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Front End Development

Module 3: JavaScript for Front End Development

Module 3 Objectives

- Upon completing this module, the learner will be able to:
  - Understand the fundamentals of JavaScript
    - Variable
    - Datatypes
      - Primitive
      - Non-Primitive
    - Operators
  - Understand Conditional Statements and Loops
  - Understand JavaScript Functions
  - Understand JavaScript Exception Handling
  - Understand working with BOM and DOM
  - Understanding HTML/DOM events to handle Form Validations

Module 3 Agenda

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070

Topic Name	Duration
Introduction to JavaScript	**20 min**
JavaScript Basic	20 mins
JavaScript Functions	30 mins
Exception Handling	20 min
Introduction to BOM	20 mins
Introduction to DOM	20 mins
HTML/DOM Events for Form Validation	20 mins

Finding the behavior

- HTML specifies the content of the web page. It defines overall structure of the web page
- Adding CSS to the HTML pages allows to specify the layout of the page
- But there is still something missing! Can you notice what?

```
@CHARSET "ISO-8859-1";
```

```
<html>
<head>
<meta ch
<title>M
<link rel="stylesheet" type="text/css" href="mystyle.css">
</head>
```

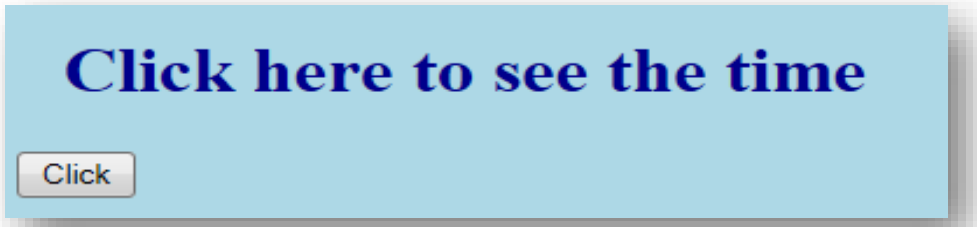
```
lightblue;
```

Correct! The web page does not respond! Nothing happens on click of the button

```
to see the time</h1>
utton">Click</button>

p>
```

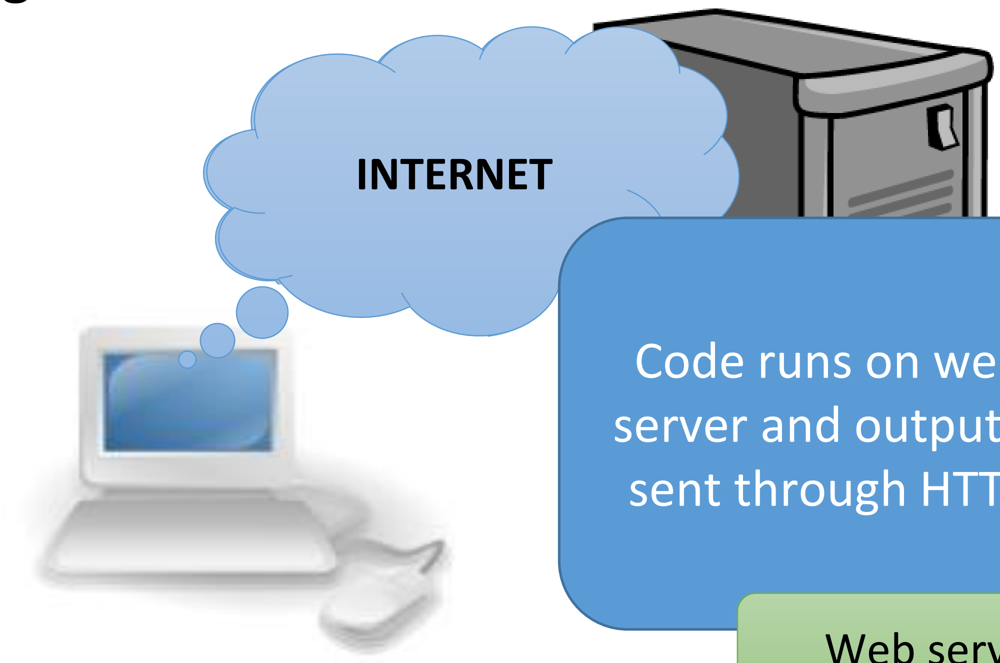
```
h1 {
    color: darkblue;
    margin-left: 20px;
}
```



Finding the behavior(contd.)

