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Concepts of Web Technology

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Dr. Jagin M. Patel | Ms. Meghna N. Vithlani

Unit - 4

JavaScript Objects

4.1 Document Object Model (DOM)

- Document Object Model (DOM) is a standard object model and programming interface for manipulating HTML and XML documents.
- It describes a standard for accessing documents.
- It is a cross-platform and language-neutral interface
- It dynamically accesses and updates the content, structure, and style of a document.

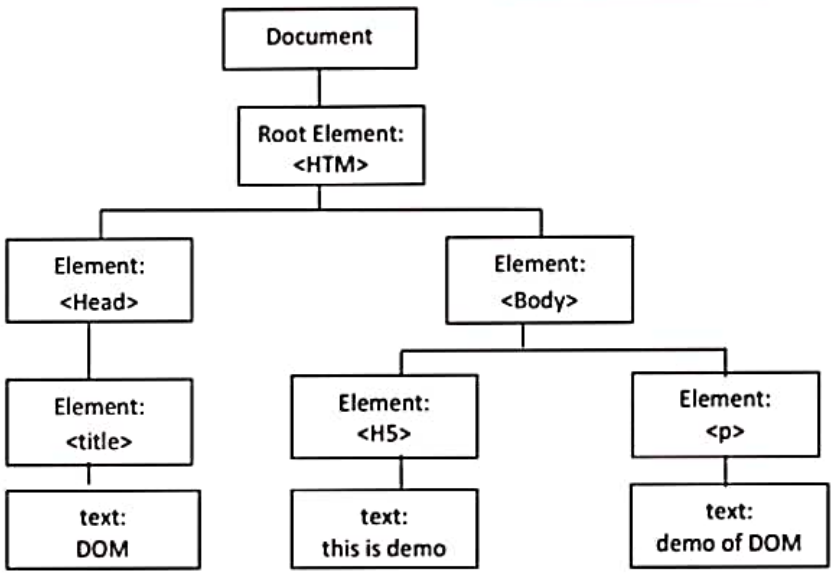
  When a web page is loaded, the browser constructs a DOM of that page. In this DOM, a document is represented as a tree. This tree is a hierarchy of nodes or elements. Using this hierarchy, any HTML element in the DOM is accessible.

  In DOM, Tags are called nodes or elements.

  Look at the following HTML document:

```
<html>
  <head>
    <title> DOM</title>
  </head>
  <body>
      <h5>  this is demo </h5>
<p> demo of DOM </p>
  </body>
</html>
```

- The DOM representation of the above HTML document is:



- In this DOM tree, the document is the always root node. The root node has one child, <html> element. After that < head> and < body> are its children. <title> is child of <head>. In this way, entire DOM is represented.

4.1.1 DOM Properties

- Following is the list of DOM properties. DOM properties are accessed using the "document" object.
- Syntax for using property is *document.property_name*

Properties	Description
links	Refers to all <a> and <area> elements that have a "href" attribute set.
anchors	Refers to all <a> elements that have a "name" attribute set.
images	Refers to all <img> elements
doctype	Specify the document's doctype
scripts	Refers to all <script> elements
head	Refers to the <head> element
forms	Refers to all <form> elements
cookie	Returns all name/value pairs of cookies in the document.
domain	Refers to the domain name of the server.
lastModified	Get the date and time of the last updated document.
readyState	Get the status of the document.
title	It sets or gets the title of the document. i.e. Refers to <title> element.
URL	Specify the URL of the document.

4.1.2 DOM Methods

- Following is the list of DOM methods. DOM methods are accessed using the "document" object.
- Syntax for using method is *document.method_name(parameter).*

Methods	Description
write()	It is used to write the output of JavaScript code or HTML to a document.

writeln()	It is the same as write(), but adds a newline character after each statement.
getElementById()	It refers to the element by using its ID
getElementsByName()	It returns a collection containing all the elements having a specified name.
getElementByTagName()	It returns a collection containing all elements with a specified tag name.
open()	It is used to open an HTML output stream to collect the output from document.write().
close()	It is used to close the output stream previously opened with document.open().

Example:

Following example demonstrate various properties and methods of DOM.

```
<html>
<head><title>  Demo of DOM properties and methods</title></head>
<body>
<img src="image2.jpg" >
<p id="test" />
<input id="input1" name="in" value="shaurya">
<p id="test1"/>
<script>
//using title
document.write("Document title: " + document.title);
document.write ("<br>");

//using  image
document.write ("<br>");
document.write("Total no. of images : " + document.images.length);
document.write ("<br>");

//Using getElementById
doc =  document.getElementById("input1");
document.write("value of input element: " +doc.value);

//using getElementsByName
doc1 = document.getElementsByName("in");
document.write("Element having name=in: " + doc1[0].tagName);

//Using getElementsByTagName
```

```
document.write ("<br>");
document.write("Total no. p elements: " +
document.getElementsByTagName("p").length);
</script>

</body>
</html>
```

Output:

```
Document title: Demo of DOM properties and methods
Total no. of images : 1
value of input element: shaurya
Element having name=in: INPUT
Total no. p elements: 2
```

4.2 JavaScript Object

- JavaScript supports Object-Oriented concept. JavaScript Object is considered as a non-primitive data type. The object has properties and methods. Properties have values of primitive data types and methods are functions. It is a set of named value pairs.
- **Ways to create JavaScript Objects**

  There are 3 ways to create objects in JavaScript.

  (1) By object literal

  (2) By creating an instance of Object

  (3) By using an object constructor

4.2.1 By object literal

- The object literal is an easy way of creating an object. It is created using { ...} brackets.
- The syntax of creating an object with object literal is:

  var object_name = {property1:value1, propertsy2:value2,...,propertyN:valueN };
- Parameter list values are written as **<name : value>** pairs, where name and value are separated by a colon(:) and each pair is separated by comma(,).

