp?filename=trydhtml_dom_color)  <html>  <body>  <h1 onclick="this.style.color='red'">Click Me!</h1>  </body>  </html> |
| **26.** | [innerHTML access](http://www.w3schools.com/dhtml/tryit.asp?filename=trydhtml_dom_innertext)  <html>  <body>  <h1 id="header">Old Header</h1>  <script type="text/javascript">  document.getElementById("header").innerHTML="New Header";  </script>  <p>"Old Header" was changed to "New Header"</p>  </body>  </html> |
| **27.** | [Change innerHTML](http://www.w3schools.com/dhtml/tryit.asp?filename=trydhtml_demo)  <html>  <head>  <script type="text/javascript">  function nameon()  {  document.getElementById('h2text').innerHTML="WELCOME!";  }  function nameout()  {  document.getElementById('h2text').innerHTML="How are you today?";  }  </script>  </head>  <body>  <h2 id="h2text" onmouseout="nameout()"  onmouseover="nameon()">  Mouse over this text!</h2>  </body>  </html> |