

Lecture 14

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 /* */

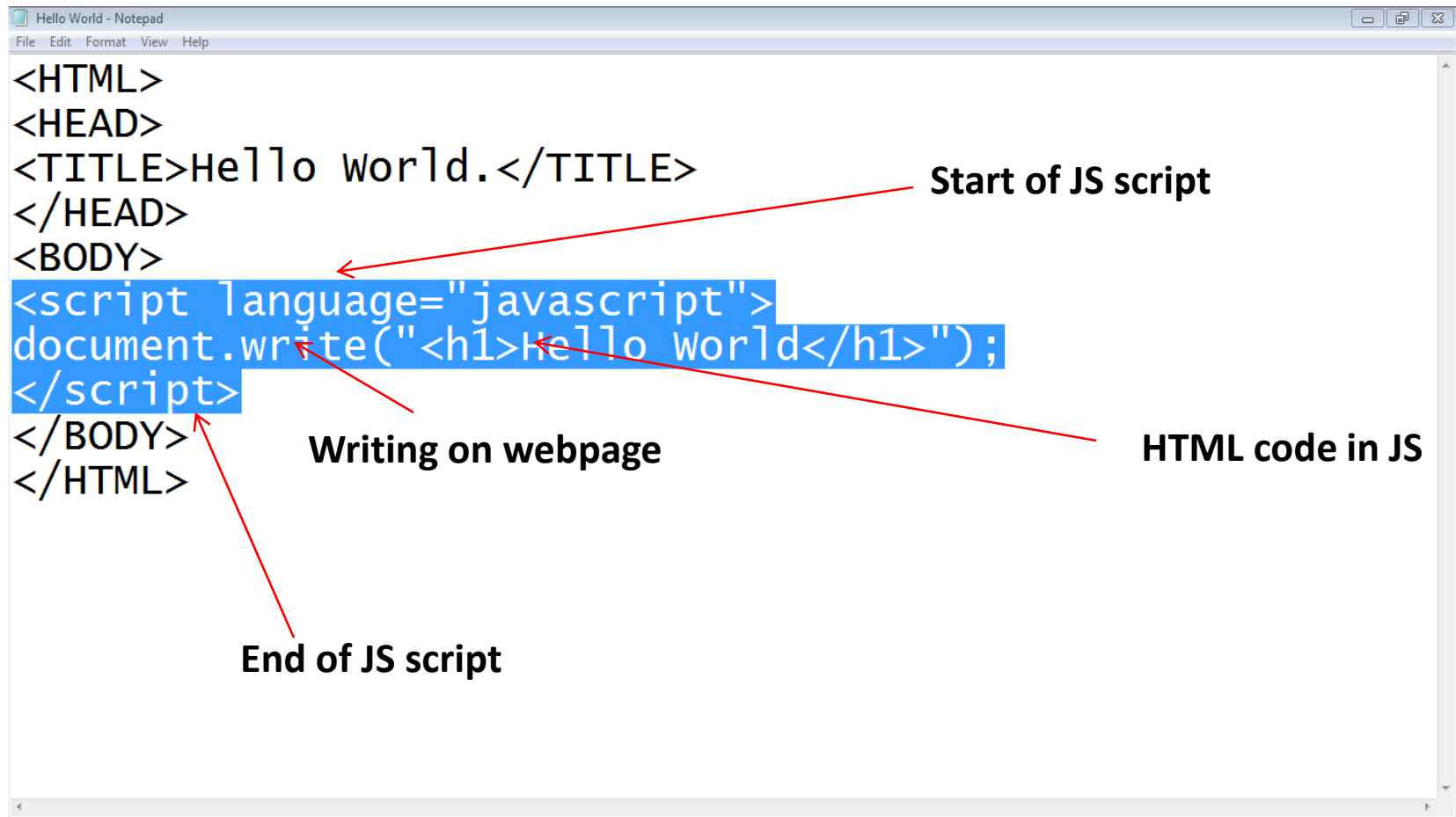
3. JavaScript Conventions...