2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f48696768207

- Response on a web page can be sent from:
  - Server side
  - Client side



Code runs on the browser and creates response immediately on the user's machine

Web browser

Code runs on web server and output is sent through HTTP

Web server

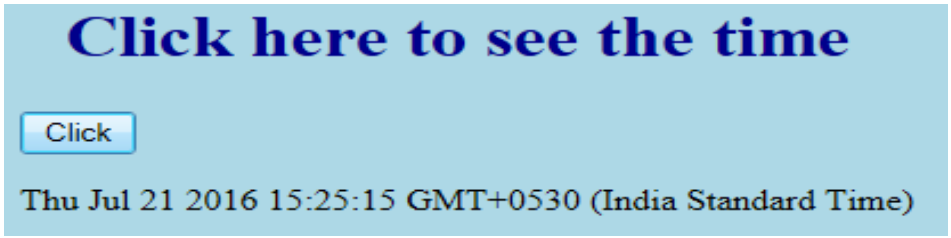
- Scripting language like JavaScript is used to create response on the client side

Finding the behavior(contd.)

```
function getTime(){
    document.getElementById('time').innerHTML = Date();
}
```

```
<html>
<head>
<meta charset="ISO-8859-1">
<title>My Page</title>
<link rel="stylesheet" type="text/css" href="mystyle.css">
<script src="my.js" type="text/javascript">
</script>
</head>
<body>
    <h1>Click here to see the time</h1>
    <button type="button" onclick="getTime()">Click</button>

    <p id="time"></p>
</body>
</html>
```



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Demonstration

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070

- Learning to add behavior for an action using JavaScript.

Introduction to JavaScript

- JavaScript is a loosely-typed client scripting language that executes in the user's browser.

- It is the default scripting language for HTML.

- Used in web pages for the following reasons:
  - Client side validations
  - To improve design and add functionality to web pages
  - Interact with HTML elements(DOM) to make interactive user interface.

- Scripts are executed when,
  - Web page loads into the browser (immediate scripts)
  - An event is triggered (deferred scripts)

– JavaScript follows and implements ECMAScript's specification.

Features of JavaScript

2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f48696768207

- Programming tool for creating interactive HTML pages.
- Interpreted Scripting Language
- Dynamically typed language
- Event driven programming
- Platform independent

- Note:
  - JavaScript can also used for non web based platforms like PDF, desktop widgets, Game development etc.
  - JavaScript is traditionally used for client side validations but can also be used for Server side web applications

Knowledge Check

2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

- Choose the odd one out:
  1. JavaScript is a client side scripting language.
  2. JavaScript is add interactivity to HTML Pages
  3. JavaScript is to style HTML pages.
  4. JavaScript is an interpreted Scripting Language.

JavaScript in HTML Pages

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070

- JavaScript code is mentioned:
  - Within the <script> tag
    - In the <body> section
    - In the <head> section
  - In an external JavaScript file (*.js)

Including the Script in the <head>

2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

- <head> section of the HTML is used to store meta information about the page
  - Charset, Keywords , link to resources etc.
  - It is not purposed to contribute to the HTML view

- The script mentioned in the <head> section is interpreted before loading the HTML view
- Generally the library scripts (functions) are mentioned in the <head> section

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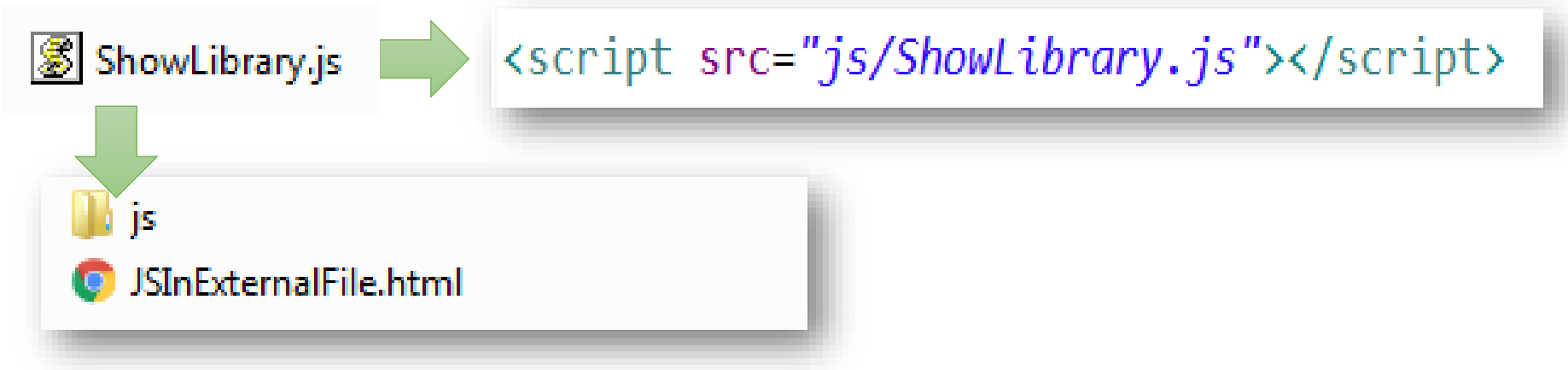
Including the Script in the <body>

2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f48696768207

- The content of the <body> section generates the view.
- Script mentioned in the <body> section participates in generating the view
- It is good practice to keep the script at the bottom of the <body>
  - Improves page load and renders the page faster without losing any time for script interpretation

Using External JavaScript File

- The library scripts or functions can be separated in an external document
- The external file should have .js extension



- Allows code reusability
  - Same library can be referenced from multiple HTML files
  - Manageable and maintainable

Where to put JavaScript?

