Background JavaScript

Brendan Eich - Creator of JavaScript

JavaScript was developed by Brendan Eich in 1995, which appeared in Netscape, a popular browser of that time. The language was initially called LiveScript and was later renamed JavaScript. There are many programmers who think that JavaScript and Java are the same. In fact, JavaScript and Java are very much unrelated.

Java is a very complex programming language whereas JavaScript is only a scripting language. The syntax of JavaScript is mostly influenced by the programming language C. JavaScript contains a standard library of objects, like Array, Date, and Math, and a core set of language elements like operators, control structures, and statements.

JavaScript can be added to your HTML file in two ways:

Internal JS: We can add JavaScript directly to our HTML file by writing the code inside the <script> tag. The <script> tag can either be placed inside the <head> or the <body> tag according to the requirement.

External JS: We can write JavaScript code in other file having an extension .js and then link this file inside the <head> tag of the HTML file in which we want to add this code.

Syntax-1

```
<script>
  // JavaScript Code
</script>
```

Syntax-2

```
<script type="text/javascript">
                         // JavaScript code;
</script>
```

Note: *type="text/javascript" is not necessary in HTML5.*

Example-1

```
<html>

<head>

        <title>My First JavaScript Program!</title>

        <script type="text/javascript">

                document.write ("This is Java Scripting ");

        </script>

</head>

<body>

</body>

</html>
```

