Lecture 13

Introduction to JavaScript

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Outline

- **What is JavaScript?**
- **Embedding JavaScript with HTML**
- **JavaScript conventions**
- **Variables in JavaScript**
- **JavaScript operators**
- **Input output in JavaScript**
- **JavaScript functions**
- **Conditional Statements**
- **Looping Statements**

1. JavaScript

- **JavaScript is a client-side scripting language**
- **JavaScript was designed to add interactivity to HTML pages**
- **JavaScript is used in millions of Web pages to improve the design, validate forms, detect browsers, create cookies, and much more**

1. JavaScript….

- **JavaScript is an interpreted language (means that scripts execute without preliminary compilation)**

- **JavaScript is usually embedded directly into HTML pages**

- **Everyone can use JavaScript without purchasing a license**

1. JavaScript....

- **JavaScript is the most popular scripting language on the internet, and works in all major browsers, such as Internet Explorer, Mozilla, Firefox, Netscape, Opera**

1.1 JavaScript: Common uses

- **JavaScript gives HTML designers a programming tool**

- **JavaScript can react to events**

- **JavaScript can read and write HTML elements**

- **JavaScript can be used to validate data**

- **JavaScript can be used to detect the visitor's browser**

- **JavaScript can be used to create cookies**

2. Embedding JavaScript in HTML

- **There are two methods to embed JavaScript in to HTML code**
  - **Internal Script: directly written in HTML code**
  - **External Script: written in separate file**
- **<script> tag is used to tell the browser that a script follows**

2.1 Internal Scripts

- **The <SCRIPT> tag is used to embed JavaScript code in HTML documents**

  <SCRIPT LANGUAGE="JavaScript">

  [*JavaScript Statements...*]

  </SCRIPT>

- **JavaScript can be placed anywhere between <HTML> and </HTML> tags**

- **two possibilities are the <HEAD>...</HEAD> portion and the <BODY>...</BODY> portion**

2.1 Internal Scripts...

```
<HTML>
<HEAD><TITLE>Using Multiple scripts</TITLE>
<SCRIPT LANGUAGE="JavaScript">
[JavaScript statements...]
</SCRIPT>
<SCRIPT LANGUAGE="JavaScript">
[JavaScript statements...]
</SCRIPT>
</HEAD>
<BODY>
<H1>This is another script</H1>
<SCRIPT LANGUAGE="JavaScript">
[JavaScript statements...]
</SCRIPT>
</BODY></HTML>
```

2.2 External Script

- **We place script in a separate file and include this in HTML code**

- **SRC attribute of the <SCRIPT> is used to include the external JavaScript file in HTML**

  <script src="myscripts.js"> </script>

- **Are useful when you have lengthy scripts**

- **Improve the readability**

3. JavaScript Conventions

- ## Using the Semicolon

  document.write("Hello"); alert("Good bye")

  document.write("Hello")

  alert("Good bye")

  document.write("Hello");

  alert("Good bye");

- ## Case Sensitivity

- ## Comments:

  - ### single line //

  - ### Multiple lines /* */
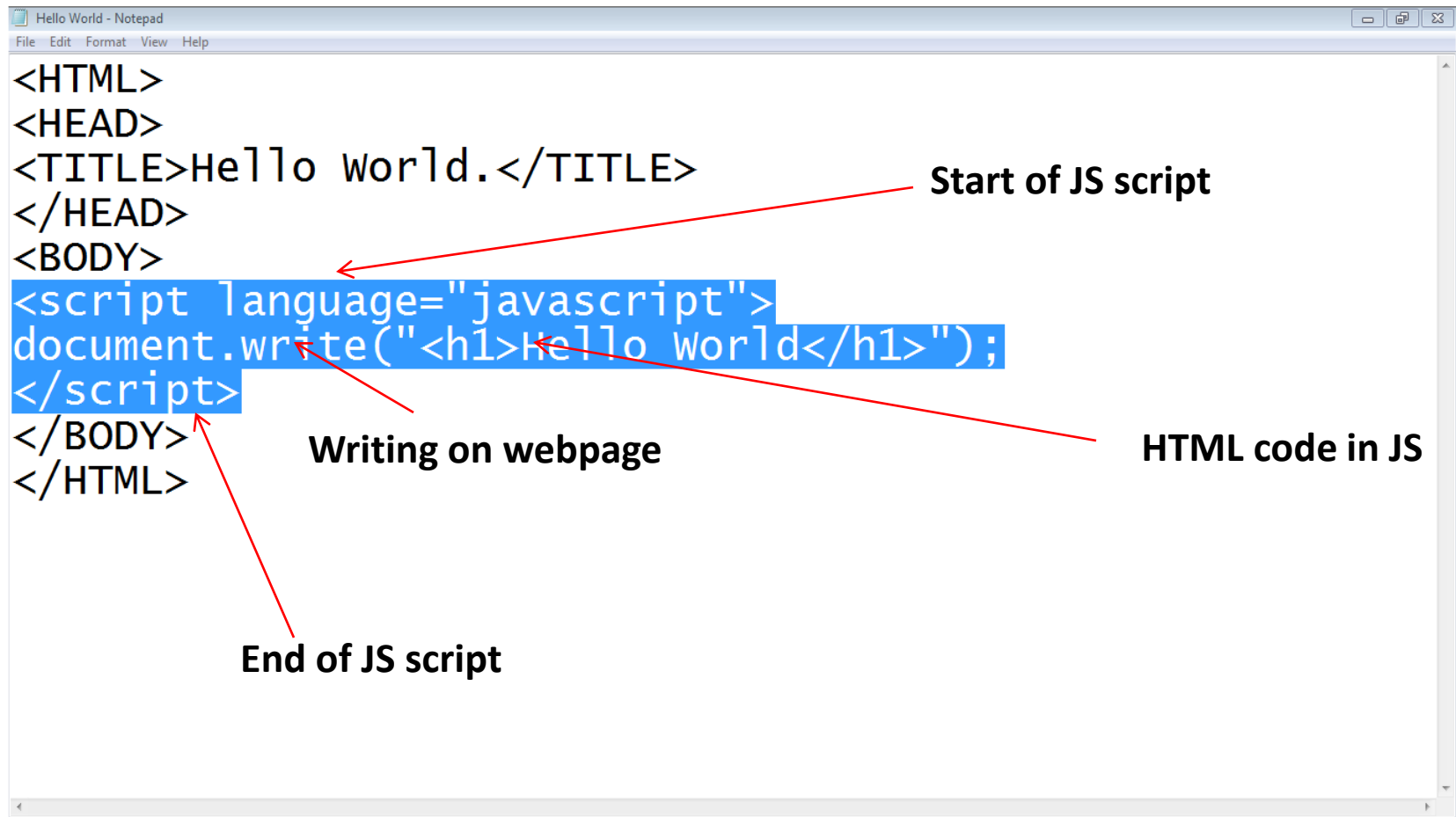
3. JavaScript Conventions…

- ## Using Quotes

  - **document.write("Hello World")**

  - **document.write("Hello World")**

4. Writing JavaScript

```
Hello World - Notepad
File  Edit  Format  View  Help
<HTML>
<HEAD>
<TITLE>Hello World.</TITLE>
</HEAD>
<BODY>
<script language="javascript">
document.write("<h1>Hello World</h1>");
</script>
</BODY>
</HTML>
```

Start of JS script

HTML code in JS

Writing on webpage

End of JS script

4. Writing JavaScript…

Out put of the JS code

4.1 Variables in JavaScript

- **Variable is the name of a memory location which holds the data of a certain type (data types)**

- **There are four common data types in JavaScript**

    numbers, strings, Boolean, null values

- **JavaScript is a loosely typed language**

4.1 Variables in JavaScript...

- **The word "var" is used to declare a variable**
  - var LastName = "Smith"
  - var AccountNumber = 1111
- **Variable Naming**
  - First character can not be a **digit**
  - Other characters may be **digits**, **letters** or **underscore**
  - **Reserved** words can not be used
  - **Case sensitive**