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657

- There is no restriction regarding where to put the JavaScript, it depends on the requirement and scope
- The script can be kept ‘anywhere for any number of times’

```
<html>
    <head>
        <script>
            document.write('This is from head section');
        </script>
    </head>
<body>
        <h2>JavaScript at multiple location</h2>
        <script>
            document.write('This is from body section');
        </script>
</body>
</html>
```

This is from head section

JavaScript at multiple location

This is from body section

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Demonstration

2f486967682070657266 6f726d616e63652e2044656c6976657265642e

- Embedding JavaScript in a document:
  - Head Section
  - Body Section
  - External JS

Module 3 Agenda

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070

Topic Name	Duration
Introduction to JavaScript	20 min
JavaScript Basic	**20 mins**
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HTML/DOM Events for Form Validation	20 mins

JavaScript Comments

2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

- The JavaScript comments are additional lines of information
  - Ignored by the JavaScript interpreter
- Comments can be of two types:
  - Single line comments

```
// This line is a single line comment
document.write('This line is interpreted by the JS Engine');
```

  - Multi line comments

```
/*
This is a multi line comment
We can add our comments in multiple lines
*/
document.write('This line is interpreted by the JS Engine');
```

  - Advantage
    - It makes the code readable and understandable
    - It avoids execution of a portion of code

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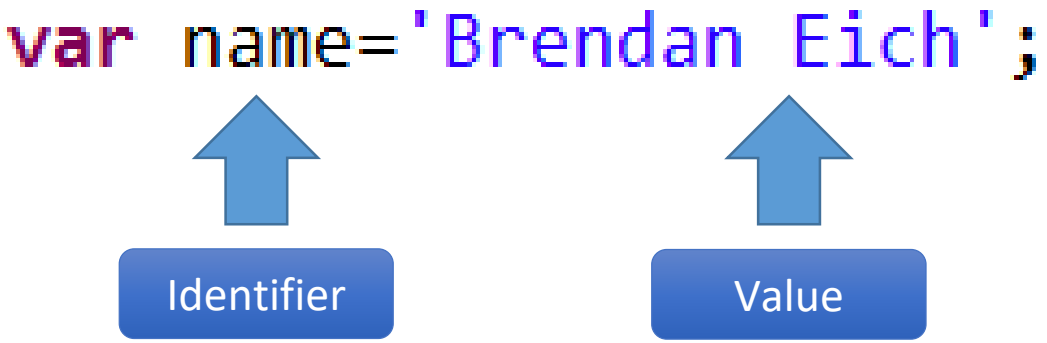
JavaScript Variables

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657

- Variables are containers to store data.
- It represents a storage location that holds the data referenced.
- It can be referenced by an identifier to use or manipulate its value.



Variable Naming Convention

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657

- Variable naming convention
  - The variable identifier should maintain the following:
    - The size should not exceed 255 characters
    - Should start with a character (a to z or A to Z), underscore (_) or dollar symbol ($)
    - After first letter the following letters can be alphanumeric
    - Reserved words (for e.g. JavaScript keywords) cannot be used
    - case sensitive in nature

- It is always advised to keep the variable names meaningful and readable

Variable Declaration

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657

- There are two ways of declaring a variable
  - Implicit declaration

```
companyName='Accenture';
```

  - Explicit declaration

```
var companyName='Accenture';
```

- If no value is assigned then the default value will be set as **undefined**

But the type of the variable is not mentioned anywhere

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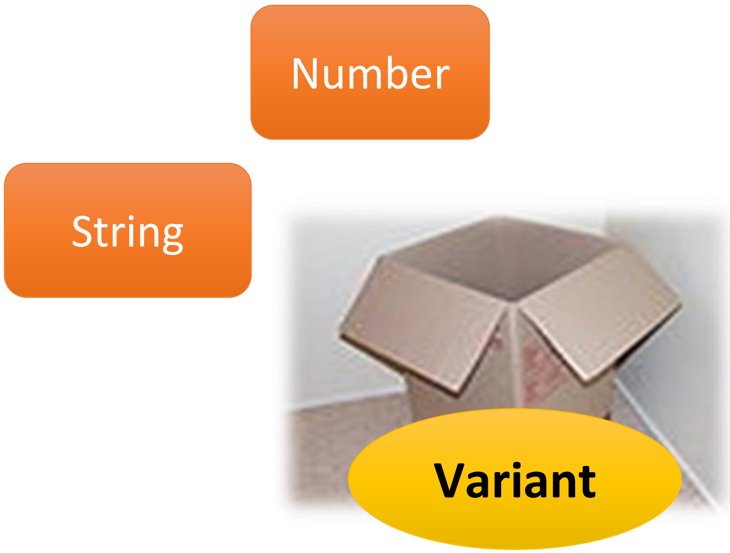
JavaScript Data types

2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

- JavaScript is a dynamic type language
- Supported data types can be categorized into:
  - Primitive data types
    - String
    - Number
    - Boolean
    - Undefined
    - Null
  - Non primitive data types
    - Array
    - Object
    - Date
- In JavaScript the type of variable can be verified using typeof().