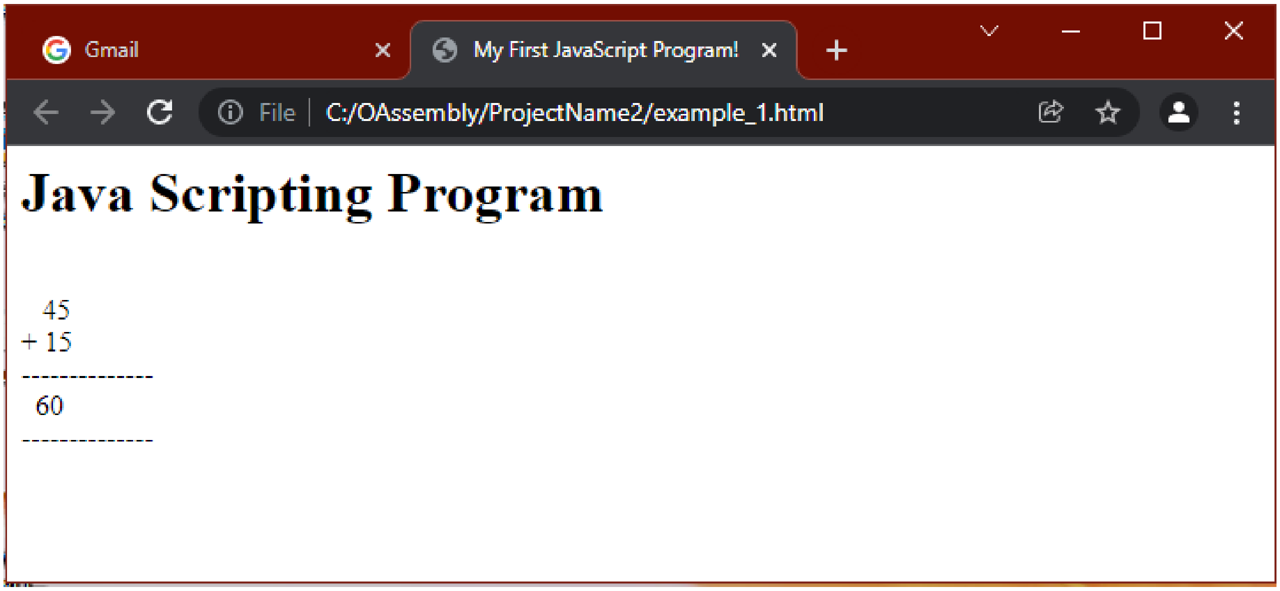
Example-2

Write a program to add two integer number and display result on the browser.

```
<html>
<head>
        <title>My First JavaScript Program!</title>

</head>
<body>
<script>
        var no1,no2,ans;     // declare variables
         no1=45;             // 45 integer number assign to no1 variable
         no2=15;             // 15 integer number assign to no2 variable
        ans = no1 + no2;     // this is expression, for addition of no1 and no2 and result into ans variable
        document.write ("<h1> Java Scripting Program</h1> ");   // output function
        document.write ("<br>&nbsp;&nbsp; "+no1);
        document.write ("<br>+ "+no2);
        document.write ("<br>--------------");
        document.write ("<br>&nbsp;&nbsp;"+ans);
        document.write ("<br>--------------");


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


Gmail
My First JavaScript Program!
File
C:/OAssembly/ProjectName2/example_1.html

```
Java Scripting Program

  45
+ 15
--------------
  60
--------------
```

Example-3

Write a JavaScript program to input an integer number for table and generate and display table of input number on the browser.

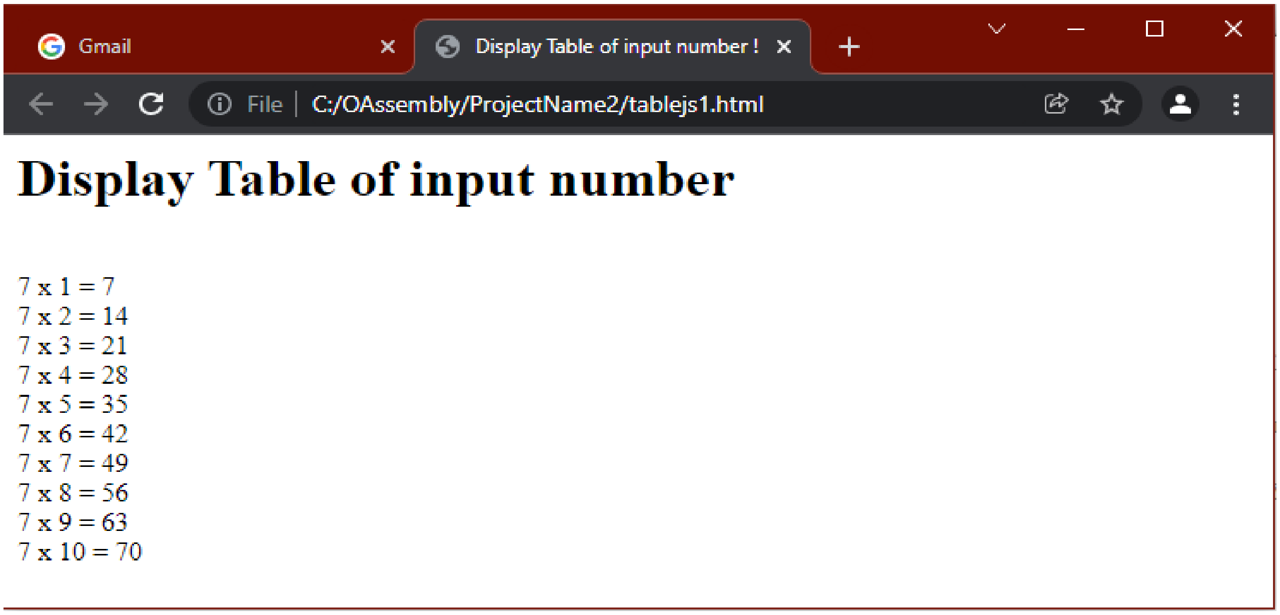
```
<html>
<head>
         <title>Display Table of input number !</title>

</head>
<body>
<script>
         var tno,series,ansans;      // declare variables
          tno = prompt ("Enter No Of Table ");               // input  integer number from user
          document.write ("<h1> Display Table Of Input Number </h1> ");   // output function

          for(series=1; series<=10; series++)               // start for loop from 1 to 10
         {
            ans = tno * series;      // this is expression, for multiplication  of tno into series and result into
                                     //   ans variable
            document.write ("<br> "+tno+" x "+series+" = "+ans );      // display output display variables

         }

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


Gmail
Display Table of input number !
File | C:/OAssembly/ProjectName2/tablejs1.html

