



JavaScript

JavaScript is *THE* scripting language of the Web.

JavaScript is used in billions of Web pages to add functionality, validate forms, communicate with the server, and much more.

JavaScript is easy to learn.

What is JavaScript?

- JavaScript was designed to add interactivity to HTML pages
- JavaScript is a scripting language
- A scripting language is a lightweight programming language

- JavaScript is usually embedded directly into HTML pages
- JavaScript is an interpreted language (means that scripts execute without preliminary compilation)
- Everyone can use JavaScript without purchasing a license

Are Java and JavaScript the same?

NO!

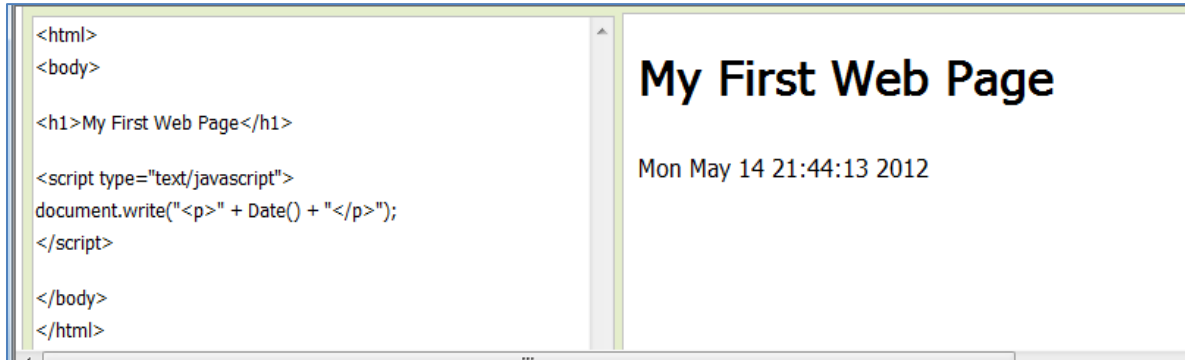
Java and JavaScript are two completely different languages in both concept and design!

Java (developed by Sun Microsystems) is a powerful and much more complex programming language - in the same category as C and C++.

What Can JavaScript do?

- **JavaScript gives HTML designers a programming tool** - HTML authors are normally not programmers, but JavaScript is a scripting language with a very simple syntax! Almost anyone can put small "snippets" of code into their HTML pages
- **JavaScript can react to events** - A JavaScript can be set to execute when something happens, like when a page has finished loading or when a user clicks on an HTML element
- **JavaScript can read and write HTML elements** - A JavaScript can read and change the content of an HTML element
- **JavaScript can be used to validate data** - A JavaScript can be used to validate form data before it is submitted to a server. This saves the server from extra processing
- **JavaScript can be used to detect the visitor's browser** - A JavaScript can be used to detect the visitor's browser, and - depending on the browser - load another page specifically designed for that browser
- **JavaScript can be used to create cookies** - A JavaScript can be used to store and retrieve information on the visitor's computer

My First JavaScript Programs



```
<html>
<body>

<h1>My First Web Page</h1>

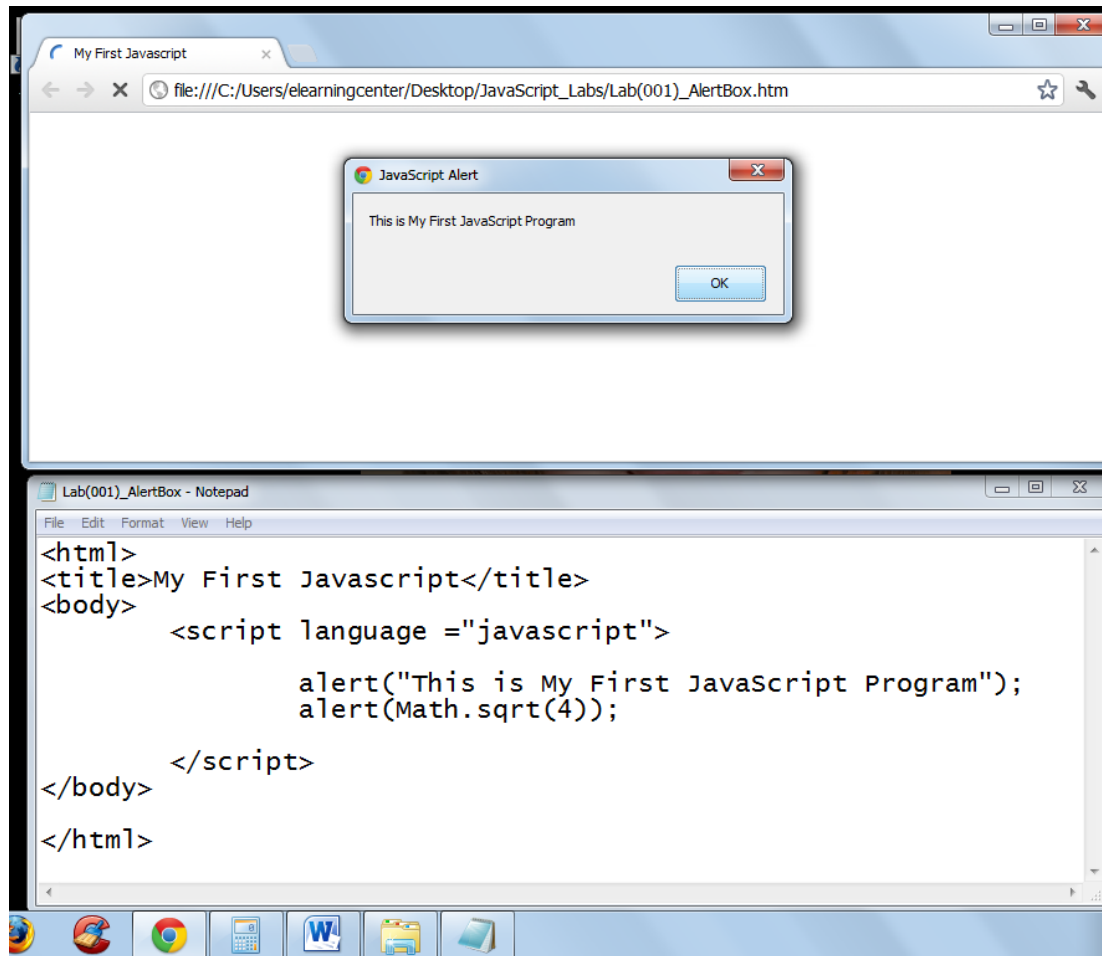
<script type="text/javascript">
document.write("<p>" + Date() + "</p>");
</script>

</body>
</html>
```

My First Web Page

Mon May 14 21:44:13 2012

Lab (001) Alert



Lab (002) Changing Browser Background Color



JavaScript Variables

Variables are "containers" for storing information.

Do You Remember Algebra From School?

Do you remember algebra from school? $x=5$, $y=6$, $z=x+y$

Do you remember that a letter (like x) could be used to hold a value (like 5), and that you could use the information above to calculate the value of z to be 11?

These letters are called **variables**, and variables can be used to hold values ($x=5$) or expressions ($z=x+y$).

JavaScript Variables

As with algebra, JavaScript variables are used to hold values or expressions.

A variable can have a short name, like x , or a more descriptive name, like `carname`.

Rules for JavaScript variable names:

- Variable names are case sensitive (y and Y are two different variables)
- Variable names must begin with a letter, the $\$$ character, or the underscore character

Note: Because JavaScript is case-sensitive, variable names are case-sensitive.

Declaring (Creating) JavaScript Variables

Creating variables in JavaScript is most often referred to as "declaring" variables.

You declare JavaScript variables with the **var** keyword:

```
var x;  
var carname;
```

After the declaration shown above, the variables are empty (they have no values yet).

However, you can also assign values to the variables when you declare them:

```
var x=5;
var carname="Volvo";
```

After the execution of the statements above, the variable **x** will hold the value **5**, and **carname** will hold the value **Volvo**.

Note: When you assign a text value to a variable, put quotes around the value.

Note: If you redeclare a JavaScript variable, it will not lose its value.

Local JavaScript Variables

A variable declared within a JavaScript function becomes **LOCAL** and can only be accessed within that function. (the variable has local scope).

You can have local variables with the same name in different functions, because local variables are only recognized by the function in which they are declared.

Local variables are deleted as soon as the function is completed.

You will learn more about functions in a later chapter of this tutorial.

Global JavaScript Variables

Variables declared outside a function become **GLOBAL**, and all scripts and functions on the web page can access it.

Global variables are deleted when you close the page.