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JavaScript Primitive Data types

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657

- String

```
var str="Hello World";
```

- Number

```
var int = 100;          var float = 100.5;
var hex = 0xfff;        var exponential = 2.56e3;
var octal = 030;
```

- Boolean

```
var  agree= true;
var  disagree = false;
```

- null

```
var myVar = null;
```

- undefined

```
var myVar;
alert(myVar); // undefined
```

Primitive Datatype

string : Hello World
number : 100
number : 100.5
number : 4095
number : 2560
number : 24
boolean : true
boolean : false
object : null
undefined : undefined

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Demonstration

2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070

- Variable and Datatype
  - Primitive

Try this out

2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

Can you predict the output?

```
var aVal=10+1+'JavaScript';
document.write(aVal);
```

11JavaScript

```
var aVal='JavaScript'+10+1;
document.write(aVal);
```

JavaScript101

JavaScript Non-Primitive Data types

2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657

- Array:

```
var <array-name> = [element0, element1, element2,... elementN];
```

- Example:

```
var strArr = ["one", "two", "three"];
var numArr = [1, 2, 3, 4];
var mixedArray = [1, "two", "three", 4];
```

- Array Constructor:

var arrayName = new Array();	var strArr = new Array(); strArr[0] = "one"; strArr[1] = "two";

var arrayName = new Array(Number length);	var numArr = new Array(3);
	numArr[0] = 1;
	numArr[1] = 2;

var arrayName = new Array(element1, element2, element3,... elementN);	var mixedArray = new Array(1, "two", 3, "four");

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JavaScript Non-Primitive Data types

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657

- Date:

```
var currentDate = new Date(); // current Date
```

```
var dt = new Date('date string');

var date1 = new Date("2015 3 February");

var date2 = new Date("3 2015 February ");
```

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JavaScript Non-Primitive Data types

2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657

- Object is like other variables in JavaScript, only difference is it can hold multiple values unlike variable.

- There are two ways to create an object :
  - Object Literal

```
var <object-name> = { key1: value1, key2: value2,... keyN: valueN};
Example :
var product={prodName:”Eraser”,prodPrice:15.56,prodType:”stationary”};
console.log(product.prodName); //OR product[“prodName”];
```

  - Object Constructor

```
var <object-name> = new Object();
Example :
var product=new Object();
product.prodName=“Eraser”;
prod.prodPrice=15.56;
console.log(product.prodName);
console.log(product.prodPrice);
```

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Demonstration

2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

- Variable and Datatype
  - Non-Primitive

Knowledge Check (1 of 3)

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070

- Choose the keyword to declare all types of variable in JavaScript:
  1. variable
  2. obj
  3. jvar
  4. var

Knowledge Check (2 of 3)

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070

- State true or false:
  1. Variable can hold only one value at a time.
  2. Object can hold multiple values.

Knowledge Check(3 of 3)

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070

- Choose output for below code snippet:

  var str1="123";

  var str2=123;

  console.log(str1+str2);

  1.246

  2.123

  3.123123

  4.Error

JavaScript Operators

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657

- Operators are the tools to perform some operations on the data
- Each operator represents a specific operation and is denoted by an unique symbol
- The operators can be classified into following categories:

Operator	Description
Arithmetic Operators	+ , - , * , /
Relational Operators	>=,<=,>,<, == ,=== etc.
Logical Operators	AND (&&), OR(||), NOT(!)
Assignment Operators	= , +=, *=, /= etc.
Bitwise Operators	&, | , ^ , ~, << ,>> ,>>>
Special Operators	delete, new, instanceof , typeof etc.

JavaScript Conditional Statements

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070

- In JavaScript we have following constructs to apply decision control logic
  - If statement
  - If…else statement
  - If…else…if statement
  - Switch statement

If..Else Statements

2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

- If statements are simplest method of decision control structure
- It verifies only one Boolean condition
- Example: If the value of a variable ‘count’ is equal to 5. Print ‘Five ’

```
if(count==5){
    document.write('Five');
}
```

- The else statement is applicable where the if condition is false
- We can multiply or nest the if…else condition if required
- Example: If the value of a variable ‘count’ is equal to 5. Print ‘Five’; Else print ‘Not Five’

```
if(count==5){
    document.write('Five');
}else{
    document.write('Not Five');
}
```

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Switch Statement

- Switch statement is used when there are too many conditions based on the value of a variable
- Example: the value of the variable ‘result’ depends on the value of variable ‘location’

Key	Value	result
location	BDC1	Cunningham road
	BDC6	Whitefield
	<No match found>	External Location

```
var office = 'BDC1';
var result;
switch (office) {
case 'BDC1':
     result = 'Cunningham road';
     break;
case 'BDC6':
     result = 'Whitefield';
     break;
default:
     result = 'External office';
     break;
}
document.write(result);
```

- Switch case block is fall-through
  - All the cases will be passed if break is not used