Display Table of input number

```
7 x 1 = 7
7 x 2 = 14
7 x 3 = 21
7 x 4 = 28
7 x 5 = 35
7 x 6 = 42
7 x 7 = 49
7 x 8 = 56
7 x 9 = 63
7 x 10 = 70
```

Example-4

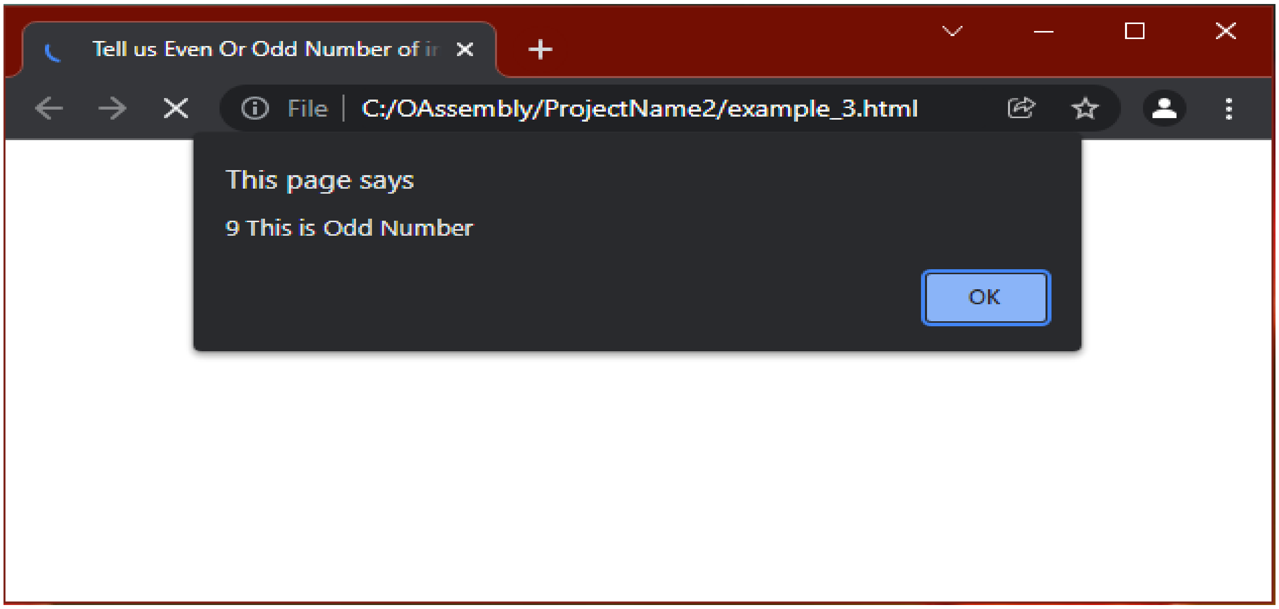
Write a JavaScript program to input an integer number and find that number is even or odd.

```
<html>
<head>
          <title>Tell us Even Or Odd Number of input number !</title>

</head>
<body>
<script>
          var no,remainder;     // declare variables
           no = prompt ("Enter No Of Table ");              // input  integer number from user
            remainder = no % 2;
           if ( remainder == 0)                  // start for loop from 1 to 10
          {
              alert(no+" This is Even Number ")
          }
         else
          {
             alert(no+" This is Odd Number ");        // display output display variables

          }

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



Tell us Even Or Odd Number of ir
File
C:/OAssembly/ProjectName2/example_3.html
OK

This page says

9 This is Odd Number

HTML events

HTML events are "things" that happen to HTML elements. When JavaScript is used in HTML pages, JavaScript can "react" on these events. An HTML event can be something the browser does, or something a user does. An Event is an action or occurrence recognized by the software. It can be triggered by the user or the system. Mostly Events are used on buttons, hyperlinks, hovers, page loading, etc.

Events are actions or occurrences that happen in the system you are programming, which the system tells you about so your code can react to them. Event handlers typically have names that begin with on, for example, the event handler for the click event is onclick. An event handler defined in the HTML can call a function defined in a script.

In this article, you will learn about different types of HTML event handler attributes. Basically, to handle events in HTML, you just need to add the function in the HTML tag which is going to be executed in JavaScript when any event in HTML is fired or triggered. There are many event attributes in HTML like keyboard event, mouse event, form event, etc.

For example, if the user clicks a button on a webpage, you might want to react to that action by displaying an information box.

Here are some examples of HTML events:

1. An HTML button on clicked.
2. An HTML web page has loading
3. An HTML input field was changed
4. Mouse over and mouse out etc.

Often, when events happen, you may want to do something. JavaScript lets you execute code when events are detected.

HTML allows event handler attributes, with JavaScript code with the help of ***function***, to be added to HTML elements with single or double quotes:

Common HTML Events

Event	Description
onclick	The user clicks an HTML element
onmouseover	The user moves the mouse over an HTML element
onmouseout	The user moves the mouse away from an HTML element
onkeydown	The user pushes a keyboard key
onchange	An HTML element has been changed

Syntax

<element event='JavaScriptfunction()'>

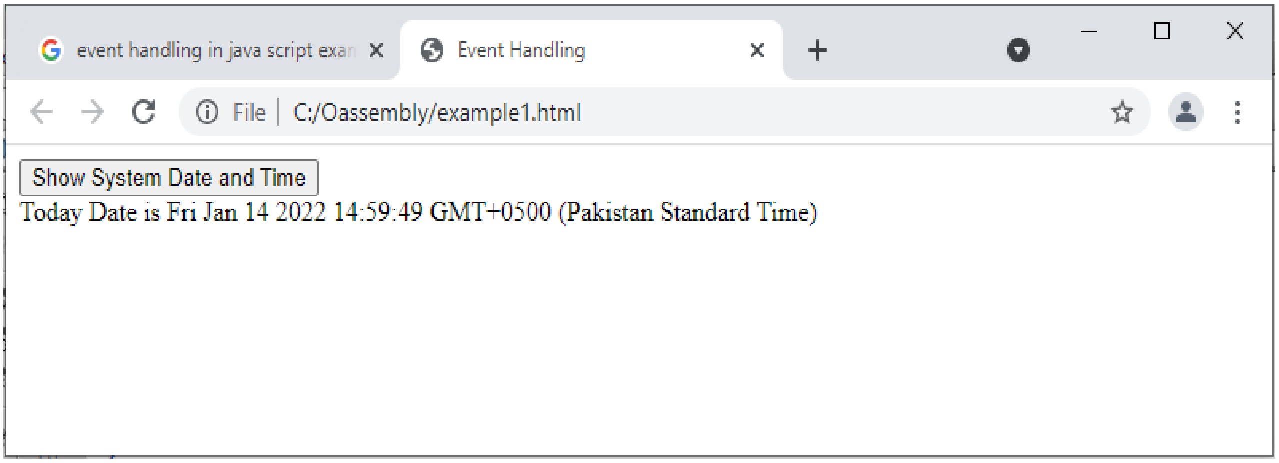
In the following example, an onclick attribute (with code), is added to a <button> element:

getElementById()

The ***getElementById()*** is a DOM method used to return the element that has the ID attribute with the specified value. This is one of the most common methods in the HTML DOM and is used almost every time we want to manipulate an element on our **document**.

Example-1