Assigning Values to Undeclared JavaScript Variables

If you assign values to variables that have not yet been declared, the variables will automatically be declared as global variables.
These statements:

```
x=5;  
carname="Volvo";
```

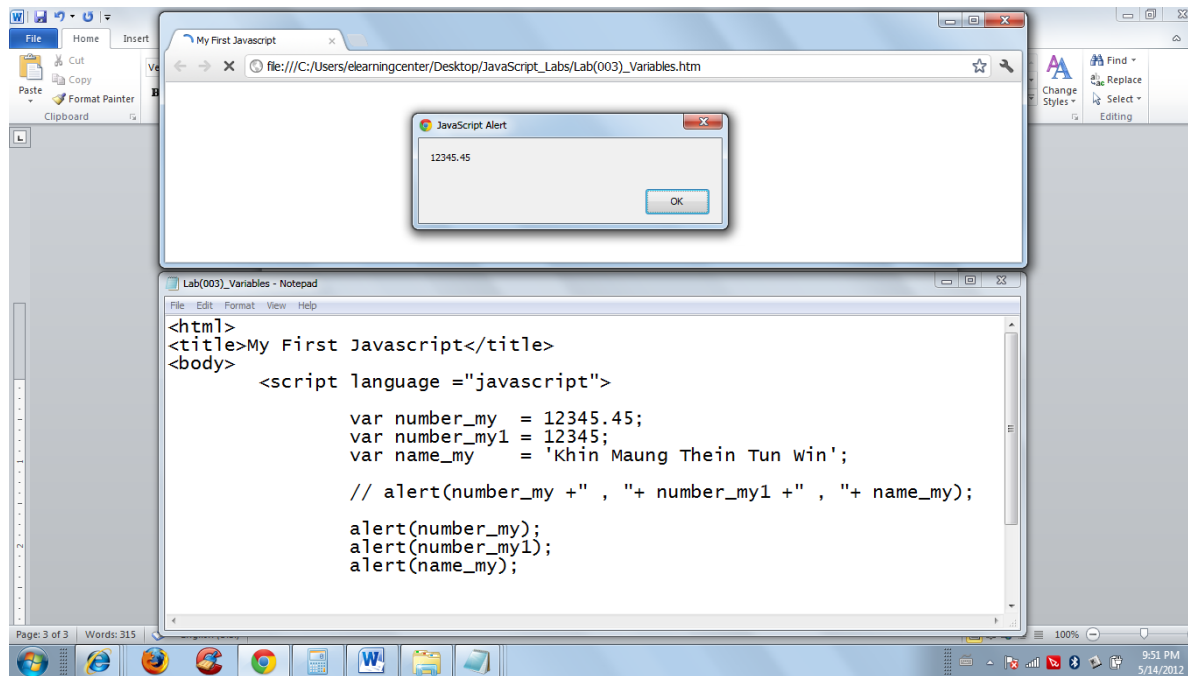
will declare the variables x and carname as global variables (if they don't already exist).

JavaScript Arithmetic

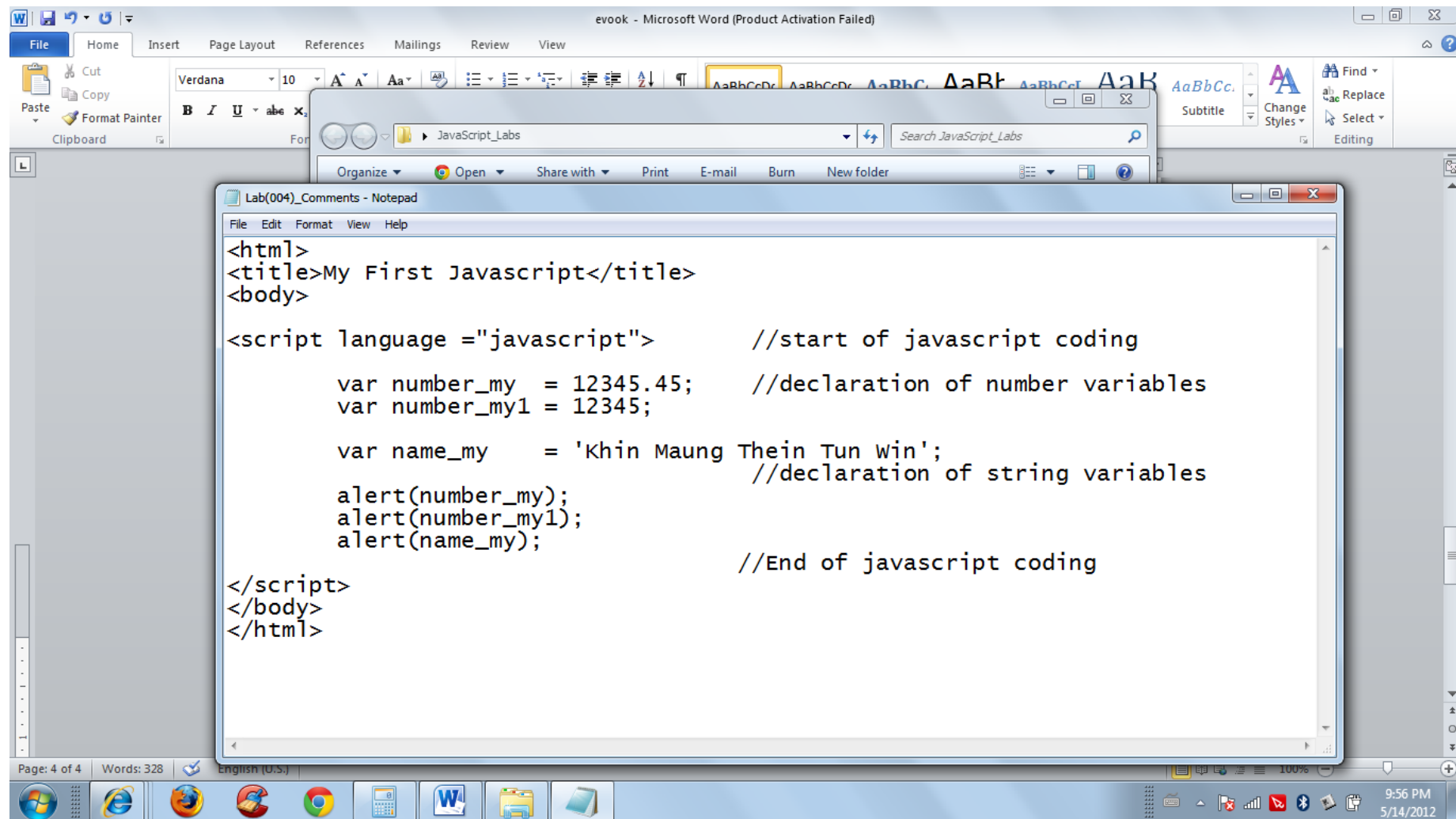
As with algebra, you can do arithmetic operations with JavaScript variables:

```
y=x-5;  
z=y+5;
```

Lab (003) Define variables



Lab (004) Inserting Comments in JavaScript



The screenshot displays a Windows desktop environment. In the foreground, a Notepad window titled "Lab(004)_Comments - Notepad" is open, showing the following JavaScript code with comments:

```
<html>
<title>My First Javascript</title>
<body>

<script language ="javascript">           //start of javascript coding

    var number_my  = 12345.45;           //declaration of number variables
    var number_my1 = 12345;

    var name_my    = 'Khin Maung Thein Tun Win';
                                           //declaration of string variables

    alert(number_my);
    alert(number_my1);
    alert(name_my);

                                           //End of javascript coding

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

The background shows a Microsoft Word window titled "eook - Microsoft Word (Product Activation Failed)" with the ribbon menu visible. The taskbar at the bottom includes icons for Internet Explorer, Firefox, Chrome, and other applications. The system tray shows the time as 9:56 PM on 5/14/2012.

Single line comments

Example

```
<script type="text/javascript">
// Write a heading
document.write("<h1>This is a heading</h1>");
// Write two paragraphs:
document.write("<p>This is a paragraph.</p>");
document.write("<p>This is another paragraph.</p>");
</script>
```

Multi line comments

Example

```
<script type="text/javascript">
/*
document.write("<h1>This is a heading</h1>");
document.write("<p>This is a paragraph.</p>");
document.write("<p>This is another paragraph.</p>");
*/
</script>
```

JavaScript Statements

JavaScript is a sequence of statements to be executed by the browser.

JavaScript is Case Sensitive

Unlike HTML, JavaScript is case sensitive - therefore watch your capitalization closely when you write JavaScript statements, create or call variables, objects and functions.

JavaScript Statements

A JavaScript statement is a command to a browser. The purpose of the command is to tell the browser what to do.

This JavaScript statement tells the browser to write "Hello Dolly" to the web page:

```
document.write("Hello Dolly");
```

It is normal to add a semicolon at the end of each executable statement. Most people think this is a good programming practice, and most often you will see this in JavaScript examples on the web.

The semicolon is optional (according to the JavaScript standard), and the browser is supposed to interpret the end of the line as the end of the statement. Because of this you will often see examples without the semicolon at the end.

Note: Using semicolons makes it possible to write multiple statements on one line.

JavaScript Code

JavaScript code (or just JavaScript) is a sequence of JavaScript statements. Each statement is executed by the browser in the sequence they are written.

This example will write a heading and two paragraphs to a web page:

Example

```
<script type="text/javascript">
document.write("<h1>This is a heading</h1>");
document.write("<p>This is a paragraph.</p>");
document.write("<p>This is another paragraph.</p>");
</script>
```

JavaScript Operators

= is used to **assign values**.

+ is used **to add values**.

The **assignment operator =** is used to assign values to JavaScript variables.

The **arithmetic operator +** is used to add values together.