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Iterative Statements

2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

- Iteration is a programming construct to execute instructions repeatedly.
  - For loop
    - Iterates for fixed number of times
    - Used when the number of iteration is known
  - While loop
    - Iterates until the loop condition fails
    - Used when number of iteration is not known
    - While loop has two types
      - Simple While loop: Entry Control Loop
      - do-while loop: Exit Control Loop
- It is important to use a feasible terminating condition to prevent infinite loops.

```
for (var i = 0; i < 5; i++)
{
   console.log(i);
}
```

```
var i =0;
while(i < 5)
{
   console.log(i);
   i++;
}
```

```
var i = 0;
do{
   alert(i);
   i++;
} while(i < 5)
```

Demonstration

2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

- Variable and Datatype
  - Conditional Statements
  - Loops

Knowledge Check

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070

- Choose the correct output for below code snippet:

```
var str1="123";
var str2=123;

if(str1===str2)
{
        console.log("Match found");
}
else
{
        console.log("Match not found")
}
```

1.Match Found
2.Match not Found
3.Exception

Module 3 Agenda

2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

Topic Name	Duration
Introduction to JavaScript	20 min
JavaScript Basic	20 mins
JavaScript Functions	**30 mins**
Exception Handling	20 min
Introduction to BOM	20 mins
Introduction to DOM	20 mins
HTML/DOM Events for Form Validation	20 mins

JavaScript Functions

- Function is a block of code, which performs a specific task
- Functions are often treated as black boxes, which encapsulates any repetitive operation and executes only when invoked

```
function functionName(argument1,argument2,...,argumentN){
    // Code to perform some action
    return retValue; // optional
}
```

- Advantage
  - Increases code reusability by reducing repetitive lines
  - Enhances the readability and maintainability of the code

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JavaScript Function Expression

- JavaScript allows a function to be assigned to a variable, and later use that variable as function, this concept is called Function Expression.

```
var <object-name> = function <function-name(parameter list){
            //function body;
};
```

- Example:

```
var greeting=function showMsg(msg){
            return “Welcome”+msg;
};

var result=greeting(“Rose”);
console.log(result);
```

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JavaScript Anonymous Function

2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070

- JavaScript allows a function without any name. This unnamed function is called anonymous function.
- Anonymous function must be assigned to a variable.

```
var <object-name> = function(parameter list){
        //function body;
};
```

- Example:

```
var greeting=function(msg){
        return "Welcome"+msg;
};

var result=greeting("Rose");
console.log(result);
```

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Demonstration

- Functions
  - Functions
  - Function Expression
  - Anonymous Function

Local and Global Variables

- Based on the scope, variables can be categorized in two types:
  - Local variables
    - Variable is explicitly declared within a block or function
    - The scope of the variable is limited within the block or function
  - Global variables
    - The variable is declared
      - Outside the function
      - Associated with the window object
      - Declared implicitly
    - Accessible throughout the code i.e. any block or function

Demonstration

2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

- Variable Scope
  - Local
  - Global

Knowledge Check

2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

- Consider below code snippet , choose the most appropriate output:

```
<script>
        var gnum=10;

        function increment()
        {
                counter=10;
                gnum=gnum+counter;
        }

        function getValues()
        {
                increment();
                console.log("gnum:"+gnum);
                console.log("counter:"+counter);

        }

    </script>
<body>
    <input type="button" value="Get Values" onclick="getValues()"/>
</body>
```

1. gnum:20
   undefined
2. gnum:20
   null
3. gnum:20
   counter:10
4. Exception

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Module 3 Agenda

2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

Topic Name	Duration
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Exception Handling	**20 min**
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HTML/DOM Events for Form Validation	20 mins

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Exception Handling in JavaScript

- JavaScript provides Exception Handling mechanism to handle runtime errors using try..catch..finally block.

- try-catch statement
  - Marks a block of statements to try, and specifies one or more responses should an exception be thrown.
  - If an exception is thrown, the catch statement catches it.

```
try
{
   // code that may throw an error
}
catch(ex)
{
   // code to be executed if an error occurs
}
finally{
   // code to be executed regardless of an error occurs or not
}
```

Exception Handling in JavaScript

2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

- try-catch statement

```
function getMonthName(mo)
{
mo=mo-1;
var months=new
Array("Jan","Feb","Mar","Apr","May","Jun","Jul","Aug","Sep","Oct","Nov","Dec");
        if (months[mo] != null) {
                return months[mo];
        }
        else {
                throw "InvalidMonthNo"; //throw keyword is used here
        }
}
try {// statements to try
        monthName=getMonthName(-1) // function could throw exception
        console.log("Month:"+monthName);
}
catch (e) {
        monthName="unknown";
        document.getElementById("errorMessage").value=e;
}
```

Exception Handling in JavaScript

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657

- finally block :
  - Contains statements to execute after the try and catch blocks execute but before the statements following the try...catch statement.
  - The finally block executes whether or not an exception is thrown.

```
openMyFile();
try {

writeMyFile(theData); //This may throw a error
}
catch(e){
handleError(e); // If we got a error we handle it
}
finally {
        closeMyFile(); // always close the
resource
 }
```