```
<!DOCTYPE html>
<html>
<head>
  <title>  Event Handling </title>
<script>
 function displaydate()
 {
    alert("Today Date is "+Date());
    document.getElementById("dt").innerHTML = "Today Date is "+Date();
 }
</script>
</head>
<body>
<button onclick="displaydate()">Show System Date and Time  </button><br>
<span id="dt"> Today date is </span>
</body>
</html>
```


event handling in java script exan
Event Handling
File | C:/Oassembly/example1.html
Show System Date and Time

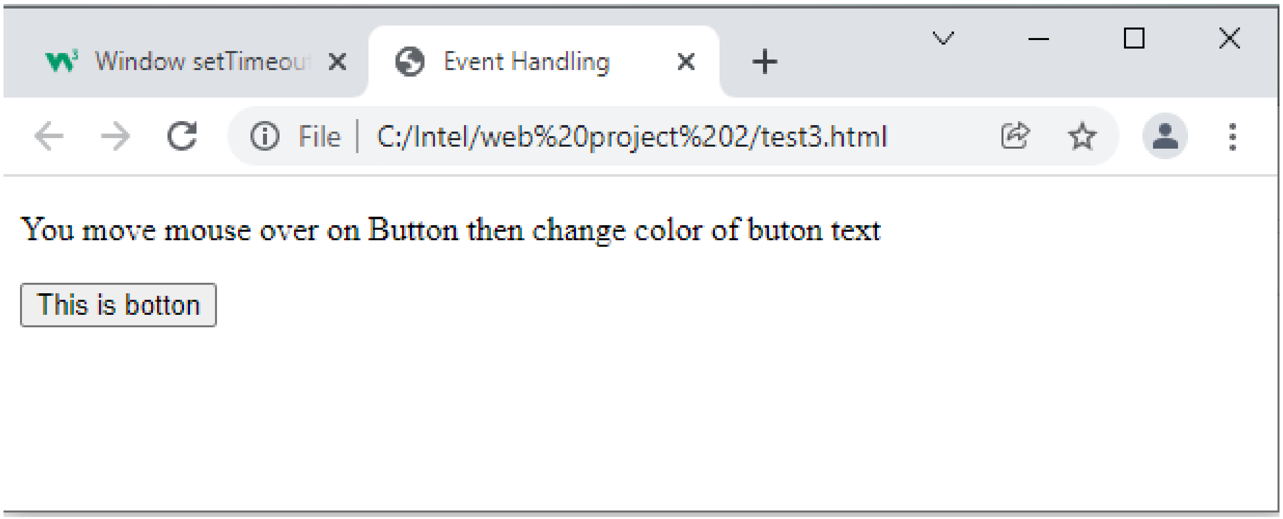
```
Today Date is Fri Jan 14 2022 14:59:49 GMT+0500 (Pakistan Standard Time)
```

Example-2

In this example we display a button on the browser when mouse over on button then change red color of button text and when we do mouse out then reverse change black color of button text.