```
y=5;
z=2;
x=y+z;
```

The value of x, after the execution of the statements above, **is 7**.

JavaScript Arithmetic Operators

Arithmetic operators are used to perform arithmetic between variables and/or values.

Given that $y=5$, the table below explains the arithmetic operators:

Operator	Description	Example	Result	
+	Addition	$x=y+2$	$x=7$	$y=5$
-	Subtraction	$x=y-2$	$x=3$	$y=5$
*	Multiplication	$x=y*2$	$x=10$	$y=5$
/	Division	$x=y/2$	$x=2.5$	$y=5$
%	Modulus (division remainder)	$x=y\%2$	$x=1$	$y=5$
++	Increment	$x=++y$	$x=6$	$y=6$
		$x=y++$	$x=5$	$y=6$
--	Decrement	$x=--y$	$x=4$	$y=4$
		$x=y--$	$x=5$	$y=4$

JavaScript Assignment Operators

Assignment operators are used to assign values to JavaScript variables.

Given that $x=10$ and $y=5$, the table below explains the assignment operators:

Operator	Example	Same As	Result
=	$x=y$		$x=5$
+=	$x+=y$	$x=x+y$	$x=15$
-=	$x-=y$	$x=x-y$	$x=5$
=	$x=y$	$x=x*y$	$x=50$
/=	$x/=y$	$x=x/y$	$x=2$
%=	$x\%=y$	$x=x\%y$	$x=0$

The + Operator Used on Strings

The + operator can also be used to add string variables or text values together.

To add two or more string variables together, use the + operator.

```
txt1="What a very";  
txt2="nice day";  
txt3=txt1+txt2;
```

After the execution of the statements above, the variable txt3 contains "What a verynice day".

To add a space between the two strings, insert a space into one of the strings:

```
txt1="What a very ";  
txt2="nice day";  
txt3=txt1+txt2;
```

or insert a space into the expression:

```
txt1="What a very";  
txt2="nice day";  
txt3=txt1+" "+txt2;
```

After the execution of the statements above, the variable txt3 contains:

"What a very nice day"

Adding Strings and Numbers

The rule is: **If you add a number and a string, the result will be a string!**

Example

```
x=5+5; document.write(x);
```

```
x="5"+"5"; document.write(x);
```

```
x=5+"5"; document.write(x);
```

```
x="5"+5; document.write(x);
```

JavaScript Comparison and Logical Operators

Comparison and Logical operators are used to **test for true or false.**

Comparison Operators

Comparison operators are used in logical statements to determine equality or difference between variables or values.

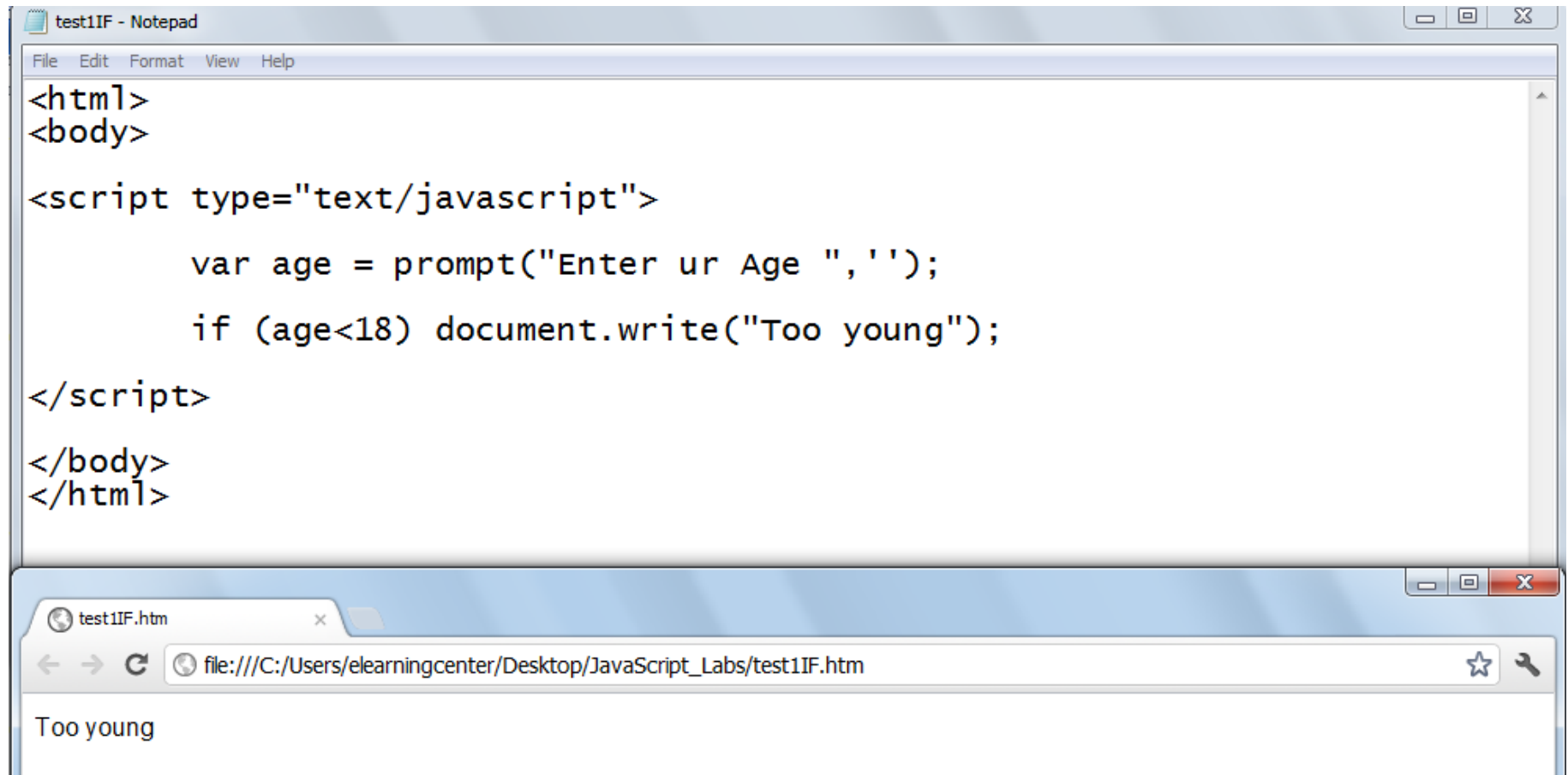
Given that **x=5**, the table below explains the comparison operators:

Operator	Description	Example
==	is equal to	x==8 is false x==5 is true
===	is exactly equal to (value and type)	x===5 is true x==="5" is false
!=	is not equal	x!=8 is true
>	is greater than	x>8 is false
<	is less than	x<8 is true
>=	is greater than or equal to	x>=8 is false
<=	is less than or equal to	x<=8 is true

How can it be used

Comparison operators can be used in conditional statements to compare values and take action depending on the result:

```
if (age<18) document.write("Too young");
```



The image shows a Notepad window titled "test1IF - Notepad" containing the following HTML and JavaScript code:

```
<html>
<body>

<script type="text/javascript">
    var age = prompt("Enter ur Age ", '');
    if (age<18) document.write("Too young");
</script>

</body>
</html>
```

Below the Notepad window is a web browser window titled "test1IF.htm". The address bar shows the file path: `file:///C:/Users/elearningcenter/Desktop/JavaScript_Labs/test1IF.htm`. The browser content area displays the text "Too young".

You will learn more about the use of conditional statements in the next chapter of this tutorial.

Example for Simple IF Pattern

```

<html>
<body>
<script type="text/javascript">
  var age = prompt("Enter ur Age ", "");
  if (age<18) {
    alert("Too YOUNG");
    document.write("Too young");
  }
  /* this is Simple IF pattern
  ****
  * if (age<18) alert("Too YOUNG");          *
  * if (age<18) document.write("Too young"); *
  * *****/
</script>
</body>
</html>

```

```

<script language ="javascript">
  var guess = prompt('Please enter NUMBER.', 'Your Number');
  if (guess == 5) {
    alert ('Your Number is Equal to '+ guess);
  }
</script>

```

Note: *guess = prompt ('Please enter NUMBER.', 'Your Number');* and *if(guess == 5)* are different usage of equal(=)sign.

Logical Operators

Logical operators are used to determine the logic between variables or values.

Given that **x=6** and **y=3**, the table below explains the logical operators:

Operator	Description	Example
&&	and	(x < 10 && y > 1) is true
	or	(x==5 y==5) is false
!	not	!(x==y) is true

For &&(AND) Operator

```
<script type="text/javascript">
  var html_my      = 80;
  var javascript_my = 80;
  var php_my       = 80;

  if (html_my >=40 && javascript_my >= 40 && php_my >= 40) {
    document.write("Exam Pass");

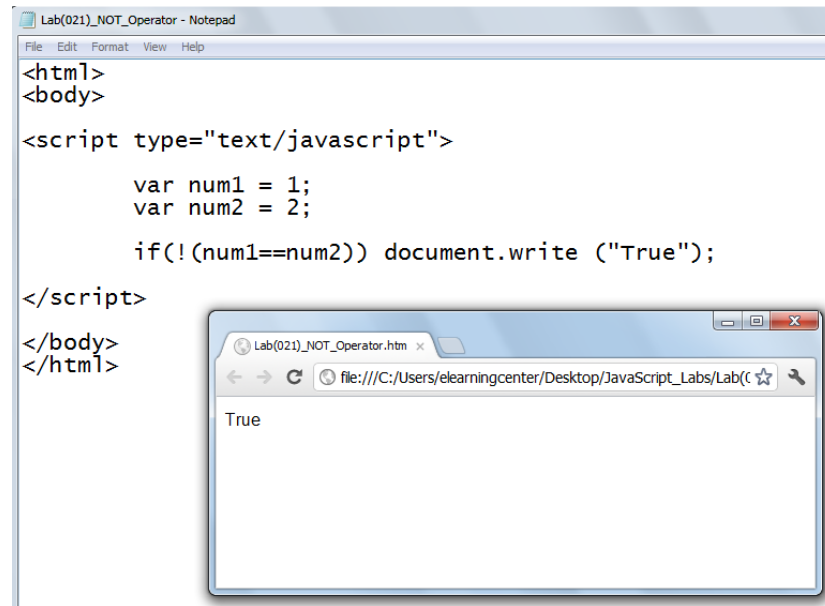
    if(html_my >=80 && javascript_my >= 80 && php_my >=80) {
      document.write(" With Credit");
    }
  }
  else {
    document.write("Exam Fail");
  }
</script>
```

For || (OR) Operator