Exception Handling in JavaScript

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657

- Utilizing error object

```
function getMonthName(mo) {
mo=mo-1;
var months=new
Array("Jan","Feb","Mar","Apr","May","Jun","Jul","Aug","Sep","Oct","Nov","Dec"
);
        if (months[mo] != null) {
                return months[mo];
        }
        else {
                throw(new Error("InvalidMonthNo"));
        }
}
try {// statements to try
        monthName=getMonthName(-1) // function could throw exception
        console.log("Month:"+monthName);
}
catch (e) {
document.getElementById("errorMessage").value="Error
Name:"+e.name+"Error Message:"+e.message;
}
```

New error object creation

Demo: Error Handling : Error Object

Error Name:ErrorError Message:InvalidMonthNo

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Demonstration

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070

- Exception Handling
  - Exception Handling with try..catch
  - Exception Handling with new Error object

Knowledge Check

2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

- Choose the most appropriate output:

```
<script>
        try
        {
                throw(new Error("Its an error"));

        }
        catch(e)
        {
                console.log("Error handled");
        }
        finally
        {
                console.log("Resource released");
        }
    </script>
```

1. Error Handled
2. Resource released
3. Error Handled
   Resource released
4. Undefined

Module 3 Agenda

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070

Topic Name	Duration
Introduction to JavaScript	20 min
JavaScript Basic	20 mins
JavaScript Functions	30 mins
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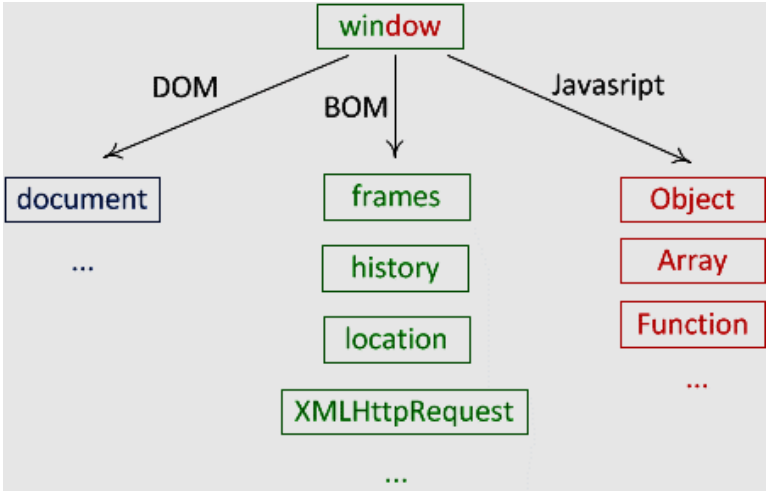
Introduction to BOM	**20 mins**
Introduction to DOM	20 mins
HTML/DOM Events for Form Validation	20 mins

Browser Object Model

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657

- Browser Object Model allows the JavaScript to respond to an event by means of the browser controls.
- Browser is represented by an implicit object, named window.
- window object provides the utilities (functions and the references) to generate response from the browser side.



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Browser Object Model

2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

- window Object
  - Represent a open window in the browser
- window Object properties:

Property	Description
innerHeight	the inner height of the browser window
innerWidth	the inner width of the browser window
applicationCache	provides access to the offline resources for the window
history	Returns reference to history object
screen	a reference to the screen object associated with the window

Browser Object Model

2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

- window Object methods:

Method	Description
open()	open a new window
close()	close the current window
moveTo()	move the current window
resizeTo()	resize the current window
alert()	Displays an alert dialog
confirm()	To receive confirmation from the user
prompt()	To receive a value from user

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Demonstration

- BOM Methods
  - open()
  - close()
  - alert()
  - confirm()
  - prompt()

Module 3 Agenda

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657

Topic Name	Duration
Introduction to JavaScript	20 min
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DOM Hierarchy