```
<!DOCTYPE html>
<html>
<head>
   <title>  Event Handling </title>
<script>
 function colorchange(obj, newcolor)
 {
          obj.style.color=newcolor ;
 }
</script>
</head>
<body>
<p> You move mouse over on Button then change color of buton text </p>
<button onmouseover="colorchange(this , 'red')"  onmouseout="colorchange(this , 'black') ">This is botton
</button><br>

</body>
</html>
```



You move mouse over on Button then change color of buton text

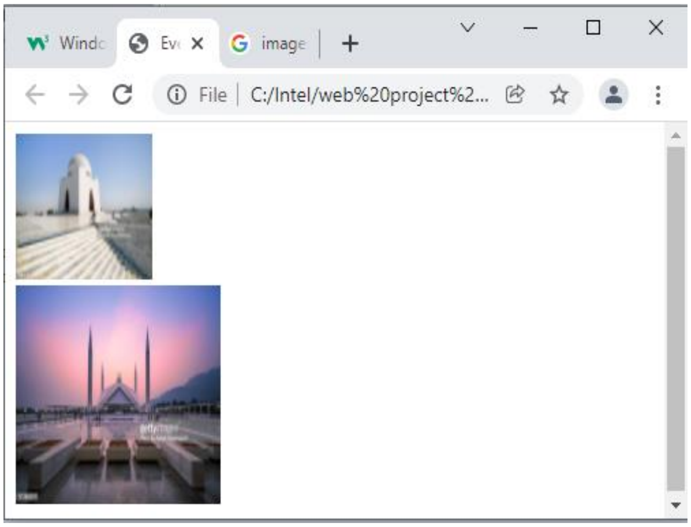
Example-3

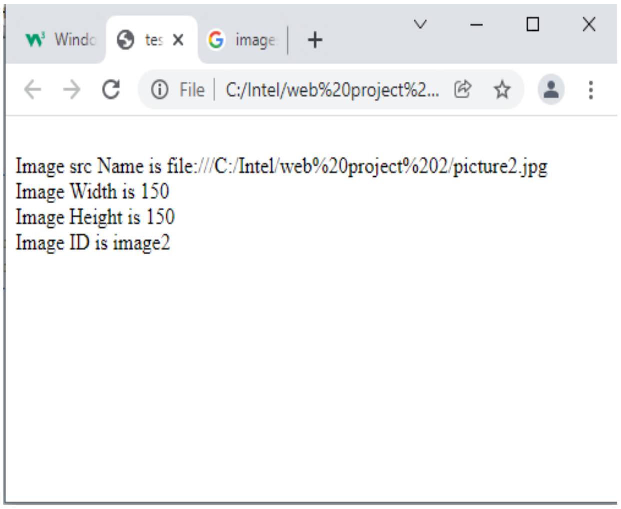
In this example we display attributes values of Image element using by JavaScript function.