- **Using Quotes**

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

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

4. Writing JavaScript



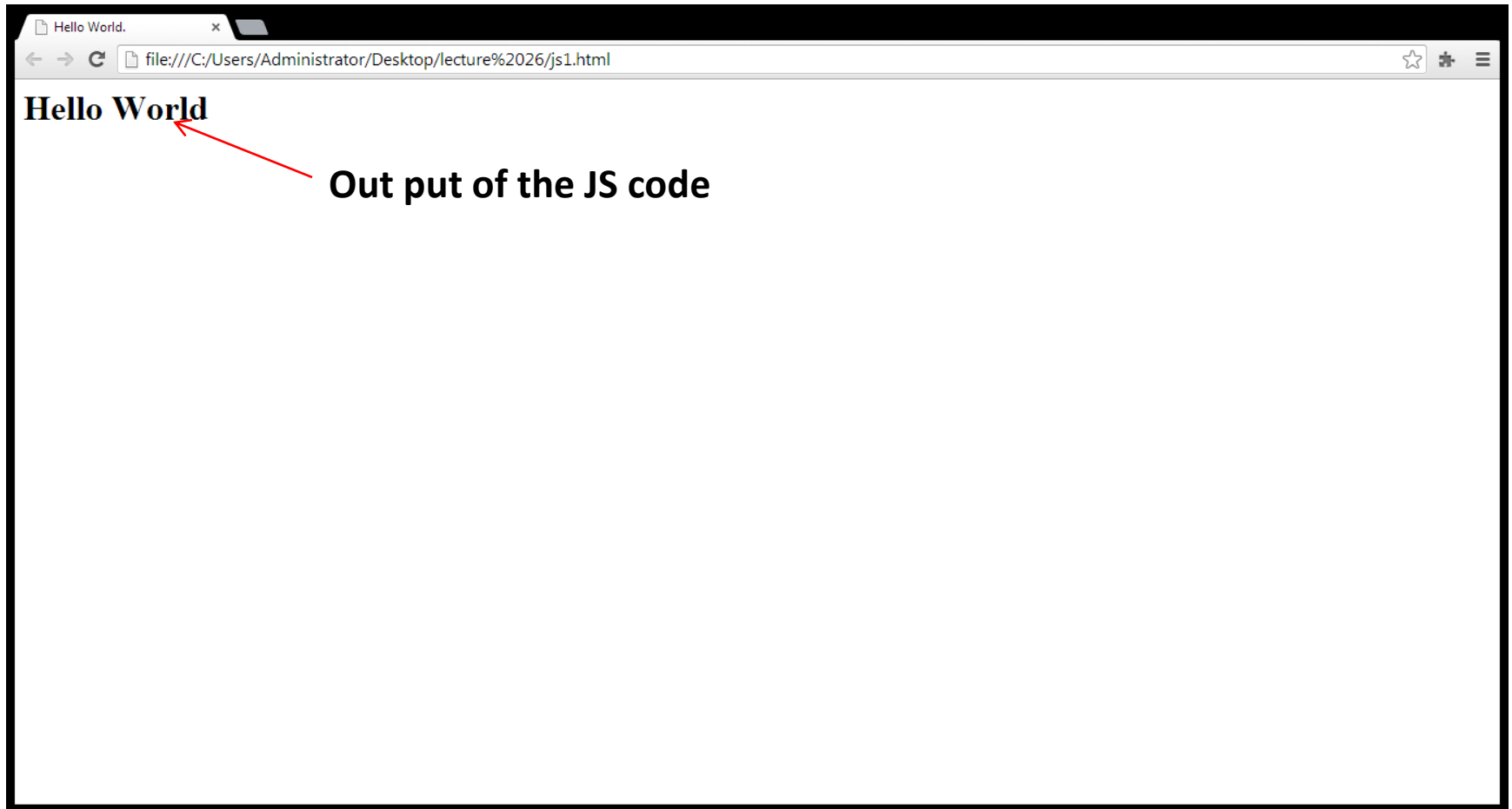
The image shows a Notepad window titled "Hello World - Notepad" with the following HTML code:

```
<HTML>
<HEAD>
<TITLE>Hello world.</TITLE>
</HEAD>
<BODY>
<script language="javascript">
document.write("<h1>Hello world</h1>");
</script>
</BODY>
</HTML>
```