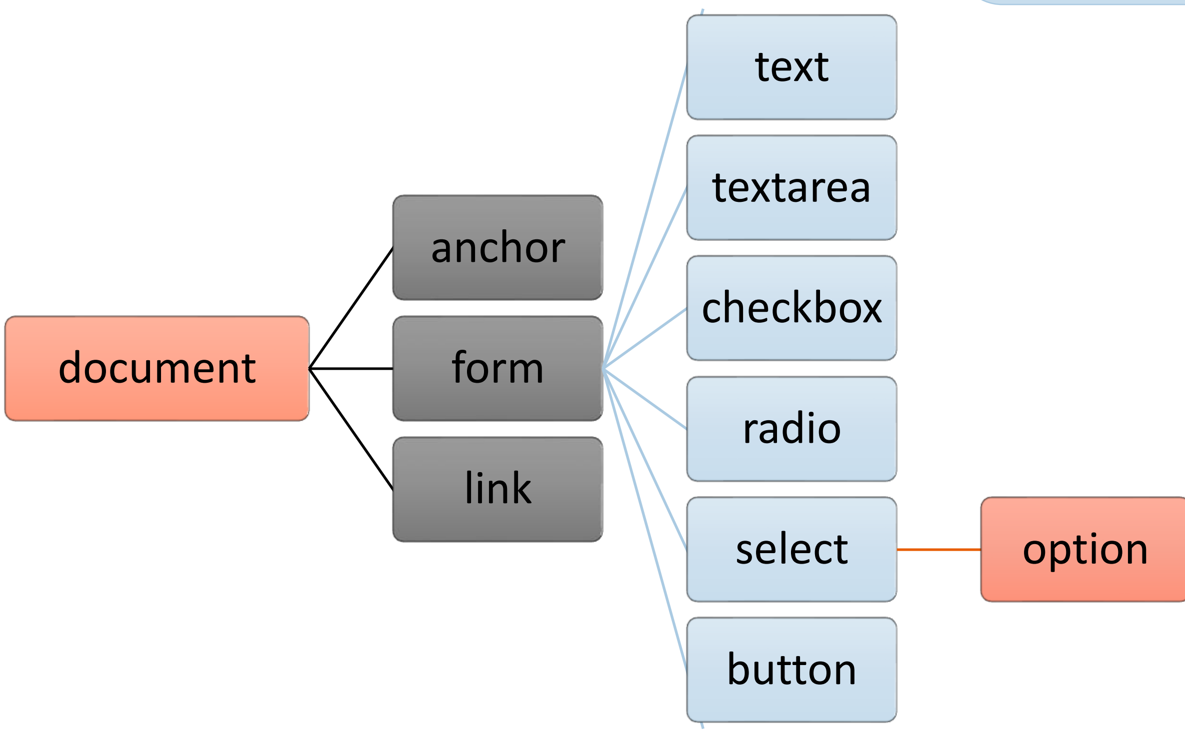
2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

- document is a container for all the tags in a HTML page
- HTML elements can be accessed and modified by following DOM as shown below:

window. document

or

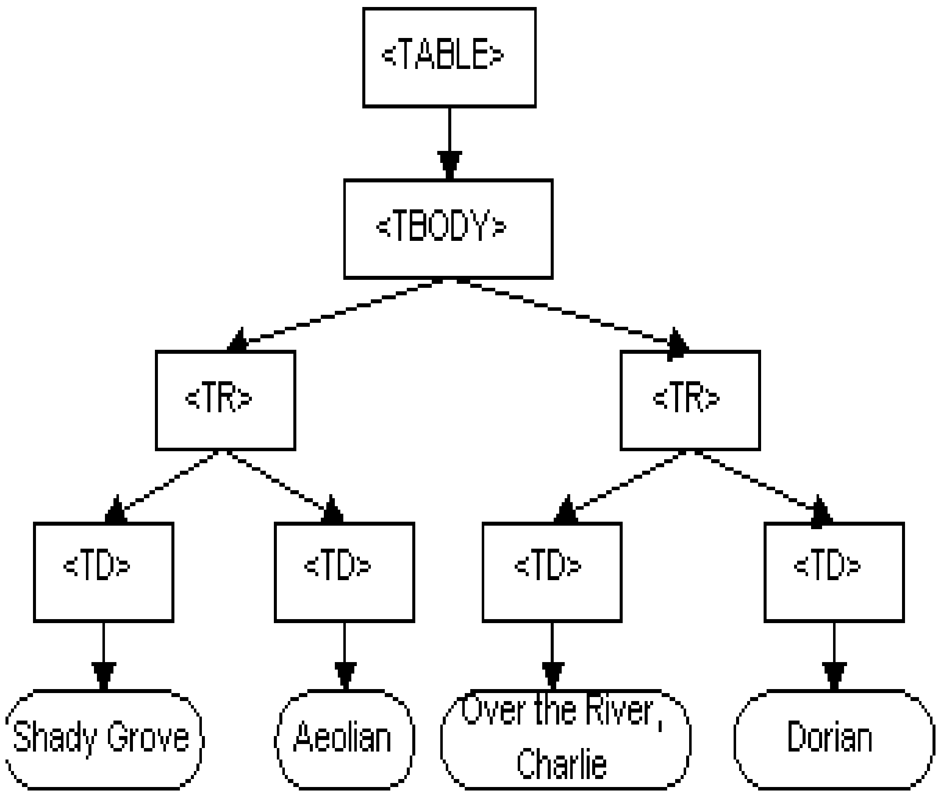
document



DOM Hierarchy

2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

```
<TABLE>
    <TBODY>
      <TR>
        <TD>Shady Grove</TD>
       <TD>Aeolian</TD>
       </TR>
       <TR>
        <TD>Over the River,Charlie</TD>
        <TD>Dorian</TD>
       </TR>
    </TBODY>
 </TABLE>
```



DOM Properties

2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

- Following are some useful document object properties:
  - innerHTML (used to write the dynamic html on the html document)
  - innerText (used to write the dynamic text on the html document. This is normal text, and not HTML text)
  - bgcolor (used to set background color for a page)
  - fgcolor (used to set text color for a page)
  - linkColor (used to specify the color of a hyperlink on a page)
  - title (used to set the title of the page, which is usually done by the <title> tag)

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DOM Methods

2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

- Following are few important methods of document object:

Method Name	Description
write("String value")	Writes the given string in the HTML document
getElementById("Id value")	Retrieves the element with given Id value
getElementByTagName("name")	retrieve an array of all elements having the given tag name
getElementsByName("element name")	Returns an array of all elements with the specified name.