```
<!DOCTYPE html>
<html>
<head>
   <title>  Event Handling </title>
<script>
 function DispAttrVal(imgSrc, imgWidth, imgHeight, imgId)
 {
    document.write (" <br> Image src Name  is " + imgSrc);
    document.write (" <br> Image Width  is " + imgWidth);
    document.write (" <br> Image Height is " + imgHeight);
    document.write (" <br> Image ID   is " + imgId);

 }
</script>
</head>
<body>
 <img src="picture1.jpg" width="100" height="100" name="image1"
onClick="DispAttrVal(this.src,this.width,this.height,this.name)"><br>
 <img src="picture2.jpg" width="150" height="150"  name="image2"
onClick="DispAttrVal(this.src,this.width,this.height,this.name)"><br>


</body>
</html>
```





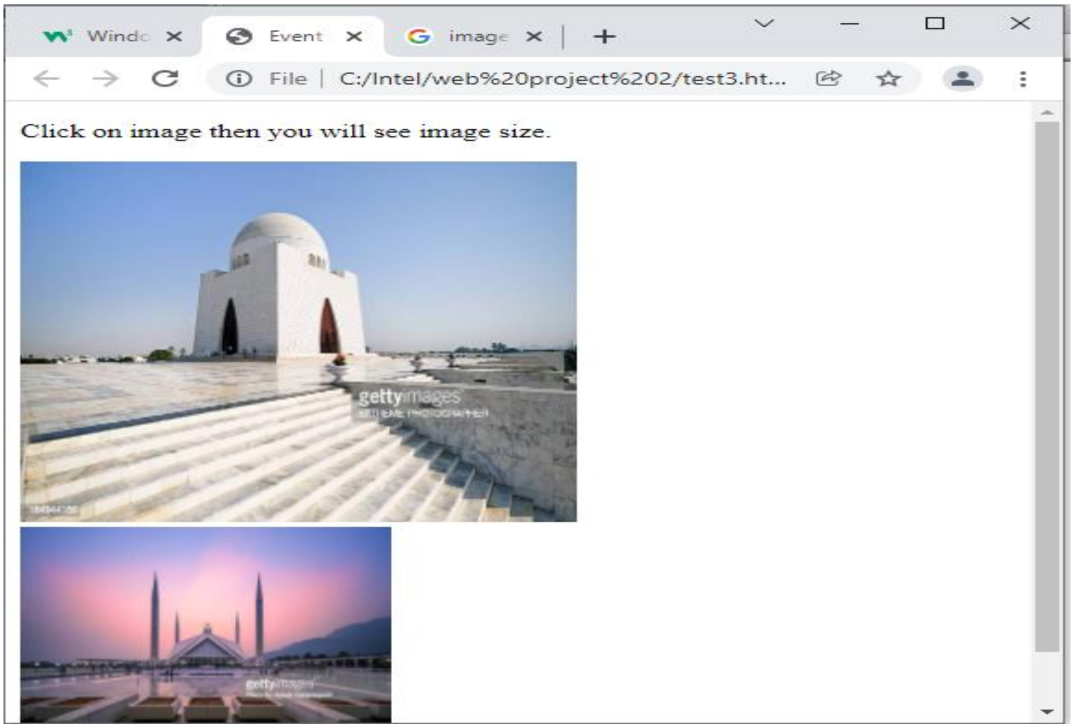
```
Image src Name is file:///C:/Intel/web%20project%202/picture2.jpg
Image Width is 150
Image Height is 150
Image ID is image2
```

Example-4

In this example we display two different Images on the browser when mouse over the click on image then image size increase and then we do mouse click again then reverse normal size of image element.