```
<script type="text/javascript">
  var html_my      = 80;
  var javascript_my = 80;
  var php_my       = 80;

  if (html_my >=40 || javascript_my >= 40 && php_my >= 40) {
    document.write("Exam Pass");
  }
  else {
    document.write("Exam Fail");
  }
</script>
```

For ! (NOT) Operator



The image shows a Notepad window titled "Lab(021)_NOT_Operator - Notepad" containing the following JavaScript code:

```
<html>
<body>

<script type="text/javascript">

  var num1 = 1;
  var num2 = 2;

  if(!(num1==num2)) document.write ("True");

</script>

</body>
</html>
```

Below the Notepad window, a browser window titled "Lab(021)_NOT_Operator.htm" is shown. The browser's address bar displays the file path: "file:///C:/Users/elearningcenter/Desktop/JavaScript_Labs/Lab(021)_NOT_Operator.htm". The browser's content area displays the text "True".

Conditional Operator

JavaScript also contains a conditional operator that assigns a value to a variable based on some condition.

Syntax

```
variablename=(condition)?value1:value2
```

Example

If the variable **visitor** has the value of "PRES", then the variable **greeting** will be assigned the value "Dear President " else it will be assigned "Dear":

```
<script type="text/javascript">
```

```
var visitor="PRES";
var greeting=(visitor=="PRES")?"Dear President ":"Dear ";
document.write(greeting);
</script>
```

JavaScript If...Else Statements

Conditional statements are used to perform **different actions based on different conditions**.

Conditional Statements

Very often when you write code, you want to perform different actions for different decisions. You can use conditional statements in your code to do this.

In JavaScript we have the following conditional statements:

- **if statement** - use this statement to execute some code only if a specified condition is true
- **if...else statement** - use this statement to execute some code if the condition is true and another code if the condition is false
- **if...else if....else statement** - use this statement to select one of many blocks of code to be executed
- **switch statement** - use this statement to select one of many blocks of code to be executed

If Statement

Use the if statement to execute some code only **if a specified condition is true**.

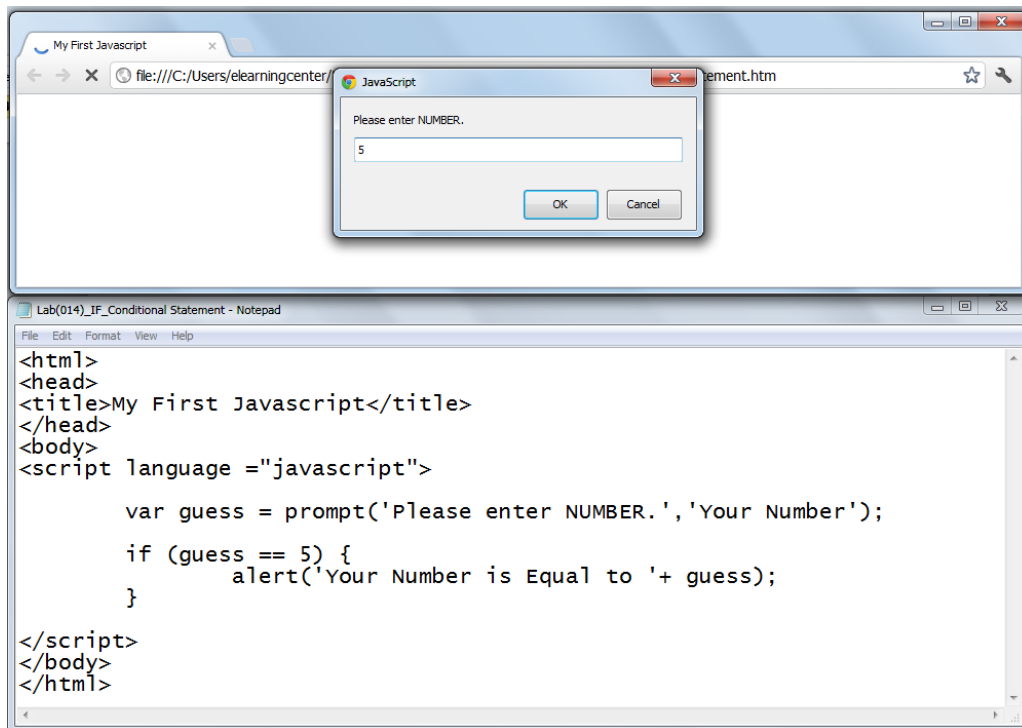
Syntax

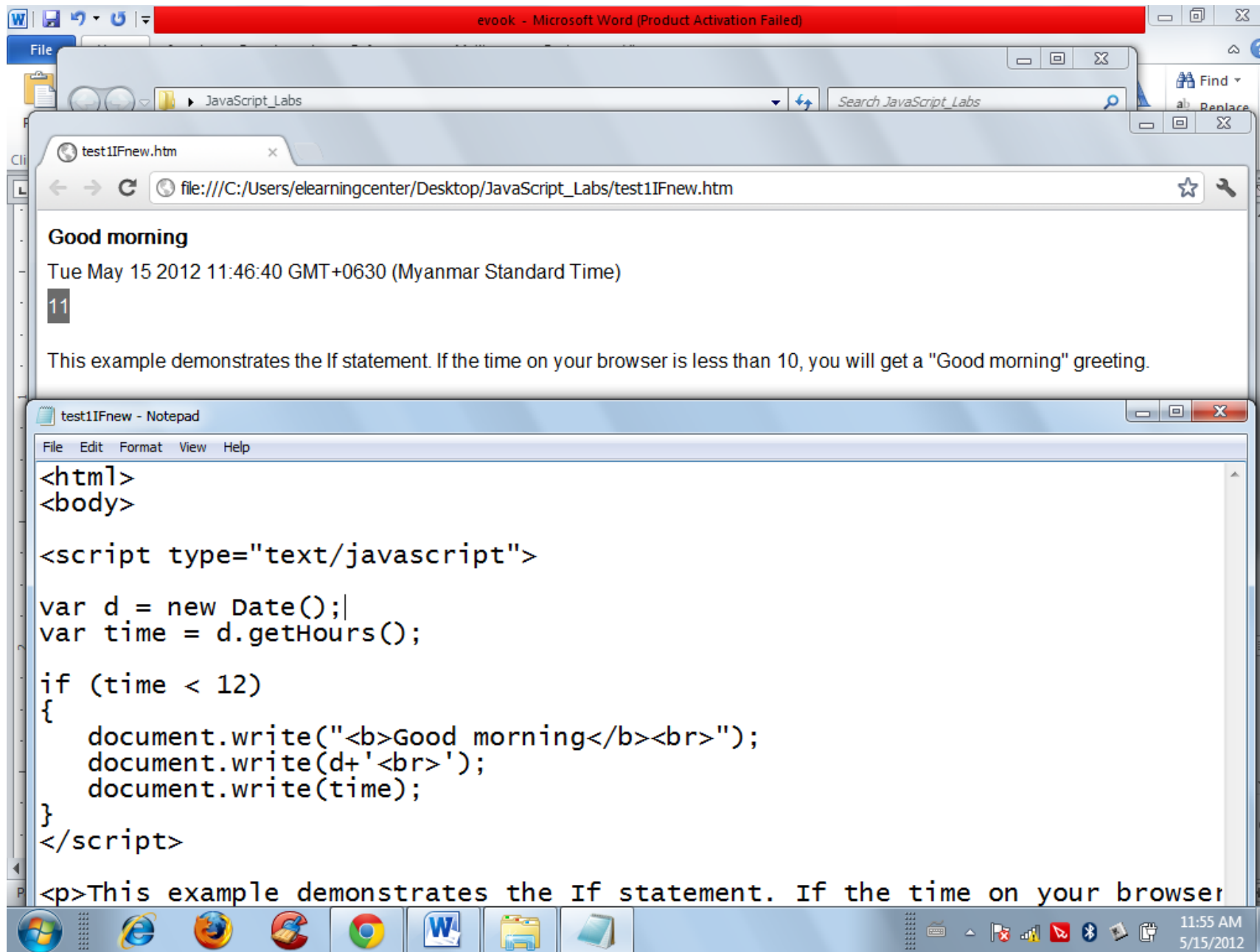
if (*condition*)

```
{  
  code to be executed if condition is true  
}
```

Note that if is written in lowercase letters. Using uppercase letters (IF) will generate a JavaScript error!

Lab (005) Simple IF Statement in JavaScript





The screenshot shows a Windows desktop environment. At the top, a Microsoft Word window is visible with the title "evook - Microsoft Word (Product Activation Failed)". Below it, a web browser window is open, displaying the file "test1IFnew.htm" located at "file:///C:/Users/elearningcenter/Desktop/JavaScript_Labs/test1IFnew.htm". The browser content shows the following output:

Good morning
Tue May 15 2012 11:46:40 GMT+0630 (Myanmar Standard Time)
11

This example demonstrates the If statement. If the time on your browser is less than 10, you will get a "Good morning" greeting.

Below the browser window, a Notepad window titled "test1IFnew - Notepad" is open, showing the source code for the HTML file:

```
<html>
<body>

<script type="text/javascript">
var d = new Date();|
var time = d.getHours();

if (time < 12)
{
    document.write("<b>Good morning</b><br>");
    document.write(d+'<br>');
    document.write(time);
}
</script>

<p>This example demonstrates the If statement. If the time on your browser
```

The Windows taskbar at the bottom shows the system clock as 11:55 AM on 5/15/2012, along with various system icons and application shortcuts.

If...else Statement

Use the if....else statement to execute some code **if a condition is true and another code if the condition is not true.**

Syntax

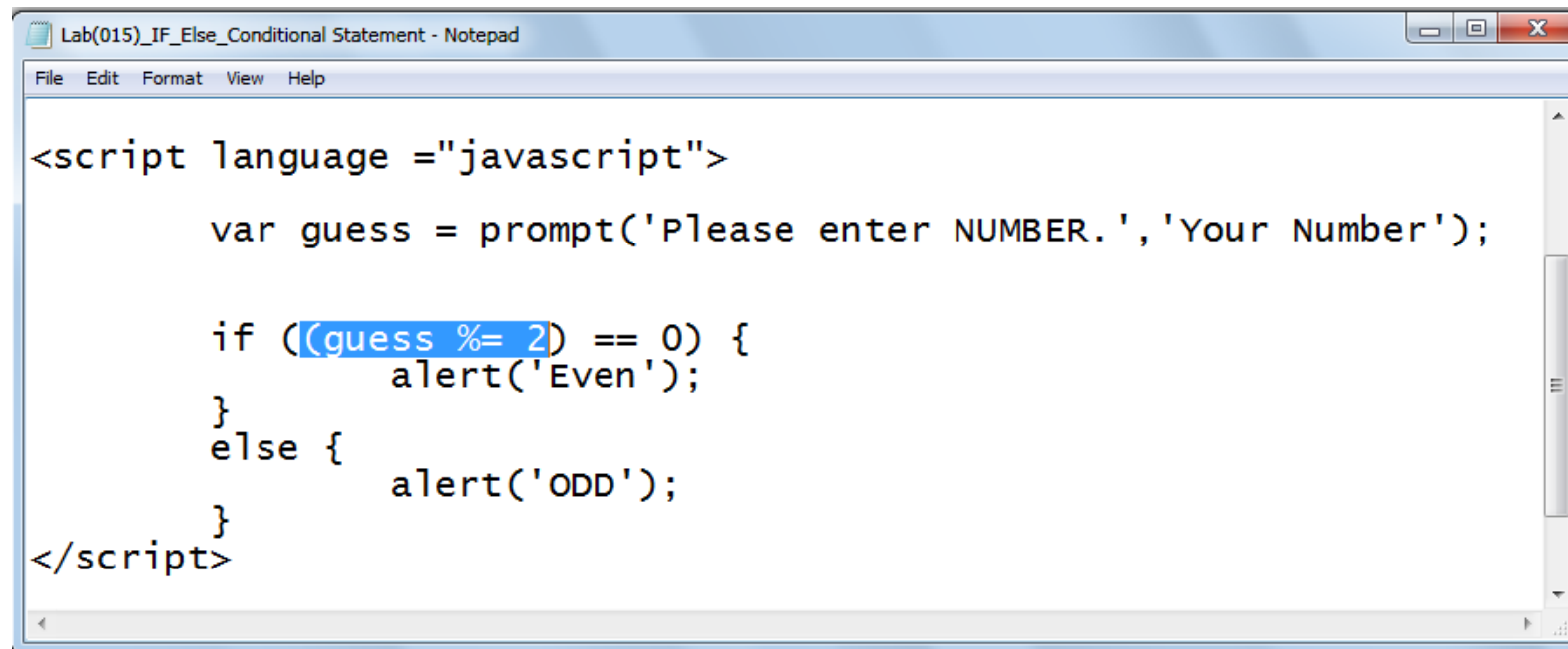
```
if (condition) {  
  code to be executed if condition is true  
}  
else {  
  code to be executed if condition is not true  
}
```

Example

```
<html>  
<body>  
<script language ="javascript">  
  var guess = prompt('Please enter NUMBER.','Your Number');  
  if (guess == 5) {  
    alert ('Your Number is Equal to '+ guess);  
  }  
  else {  
    alert ('Your Number is not 5');  
  }  
</script>  
</body>  
</html>
```

```
<script type="text/javascript">
  var d = new Date();
  var time = d.getHours();
  if (time < 10) {
    document.write("Good morning!");
  }
  else {
    document.write("Good day!");
  }
</script>
```

Even or ODD Script

A screenshot of a Notepad window titled "Lab(015)_IF_Else_Conditional Statement - Notepad". The window contains the following JavaScript code:

```
<script language = "javascript">
  var guess = prompt('Please enter NUMBER.', 'Your Number');

  if ((guess % 2) == 0) {
    alert('Even');
  }
  else {
    alert('ODD');
  }
</script>
```

The code is displayed in a monospaced font. The window has a standard menu bar with "File", "Edit", "Format", "View", and "Help". The code is enclosed in a light blue border.

If...else if...else Statement

Use the if...else if...else statement to select one of several blocks of code to be executed.

Syntax

```
if (condition1) {  
    code to be executed if condition1 is true  
}  
else if (condition2) {  
    code to be executed if condition2 is true  
}  
else {  
    code to be executed if neither condition1 nor condition2 is true  
}
```

Example

```
<script type="text/javascript">  
    var d = new Date()  
    var time = d.getHours()  
    if (time<10) {  
        document.write("<b>Good morning</b>");  
    }  
    else if (time>=10 && time<16) {  
        document.write("<b>Good day</b>");  
    }  
    else {  
        document.write("<b>Hello World!</b>");  
    }  
</script>
```

JavaScript Switch Statement

Conditional statements are used to perform **different actions based on different conditions.**

The JavaScript Switch Statement

Use the switch statement to select one of many blocks of code to be executed.

Syntax

```
switch(n)
{
case 1:
  execute code block 1
  break;
case 2:
  execute code block 2
  break;
default:
  code to be executed if n is different from case 1 and 2
}
```

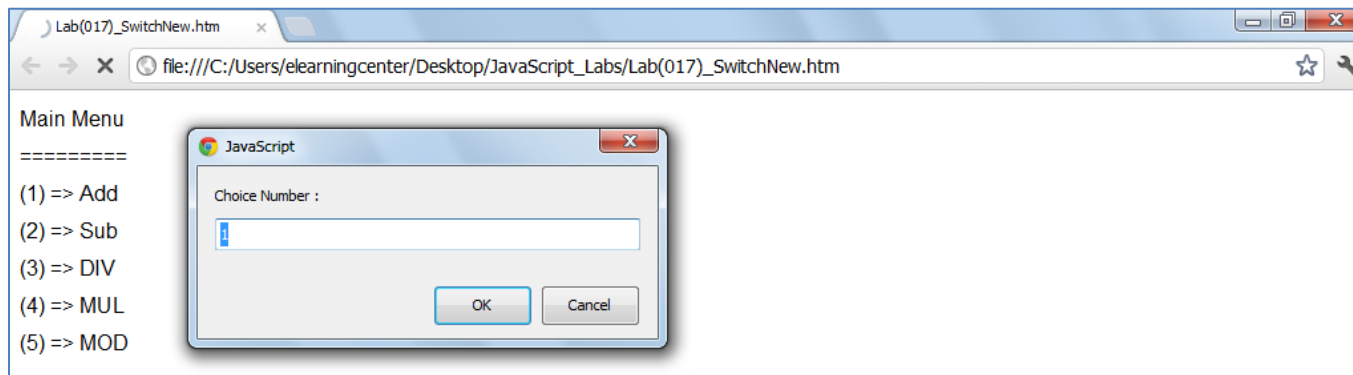
Example

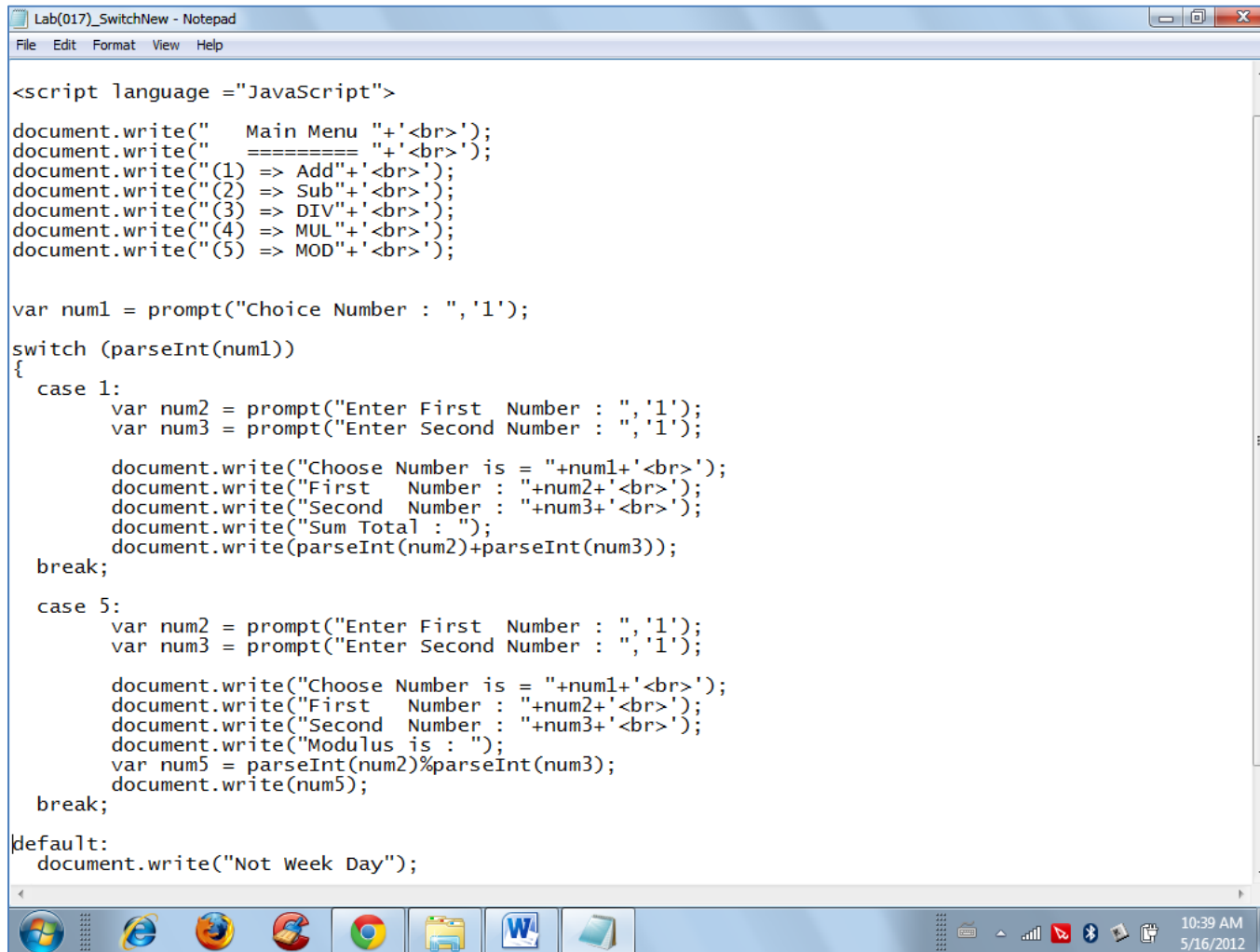
```
<script type="text/javascript">