4.1 Variables in JavaScript...

- **Variable Initialization**

  - **var** *variableName* **=** *initialValue*

  - **var variableName1 = initialValue1, variableName2 = initialValue2, …**

5. JavaScript Operators

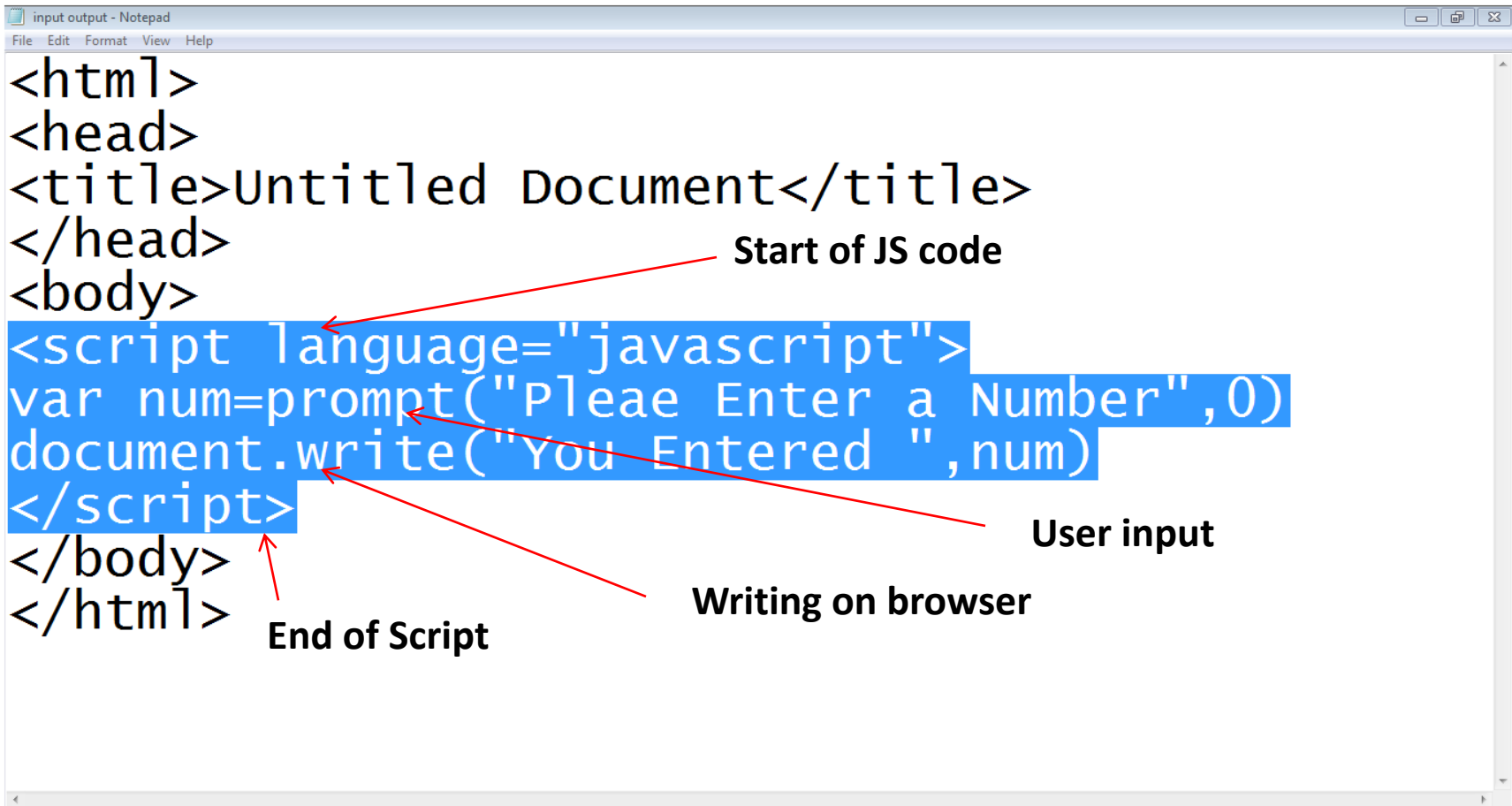- **An operator is simply a symbol that tells the compiler (or interpreter) to perform a certain action**