Annotations with red arrows point to specific parts of the code:

- Start of JS script**: Points to the opening tag `<script language="javascript">`.
- Writing on webpage**: Points to the `document.write()` function call.
- HTML code in JS**: Points to the string `"<h1>Hello world</h1>";` inside the `document.write()` function.
- End of JS script**: Points to the closing tag `</script>`.

4. Writing JavaScript...



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*, ...

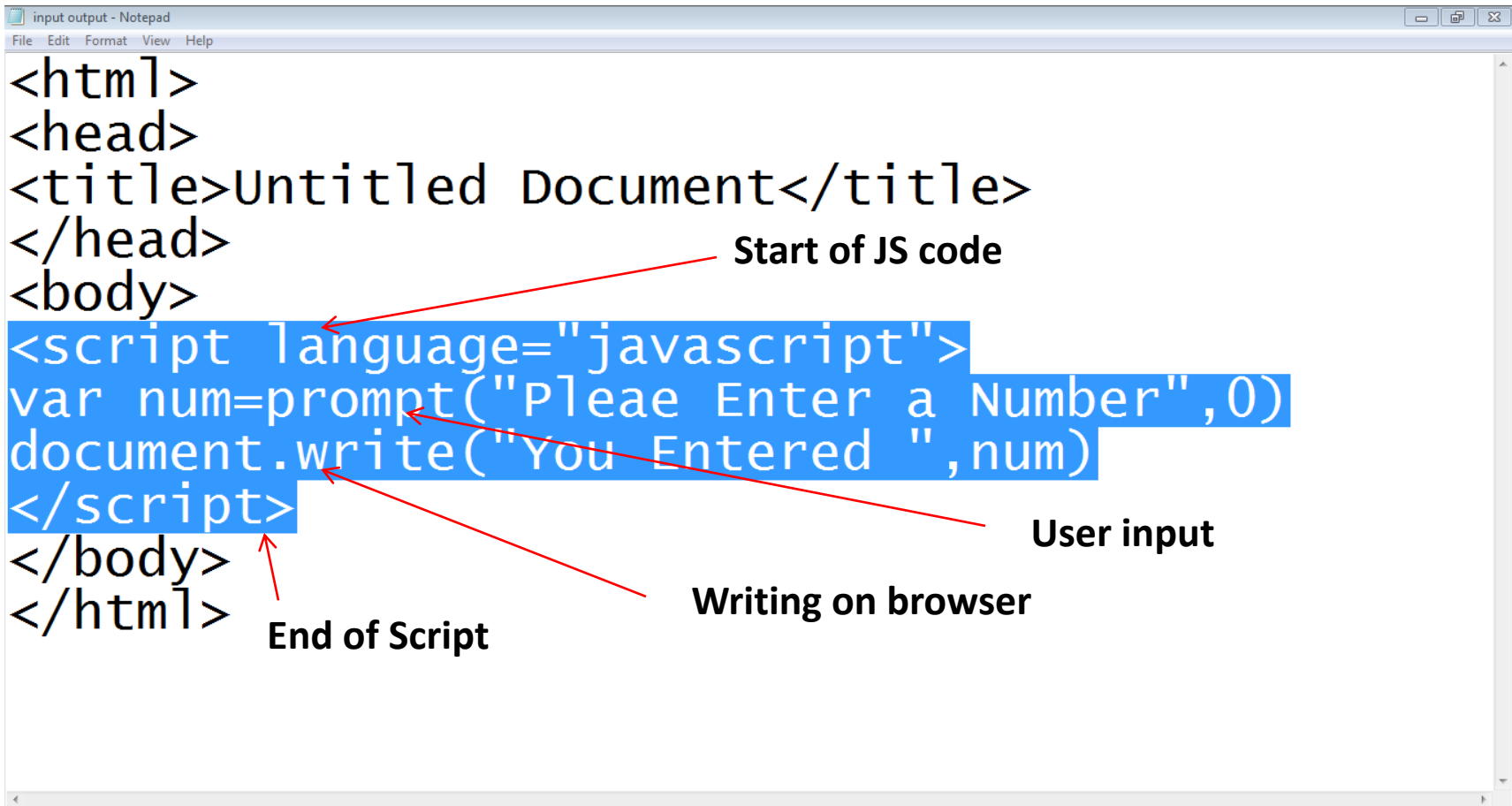
5. JavaScript Operators

- 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 Output 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...



The image shows a Notepad window titled "input output - Notepad" with a menu bar (File, Edit, Format, View, Help). The code inside is as follows:

```
<html>
<head>
<title>Untitled Document</title>
</head>
<body>
<script language="javascript">
var num=prompt("Pleaee Enter a Number",0)
document.write("You Entered ",num)
</script>
</body>
</html>
```

Annotations with red arrows point to specific parts of the code:

- Start of JS code**: Points to the opening tag of the script element: `<script language="javascript">`.
- User input**: Points to the prompt function call: `var num=prompt("Pleaee Enter a Number",0)`.
- Writing on browser**: Points to the `document.write` statement: `document.write("You Entered ",num)`.
- End of Script**: Points to the closing tag of the script element: `</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...

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


7. JavaScript Function...

- **Common events**
- **onClick**
- **onDbIcIck**
- **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...