var d=new Date();
var theDay=d.getDay();
```

```
switch (theDay)
{
case 5:
    document.write("Finally Friday");
    break;
case 6:
    document.write("Super Saturday");
    break;
case 0:
    document.write("Sleepy Sunday");
    break;
default:
    document.write("I'm looking forward to this weekend!");
}
</script>
```

Result



Code for above mentioned result

```
Lab(017)_SwitchNew - Notepad
File Edit Format View Help

<script language = "JavaScript">

document.write("  Main Menu "+<br>');
document.write("  ===== "+<br>');
document.write("(1) => Add"+<br>');
document.write("(2) => Sub"+<br>');
document.write("(3) => DIV"+<br>');
document.write("(4) => MUL"+<br>');
document.write("(5) => MOD"+<br>');

var num1 = prompt("Choice Number : ", '1');
switch (parseInt(num1))
{
  case 1:
    var num2 = prompt("Enter First Number : ", '1');
    var num3 = prompt("Enter Second Number : ", '1');

    document.write("Choose Number is = "+num1+'<br>');
    document.write("First Number : "+num2+'<br>');
    document.write("Second Number : "+num3+'<br>');
    document.write("Sum Total : ");
    document.write(parseInt(num2)+parseInt(num3));
    break;

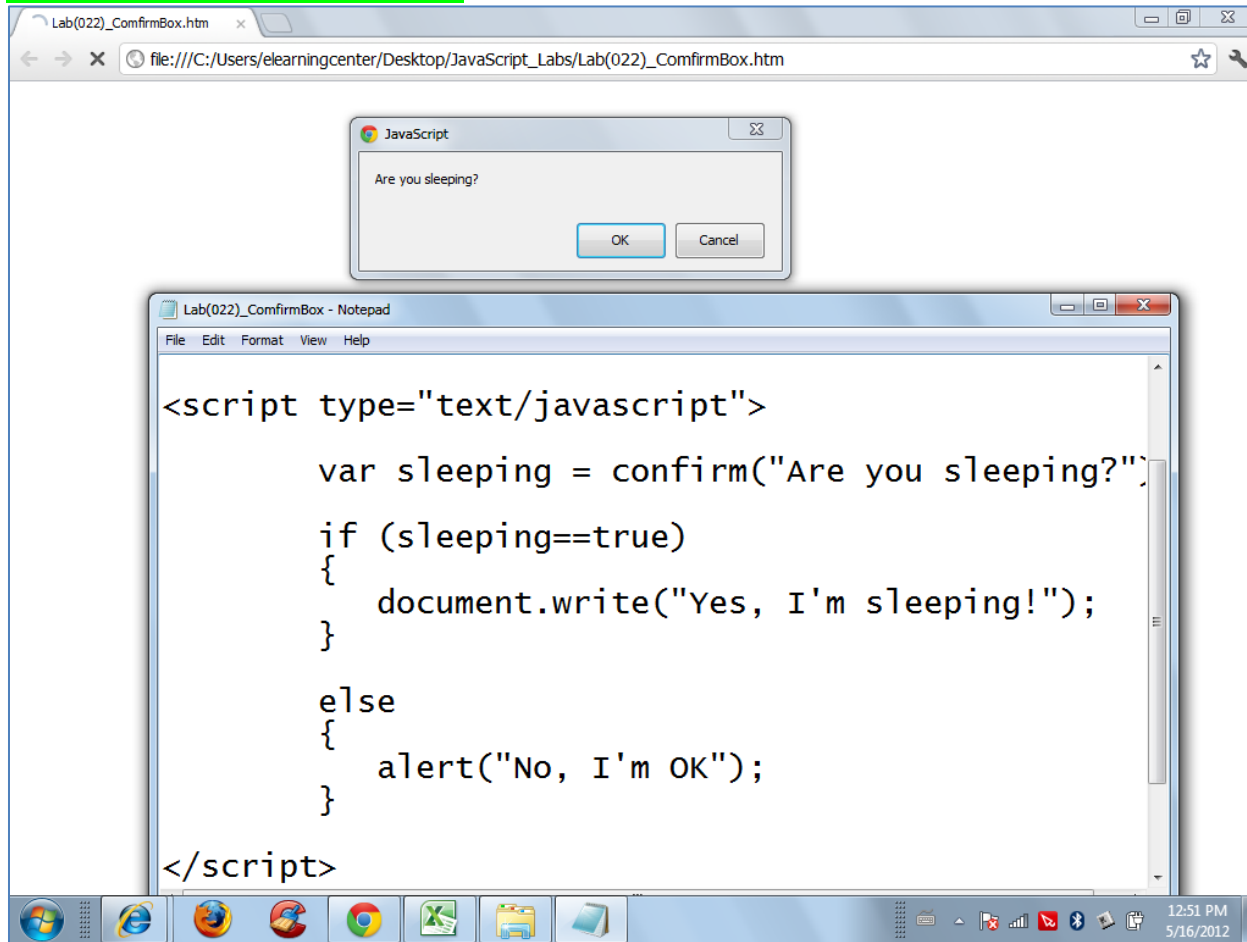
  case 5:
    var num2 = prompt("Enter First Number : ", '1');
    var num3 = prompt("Enter Second Number : ", '1');

    document.write("Choose Number is = "+num1+'<br>');
    document.write("First Number : "+num2+'<br>');
    document.write("Second Number : "+num3+'<br>');
    document.write("Modulus is : ");
    var num5 = parseInt(num2)%parseInt(num3);
    document.write(num5);
    break;