- **Assignment Operator:** **=**

- **Arithmetic Operators:** **+, - , *, /, %, ++, --**

- **Logical Operators:** **&&, ||, !**

- **Comparison Operators:** **==, ===, !=, !==, <, >, <=, >=**

6. Input Out put in JavaScript

- **write(); is used to write on browser**
  - **document.write("hello world")**
  - **document.write(a)**
- **prompt(); is used to take input from users**
  - **var num = prompt("Please Enter a Number", 0)**

6. Input Out put in JavaScript...

```
input output - Notepad
File  Edit  Format  View  Help
<html>
<head>
<title>Untitled Document</title>
</head>
<body>
<script language="javascript">
var num=prompt("Pleae Enter a Number",0)
document.write("You Entered ",num)
</script>
</body>
</html>
```

Start of JS code

User input

Writing on browser

End of Script

7. JavaScript Function

- **User defined functions**

- **Predefined functions**

7. JavaScript Function…

- **Functions are defined using the keyword function, followed by the name of the function and list of parameters**

  function *functionName*([*parameters*])

  {

  [*statements*]

  }

7. JavaScript Function…

- **Calling a function**
  - **The syntax of a function call is:**

    functionName(**[***arguments***]**)

7. JavaScript Function...

```html
<head>
<title>Untitled Document</title>
<script language="javascript">
function getName()          ← Start of the function
{
var name=prompt("Pleae enter your name",'name')   Asks user to
document.write("Welcome Mr. ",name)                enter name
}
</script>
</head>                                            Writes name on
<body onload="getName()">                          the webpage
</body>
</html>
          Calling a function
```

7. JavaScript Function...

- **Common events**
- **onClick**
- **onDblClick**
- **onChange**
- **onFocus**
- **onMouseOver**
- **onMouseOut**
- **onSubmit**
- **onload**

7. JavaScript Function…

- **Some common predefined math functions**
  - **Math.sqrt**
  - **Math.pow**
  - **Math.abs**
  - **Math.max**
  - **Math.min**
  - **Math.floor**
  - **Math.ceil**
  - **Math.round**
  - **Math.random**