Demonstration

- DOM Methods
  - getElementById()
  - getElementsByName()
  - getElemenstByTagName()

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Module 3 Agenda

2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f4869676820706572666f726d616e63652e2044656c6976657265642e2f48696768207

Topic Name	Duration
Introduction to JavaScript	20 min
JavaScript Basic	20 mins
JavaScript Functions	30 mins
Exception Handling	20 min
Introduction to BOM	20 mins
Introduction to DOM	20 mins
HTML/DOM Events for Form Validation	**20 mins**

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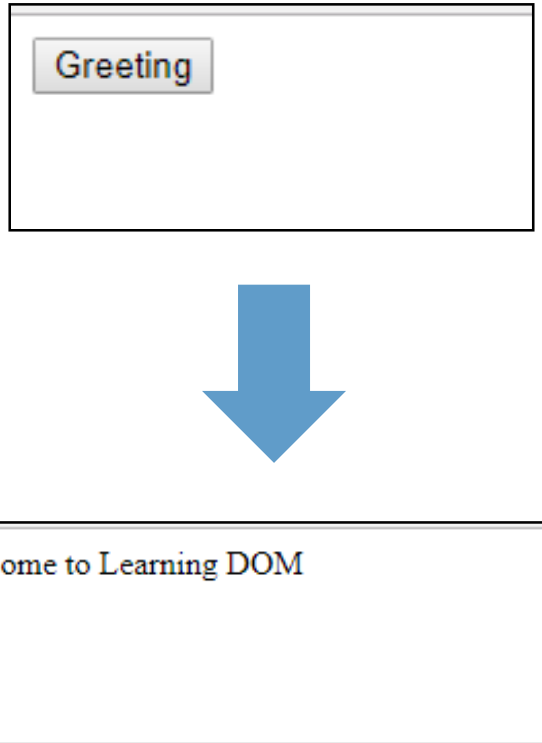
HTML/DOM Events

- Events are mode of interaction between the user and the web page
- JavaScript is used to react to the events
- Example of an event can be:
  - An HTML Page is loaded
  - A field value is changed
  - An HTML button is clicked
- Specific HTML elements have event handler attributes for supported events
- When the event is triggered corresponding script is executed

HTML/DOM

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657

```
<!DOCTYPE html>
<html>
 <head>
  <title>Learning DOM</title>
<script>
function greeting(){
document.write("Welcome to Learning DOM");
}
</script>
  </head>
 <body>
<button
onclick="greeting()">Greeting</button>
 </body>
</html>
```



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HTML/DOM

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HTML/DOM Events

2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070

- Based user interaction, events can be of many types. For example, Mouse events, Keyboard events etc.
- Following are list of few common HTML events:

Event	Event Type	Description
onblur	Form Event	This event is triggered only when the concerned element loses cursor focus
onfocus	Form Event	This event is triggered only when the concerned element gets cursor focus
onclick	Mouse Event	This event is triggered when a button or hyperlinked is clicked

Demonstration

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070

- DOM Events
  - Blur
  - Focus
  - Click

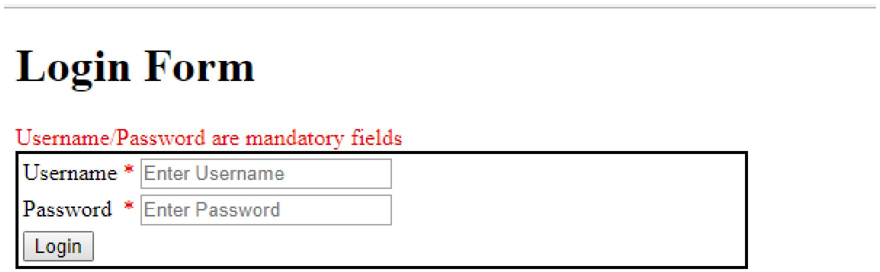
Form Validation

2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f4869676820

- JavaScript with DOM and Events provides a way to validate form data.

- Types of Form Validation that can be performed using JavaScript are:
  - Validating for mandatory fields
  - Validating for correct value

- JavaScript Form Validation is also called as Client Side Validation enhancing user experience by
  - Faster validation on the client machine
  - Avoiding sending data to sever for validation



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Demonstration

2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070657266f726d616e63652e2044656c6976657265642e2f486967682070

- Form Validation

JavaScript innerHTML

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070

- innerHTML property can be used to write the dynamic html on the html document.

```
<div id="mylocation"></div>
<input type="button" onclick="showLocation()"/>

<script>

function showLocation()
{
document.getElementById('<b>mylocation</b>').innerHTML=data;

}

</script>
```

Module 3 Summary

2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657266f726d616e63652c2044656c6976657265642c2f486967682070657

- Upon completing this module, you should now be able to:
  - Create script using JavaScript Syntax
  - Create Functions
  - Handle runtime errors
  - Manipulate DOM
  - Handle DOM events
  - Form Validations

Questions