```
<!DOCTYPE html>
<html>
<head>
  <title>  Event Handling </title>
<script>
 function changesize(obj, imagewidth)
 {
          if (imagewidth==300) {
             obj.style.width="200px”;
             obj.style.height="200px”;
            }
            else {
             obj.style.width="300px”;
             obj.style.height="300px”;
        }
 }
</script>
</head>
<body>
<p> Click on image then you will see image size. </p>
  <img  src="picture1.jpg" width="200" height="200" onClick="changesize(this, this.width)"><br>
  <img  src="picture2.jpg" width="200" height="200" onClick="changesize(this, this.width)" ><br>

</body>
</html>
```



Click on image then you will see image size.

Example-5

In this example we display Today date and time and counter value, after 1 second change time and increase counter value and this process will be continuing automatically on the browser. In this example we use **SetTimeout()** Function with recursive function calling technique.

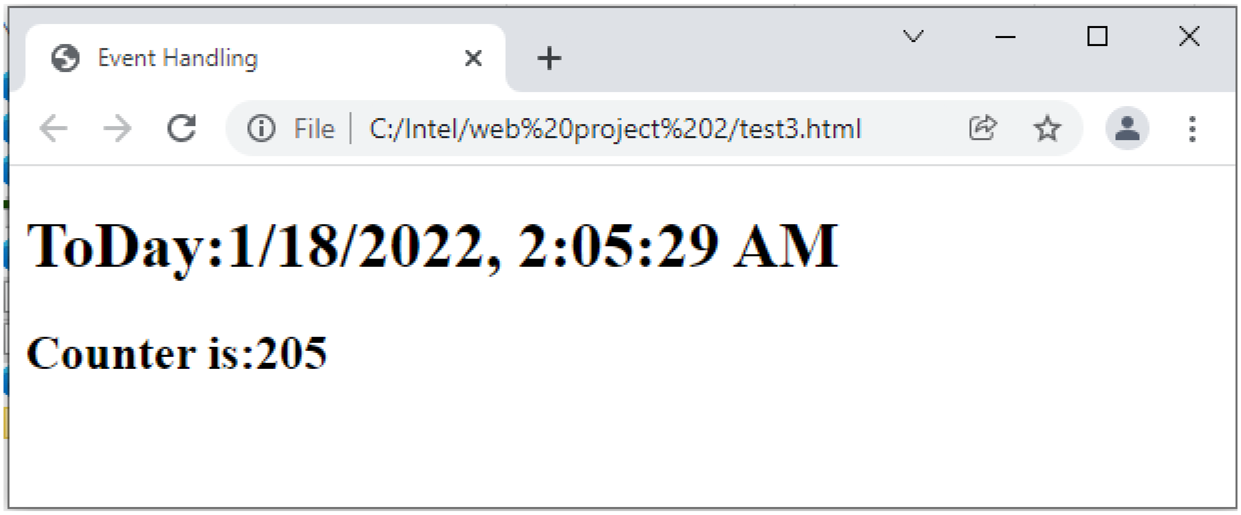
```
<!DOCTYPE html>
<html>
<head>
  <title>  Event Handling </title>
<script>
var counter=0;

 function myFuncCall()
 {   var d = new  Date();

     document.getElementById("datetime").innerHTML = "ToDay:"+ d.toLocaleString();
           document.getElementById("counter").innerHTML = "Counter is:"+counter;
           counter++;
           timeout = setTimeout(myFuncCall,1000);
 }
</script>
</head>
<body onload="myFuncCall()">
     <h1 id="datetime"> ToDay : </h1>
     <h2 id="counter">  Counter : </h2>