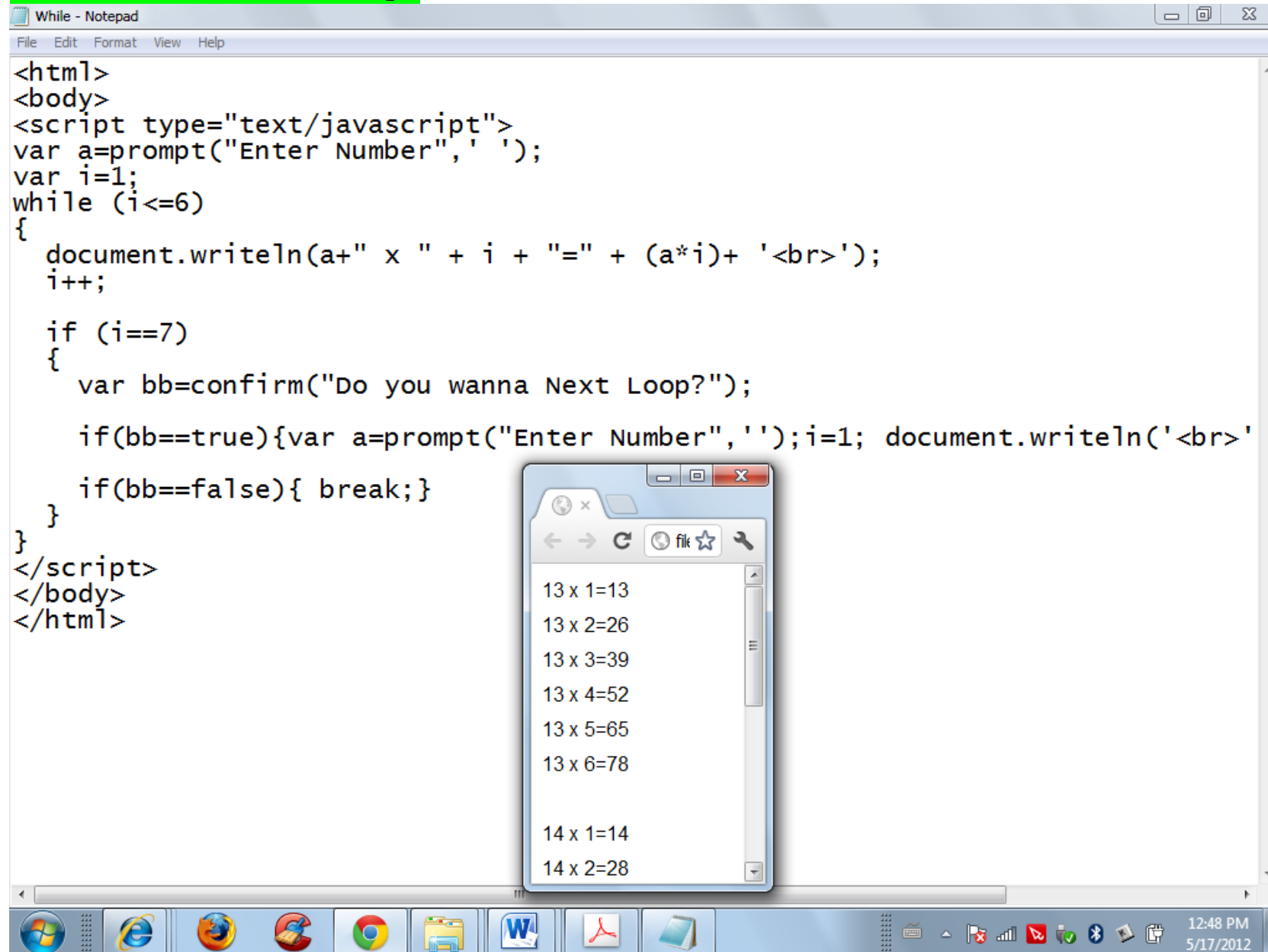
  default:
    document.write("Not Week Day");
}
```

The screenshot shows a Notepad window titled "Lab(017)_SwitchNew - Notepad" with a menu-driven JavaScript program. The code uses `document.write()` to display a main menu with options 1 through 5: Add, Sub, DIV, MUL, and MOD. A `prompt()` function asks the user for a choice number. A `switch` statement handles the choices: case 1 performs addition, case 5 performs modulus, and the default case outputs "Not Week Day". The window's taskbar shows various application icons and a system tray with the date and time (10:39 AM, 5/16/2012).

Using Confirm BOX in JavaScript



While LOOP in JavaScript



```
<html>
<body>
<script type="text/javascript">
var a=prompt("Enter Number",' ');
var i=1;
while (i<=6)
{
  document.writeln(a+" x " + i + "=" + (a*i)+ '<br>');
  i++;

  if (i==7)
  {
    var bb=confirm("Do you wanna Next Loop?");

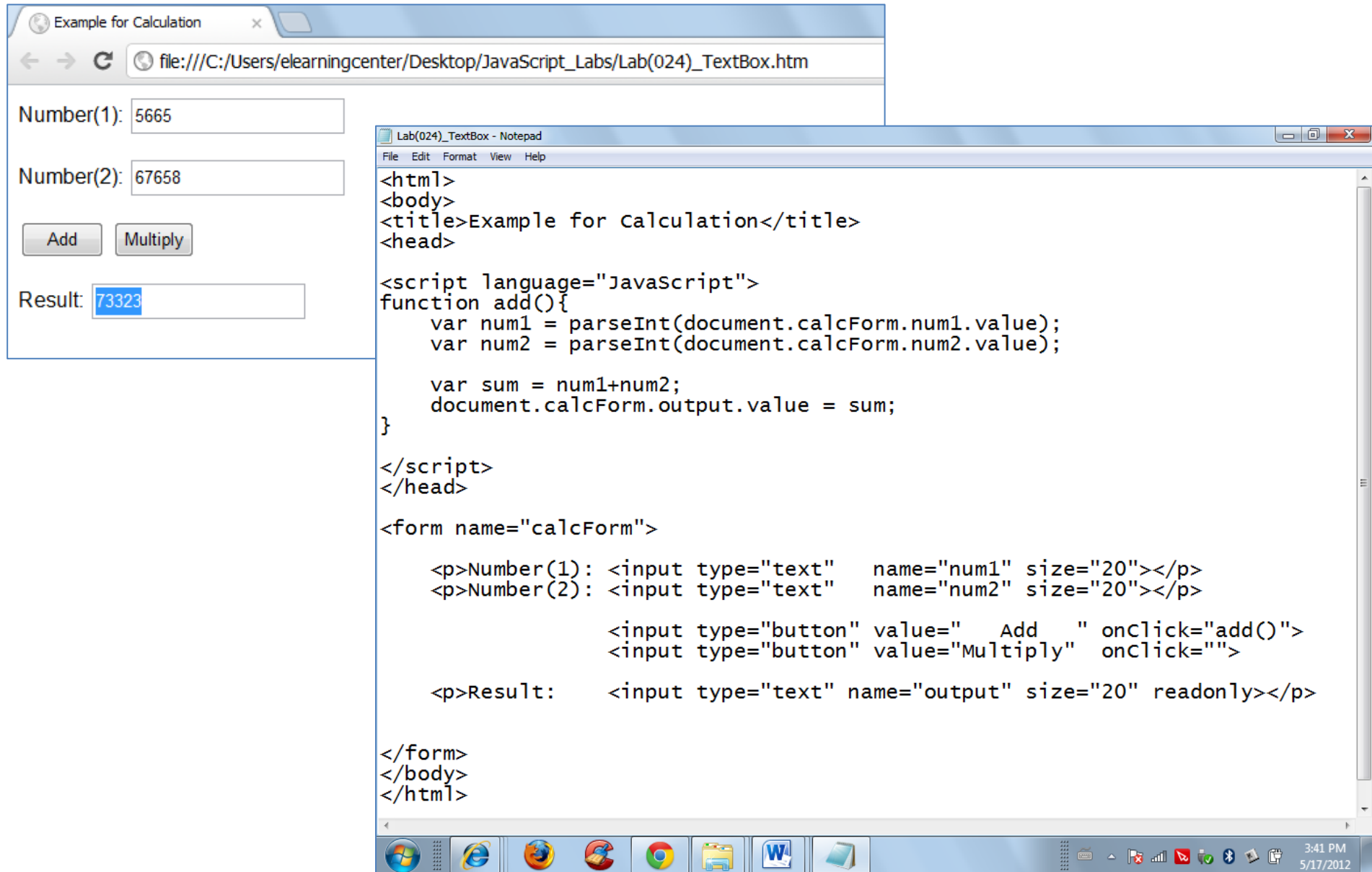
    if(bb==true){var a=prompt("Enter Number",' ');i=1; document.writeln('<br>'}
    if(bb==false){ break;}
  }
}
</script>
</body>
</html>
```

The screenshot shows a Notepad window with the above JavaScript code. A browser window is overlaid on top, displaying the output of the script. The output consists of two rows of multiplication results, each with a blank line between them. The first row shows results for a=13 (13 x 1=13 to 13 x 6=78) and the second row shows results for a=14 (14 x 1=14 to 14 x 2=28).

13 x 1=13
13 x 2=26
13 x 3=39
13 x 4=52
13 x 5=65
13 x 6=78

14 x 1=14
14 x 2=28

Function Call in JavaScript



The screenshot displays a web browser window titled "Example for Calculation" and a Notepad window titled "Lab(024)_TextBox - Notepad".

The browser window shows a form with the following elements:

- Number(1):
- Number(2):
- Buttons: Add, Multiply
- Result:

The Notepad window shows the following HTML and JavaScript code:

```
<html>
<body>
<title>Example for calculation</title>
<head>

<script language="JavaScript">
function add(){
    var num1 = parseInt(document.calcForm.num1.value);
    var num2 = parseInt(document.calcForm.num2.value);

    var sum = num1+num2;
    document.calcForm.output.value = sum;
}
</script>
</head>