8. Conditional Statements

- **If statement**
  - **if (condition)**

    statement
  - **if(condition)**

    { statements }
- **If-else statement**
  - **if(condition)**
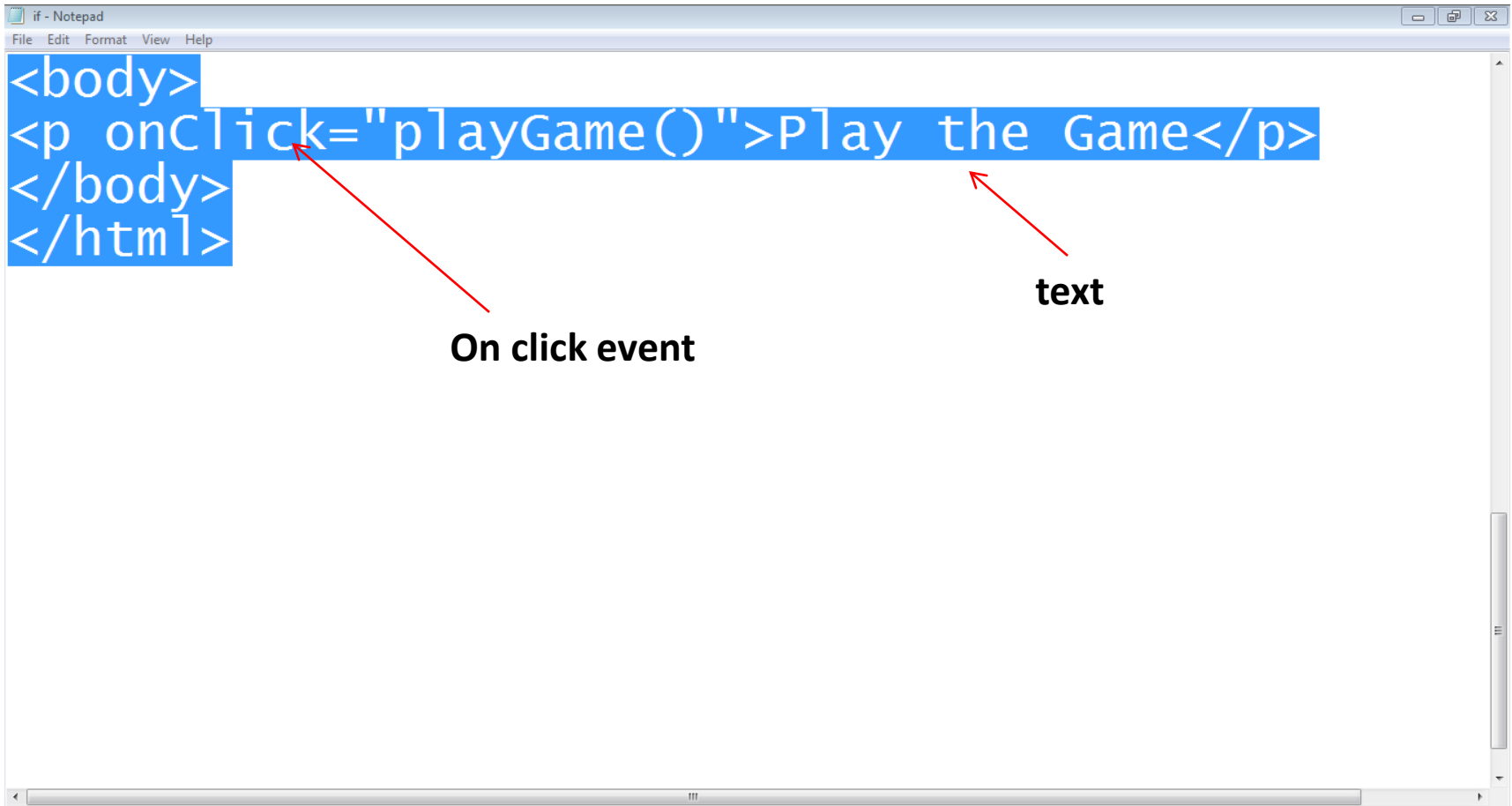
    {statement}

    else

    {statements}

8. Conditional Statements...


```
<title>Using If condition</title>
<script language="javascript">
function playGame()
{
var res=parseInt(Math.random(   )*10   )
var num=prompt("Pleae a number",0)
if(num==res)
document.write("You Won")
else
document.write("Your loss, correct Answer is"
,res)
}
</script>
```

Random number is generated

User's Input

If condition

8. Conditional Statements...

```
if - Notepad
File  Edit  Format  View  Help
<body>
<p onClick="playGame()">Play the Game</p>
</body>
</html>
```

On click event

text

9. Loops

- **For loop**

    for(var i=1; i<10; i++)

    {

    Document.write("hello world")

    }

- **While loop**

    While(condition)

    {

    }

9. Loops

```
loop - Notepad
File  Edit  Format  View  Help
<body>
<SCRIPT LANGUAGE="JavaScript">
for (var i = 0; i < 10; ++i)
{
document.write("Hello Dear<br>")
}
var j=0
do
{
document.write("Pakistan")
j++
}
while(j<10)
</SCRIPT>
</body>
</html>
```
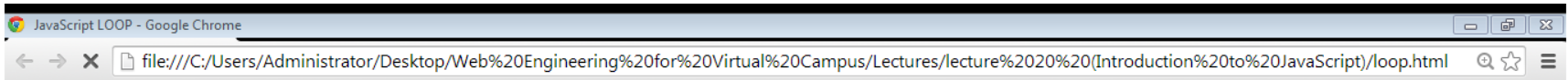
For loop

Do-while loop

9. Loops

Output of for loop

Output of do-while loop

Summary

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References

- **Chapter 11.** Beginning HTML, XHTML,CSS, and JavaScript, by Jon Duckett, Wiley Publishing; 2009, ISBN: 978-0-470-54070-1.

- **Chapter 2,** Learn JavaScript, by Chuck Easttom, Wordware Publishing; 2002, ISBN 1-55622-856-2