  Above syntax can be written as:

```
var object_name = {
        property1:value1,
        propertsy2:value2
        , .....,
        propertyN:valueN };
```

Example: The following is the example of creating an object using object literal.

```
var student = {name:"Shubh",
               age:11,
               marks:95};
```

```
//accessing property
document.write( student.name+" is "+student.age+" years old");
```

Explanation: Here object **student** is created with three properties.

- The first property is "name" and the value is "Shubh".
- The second property is "age" and the value is 11.
- Third property is "marks" and the value is 95.

4.2.2 By creating an instance of Object

- The second way to create an object is using new keyword with Object(). The new operator is used to create an instance of an object. Dot (.) and [ ] brackets can be is used to specify properties and methods.

Syntax:

```
var object_name =new Object();  // create object
 object_name.property_name = property_value ; //specify properties using dot.
object_name .["property_name"] = property_value ; //specify properties using [ ]
```

Example:

```
// create object student
student=new Object();
//assign properties to the object student
student.name = "Shubh";
student["age"]=11;
student.marks = 95;
```

4.2.3 By using an Object constructor

- This is another way to create an object. Here, first, create a function with parameters. Then, assign value to each parameter using **this** keyword. **this** keyword refers to the current object.

Syntax:

```
//create function
function function_name(parameter1, parameter2,..., parametern)
{
//assign value to parameters
this. parameter1= value1;
this. parameter2= value2;
  .....
  this. parametern= valuen;
}
// create object using constructor
object_name = new function_name(value1, value2,....,valuen);
```

Example:

Following example creates object student, and assign "Shubh" to name, "11" to age, and "95" to marks.

```
function stud (name,age, marks)
{
this. name = name;
this.age=age;
this.marks=marks;
}
student = new stud("Shubh", 11, 95);
```

The following example demonstrates how to set and get values of Object:

```
<script>
function stud (name,age, marks) {
this. name = name;
this.age=age;
this.marks=marks;
}
student = new stud("Shubh", 11, 95);
document.writeln("Name:" + student.name);
document.writeln("Age:" + student.age);
document.writeln("Marks:" + student.marks);
</script>
```

Output:

```
Name:Shubh
Age:11
Marks:95
```

4. 3 Date object

- The purpose of the Date object is to work with date (days, months, years) and time (milliseconds, seconds, minutes, hours)
- Date object is created using new Date( ).
- Following code create a date object.
- var dateObj = new Date(); // create date object dateObj

4.3.1 Date constructor:

- There are four basic forms for the Date() constructor:

1) **new Date() :** This is a default constructor with no argument. It initializes the Date object with the current date and time.
2) **new Date(milliseconds):** This parameter is an integer value. It representants the date in milliseconds since January 1, 1970.

Example:

```
dateObj = new Date(999999);
```

1) **new Date(dateString)**: A dateString parameter is string value representing a date, in the format accepted by the Date.parse() method.
Example:

```
str = "10/11/1975";
dateObj = new Date(str);
```

2) **new Date(year, month, day [, hours, minutes, seconds, milliseconds])**: This constructor take 3 to 7 parameters. All these parameters are integer value. Description of these parameters is:

Parameter	Description
year	It specifies the year
month	It specifies the month, ranging from 0 (for January) to 11 (for December)
day	It specifies the day of the month. Its default value is 1.
hours	It specifies the hour of the day in 24-hour format. Its default value is 0.
minutes	It specifies the minute part of a time
seconds	It specifies the second part of a time
milliseconds	It specifies the millisecond part of a time

Example:
Following code create date object birth_date using 7 parameters.

```
birth_date = new Date(1981, 0, 18, 16, 45, 30, 0);
```

4.3.2 Date methods:

Following is the list of Date methods.

Method	Description
getDate()	It returns the day (from 1 to 31) of the month.
getDay()	It returns the day of the week, value is from 0 (Sunday) to 6 (Saturday)
getMonth()	It returns the month, value is from 0 (January) to 11 (December)
getHours()	It returns the hour, value is from 0 to 23
getMinutes()	It returns the minutes
setDate()	It sets the day of the month of a given date object
setHours()	It sets the hour of a given date object
setMonth()	It sets the month of a given date object
setMinutes()	It sets the minutes
toString()	It converts a Date object to a string value
toDateString()	It returns the date portion of a Date object

Examples:

Following example demonstrate various methods of Date object. If you set birth_date= new Date(); in following code, you will get current date and time information.

```
<script>
   birth_date= new Date(1981, 0, 18, 16, 45, 30, 0);  //set date
   document.write("day of month: "+birth_date.getDate());
   document.write("<br>");
   document.write("hour: "+birth_date.getHours());
   document.write("<br>");
   document.write("minutes:"+birth_date.getMinutes());
   document.write("<br>");
   document.write("second:"+birth_date.getSeconds());
   document.write("<br>");
   document.write("day of the week:"+ birth_date.getDay());
   document.write("<br>");
   document.write("month:"+birth_date.getMonth());
   document.write("<br>");
   birth_date.setDate(20); //  set day to 20
</script>
```

Output:

```
Day of month: 18
hour: 16
minutes:45
second:30
day of the week:0
month:0
```

Following example demonstrate use of setDate method. It is also used to add days to a date:

```
<script>
 dateObj = new Date();
dateObj.setDate(10);
document.write(dateObj.getDate() + "<br>");
dateObj.setDate(dateObj.getDate() + 15);
document.write(dateObj.getDate());
</script>
```

Output:

10

25

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