<form name="calcForm">

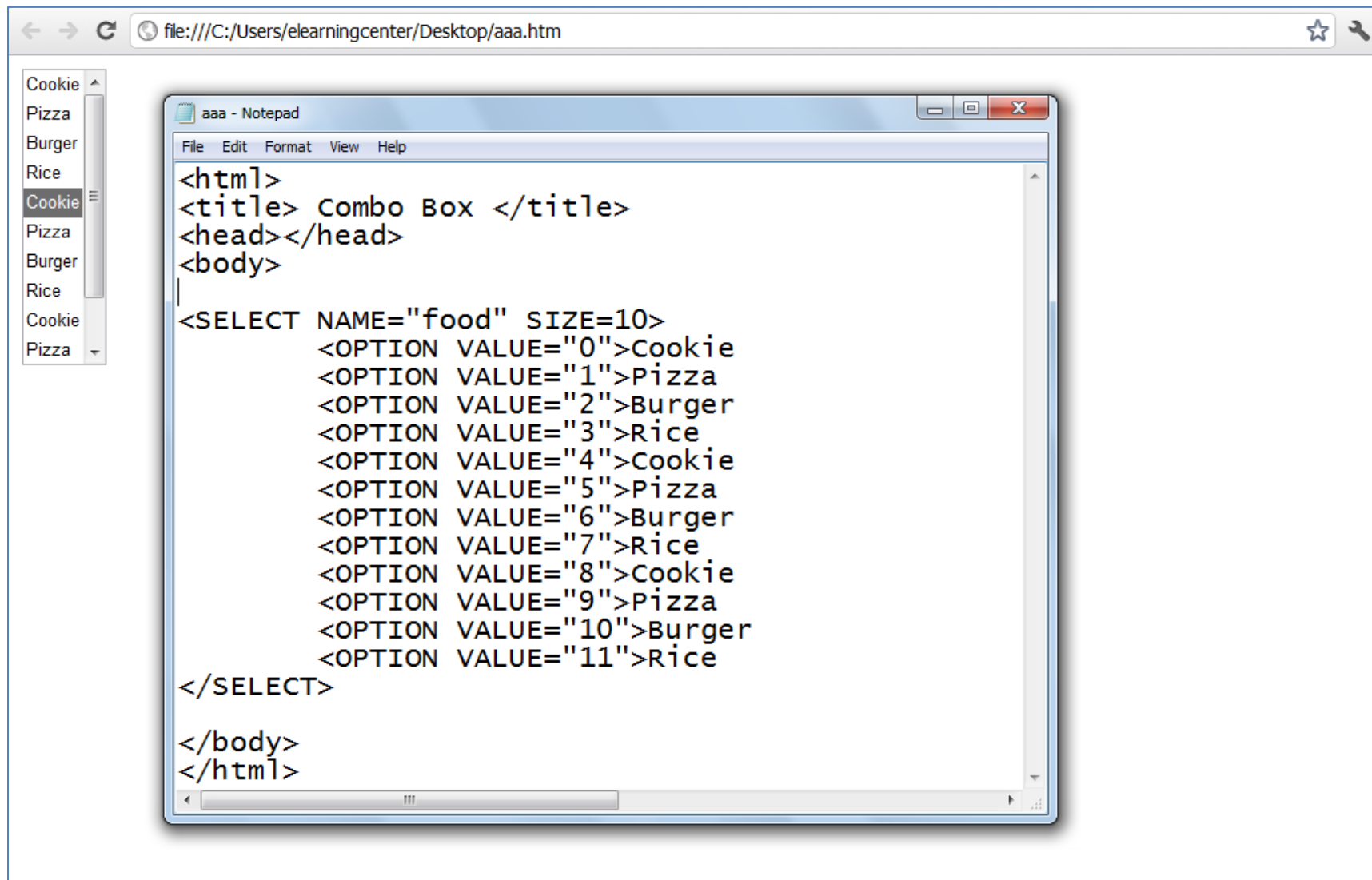
    <p>Number(1): <input type="text" name="num1" size="20"></p>
    <p>Number(2): <input type="text" name="num2" size="20"></p>

                <input type="button" value=" Add " onClick="add()">
                <input type="button" value="Multiply" onClick="">

    <p>Result: <input type="text" name="output" size="20" readonly></p>

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

Combo Box

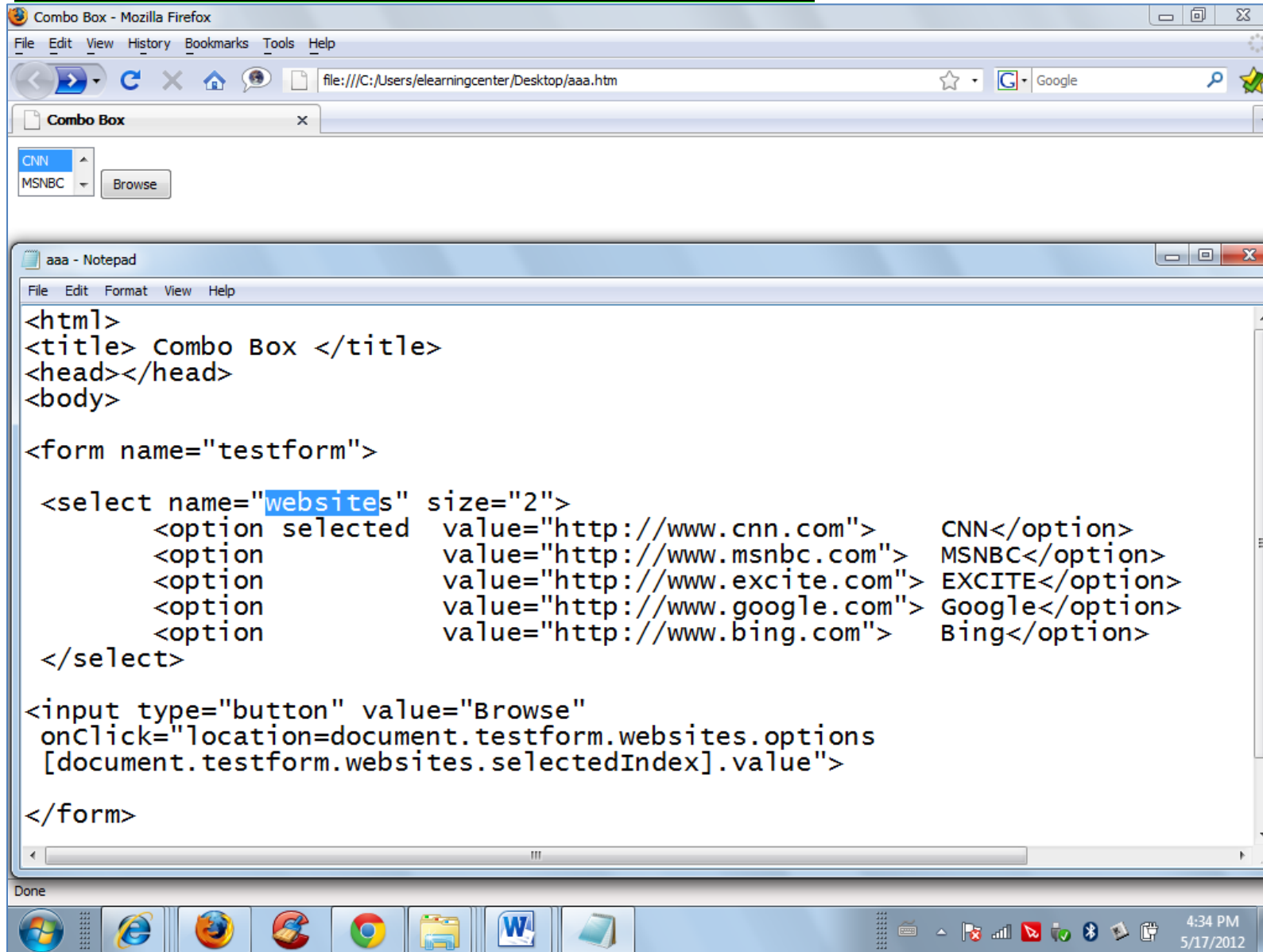


The image shows a web browser window displaying a dropdown menu with the following items: Cookie, Pizza, Burger, Rice, Cookie, Pizza, Burger, Rice, Cookie, Pizza. The dropdown menu is currently open, showing the selected item 'Cookie'.

The Notepad window displays the following HTML code:

```
<html>
<title> Combo Box </title>
<head></head>
<body>
  <SELECT NAME="food" SIZE=10>
    <OPTION VALUE="0">Cookie
    <OPTION VALUE="1">Pizza
    <OPTION VALUE="2">Burger
    <OPTION VALUE="3">Rice
    <OPTION VALUE="4">Cookie
    <OPTION VALUE="5">Pizza
    <OPTION VALUE="6">Burger
    <OPTION VALUE="7">Rice
    <OPTION VALUE="8">Cookie
    <OPTION VALUE="9">Pizza
    <OPTION VALUE="10">Burger
    <OPTION VALUE="11">Rice
  </SELECT>
</body>
</html>
```


Combo Box link with other online Site



The screenshot shows a Mozilla Firefox browser window displaying a file named 'aaa.htm' located at 'file:///C:/Users/elearningcenter/Desktop/aaa.htm'. The browser's address bar shows the file path, and the page content displays a dropdown menu with 'CNN' selected and 'MSNBC' as an option, along with a 'Browse' button.

Below the browser window, a Notepad window titled 'aaa - Notepad' displays the following HTML code:

```
<html>
<title> Combo Box </title>
<head></head>
<body>

<form name="testform">

  <select name="websites" size="2">
    <option selected value="http://www.cnn.com"> CNN</option>
    <option value="http://www.msnbc.com"> MSNBC</option>
    <option value="http://www.excite.com"> EXCITE</option>
    <option value="http://www.google.com"> Google</option>
    <option value="http://www.bing.com"> Bing</option>
  </select>

  <input type="button" value="Browse"
  onClick="location=document.testform.websites.options
  [document.testform.websites.selectedIndex].value">

</form>
```

The Windows taskbar at the bottom shows the system tray with the time 4:34 PM and date 5/17/2012, and several application icons including Internet Explorer, Firefox, Chrome, and Word.

USING iframe