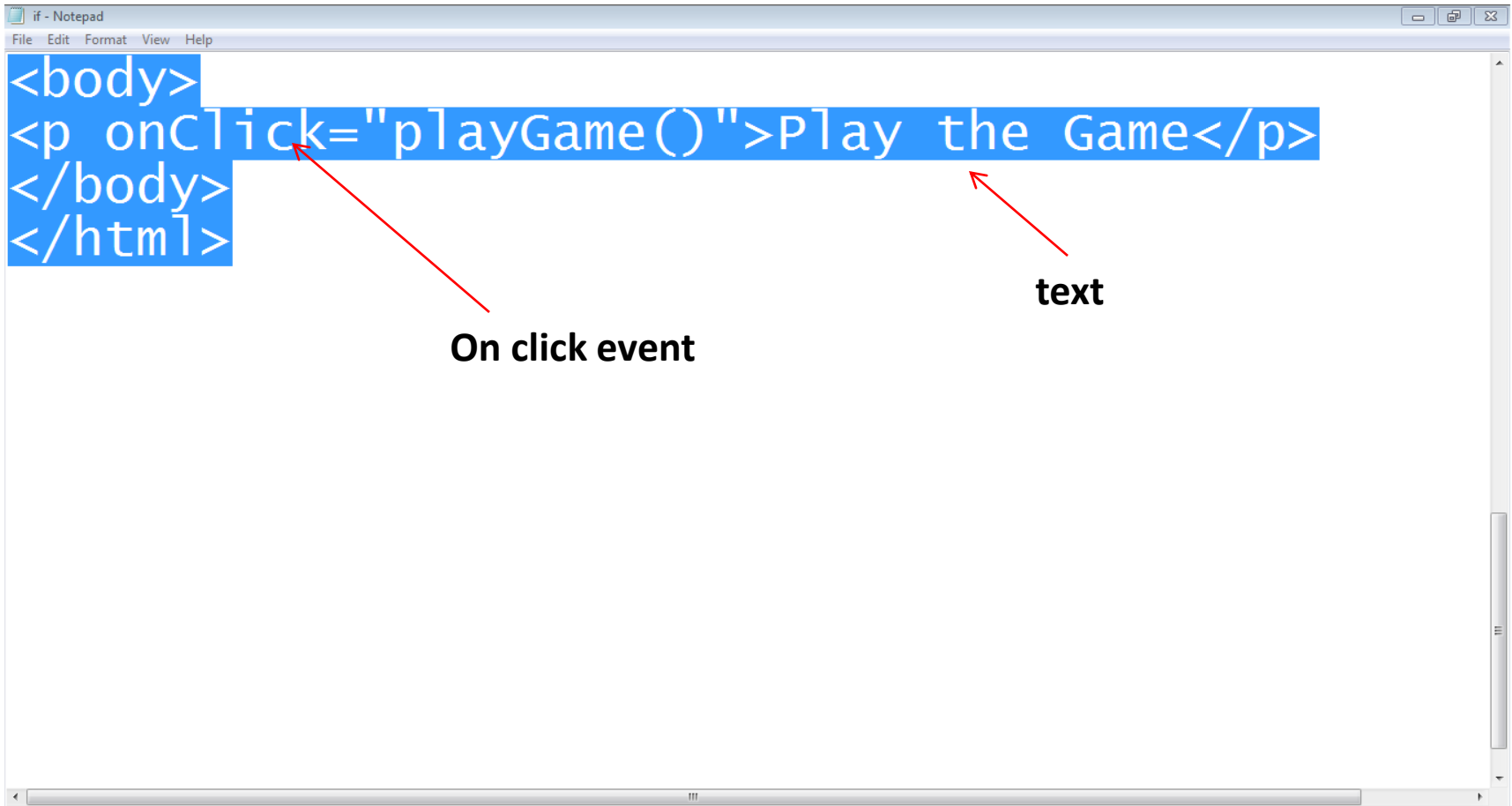
```
if - Notepad
File Edit Format View Help
<title>Using If condition</title>
<script language="javascript">
function playGame()
{
var res=parseInt(Math.random()*10)
var num=prompt("Pleae a number",0)
if(num==res)
document.write("You Won")
else
document.write("Your loss, correct Answer is"
,res)
}
</script>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

Random number is generated

User's Input

If condition

8. Conditional Statements...



The image shows a Notepad window titled 'if - Notepad' with a menu bar (File, Edit, Format, View, Help). The text content is as follows:

```
<body>  
<p onClick="playGame()">Play the Game</p>  
</body>  
</html>
```

Annotations:

- A red arrow points from the text **On click event** to the `onClick="playGame()"` attribute in the HTML code.
- A red arrow points from the text **text** to the text `Play the Game` inside the `<p>` tag.

9. Loops

- **For loop**

```
for(var i=1; i<10; i++)  
{  
  Document.write("hello world")  
}
```

- **While loop**

```
While(condition)  
{  
}
```

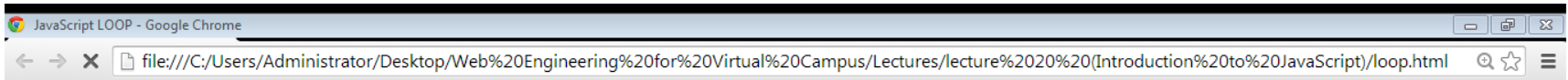
9. Loops

```
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



Hello Dear!
Hello Dear!
Hello Dear!
Hello Dear!
Hello Dear!
Hello Dear!
Hello Dear!
Hello Dear!
Hello Dear!
Hello Dear!

Output of for loop

PakistanPakistanPakistanPakistanPakistanPakistanPakistanPakistanPakistanPakistan

Output of do-while loop

Summary

- **What is JavaScript?**
- **Embedding JavaScript with HTML**
- **JavaScript conventions**
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- **Conditional Statements**
- **Looping Statements**

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