</body>

</html>
```



```
ToDay:1/18/2022, 2:05:29 AM

Counter is:205
```

Pattern Attribute

The pattern attribute is an attribute of the text, tel, email, url, password, and search input types. The pattern attribute, when specified, is a regular expression which the input's value must match in order for the value to pass constraint validation.

Syntax:

```
<input  type="text"   pattern = "regular_exp">
```

Regular Expression Pertern

Regular Expression	Description
[A-Za-z0-9_]{1,15}	Only letters (either case), numbers, and the underscore; no more than 15 characters.
[a-zd.]{5,}	Only lowercase letters and numbers; at least 5 characters, but no limit.
[a-zA-Z][a-zA-Z0-9-_.]{1,20}	Only letters (either case), numbers, hyphens, underscores, and periods. (Not the slash character, that is being used to escape the period.) The username must start with a letter and must be between 1 and 20 characters long (inclusive).
[0-9]{2,6}	Only digit numbers at least 2 and maximum 6

Example-4

In this example we develop form of web page for input three subject like (Math, English and Urdu and Show Result Button) when we click button then display result on the browser screen Same as following.

```
<!DOCTYPE html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<title>Result Show </title>
<style>
input:invalid
{
  border:2px solid red;
}

</style>
<script>
function DispResult()
{
   var ma,en,ur,obt,per,grade;
          ma=document.getElementById("Math").value;
```

```
        en=document.getElementById("English").value;
        ur=document.getElementById("Urdu").value;

        obt = parseInt(ma) + parseInt(en) + parseInt(ur);
        per = obt *100/300;
        if (per>=80)
           grade="A+1";
        else if (per>=70)
           grade="A";
        else if (per>=60)
           grade="B";
        else if (per>=50)
           grade="C";
        else if (per>=40)
           grade="D";
        else
           grade="Fail";
        document.getElementById("Obtain").value = obt;
        document.getElementById("Percentage").value=per;
        document.getElementById("Grade").value=grade;
}
</script>
</head>
<body>
<h1> Result Sheet </h1>
<form>
Roll :<input type="number" id="Roll" pattern="[0-9]{1,3]" placeholder="Type Roll No. " /><br />
Student:<input type="text"  id="Name" pattern="[a-zA-Z ]{4,15}" placeholder="Type Student Name "/><br
/>
Maths<input type="number" id="Math" pattern="[0-9]{1,3]" placeholder="Type Math Marks "/><br/>
English:<input type="number" id="English" pattern="[0-9]{1,3]" placeholder="Type English Marks "/><br/>
Urdu:<input type="number" id="Urdu" pattern="[0-9]{1,3]" placeholder="Type Urdu Marks"/><br /><br>
Obtain Marks:<input type="number" id="Obtain" /><br />
Percentage:<input type="number" id="Percentage" /><br />
Grade:<input type="text" id="Grade"/><br /><br><br>
<button type="button" onclick="DispResult()" /> Show Result </button>
</form>
</body>
</html>
```

Exercise

Theory Question

1) What is JavaScript.
2) How many ways to add java scripting code in HTML document.
3) What is getElementId() method.
4) What is HTML event attribute and list of 5 event name with description.

Practical Question

1) Write a JavaScript program to input an integer number and find that number is even or odd.
2) Write a JavaScript program you display two different Images on the browser when mouse over the click on image then image size increase and then you do mouse click again then reverse normal size of image element using by event handling.

Objective and MCQ

1) JavaScript was developed by _______.
   a) Brendan Eich
   b) John smith
   c) Eailn allex
   d) Tom
2) JavaScript was developed in _____ year.
   a) 2000
   b) 2010
   c) 1995
   d) 1972
3) Only digit numbers at least 2 and maximum 6.
   a) [a-z]
   b) [A-Z]{2,6}
   c) [0-9]{6,2}
   d) [0-9]{2,6}
4) The user moves the mouse over an HTML element.
   a) mouseover
   b) mouseout
   c) onmouseover
   d) donclick

5) The _____ is a DOM method used to return the element that has the ID attribute.
   a) getElementById()
   b) elmentById()
   c) getelementbyid()
   d) getElementbyId()