JavaScript and AJAX
2nd Edition

Tutorial 1

Programming with JavaScript

Objectives

- Learn the history of JavaScript
- Create a script element
- Understand basic JavaScript syntax
- Write text to a Web page with JavaScript
- Learn about JavaScript data types

Objectives

- Declare and work with variables
- Create and call a JavaScript function
- Access an external JavaScript file
- Add comments to JavaScript code
- Learn about basic debugging techniques and tools
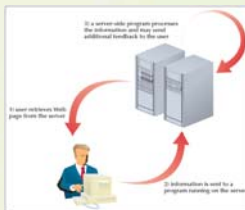

Introducing JavaScript

- Server-side programs are placed on the server that hosts a Web site
  - Can be problematic
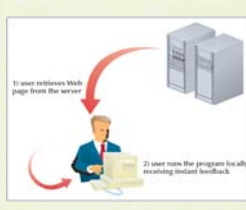- Client-side programming runs programs on each user's computer

---

Introducing JavaScript

Server-Side Programming   **Client-Side Programming**

The Development of JavaScript

- JavaScript is a subset of Java
- Differences between Java and JavaScript:
  - Java is a compiled language
  - JavaScript is an interpreted language

Comparing Java and JavaScript

Java	JavaScript
A compiled language	An interpreted language
Requires the JDK (Java Development Kit) to create the applet	Requires a text editor
Requires a Java virtual machine or interpreter to run the applet	Requires a browser that can interpret JavaScript code
Applet files are distinct from the HTML and XHTML code	JavaScript programs are integrated with HTML and XHTML code
Source code is hidden from the user	Source code is accessible to the user
Powerful, requiring programming knowledge and experience	Simpler, requiring less programming knowledge and experience
Secure; programs cannot write content to the hard disk	Secure; programs cannot write content to the hard disk; however, there are more security holes than in Java
Programs run on the client side	Programs run on the client side

---

The Development of JavaScript

- Jscript is a version of JavaScript supported by Internet Explorer
- The European Computer Manufacturers Association (ECMA) develops scripting standards
  - The standard is called ECMAScript but browsers still generally call is JavaScript

---

Working with the Script Element

- A JavaScript program can either be placed directly in a Web page file or saved in an external text file
- Insert a client-side script in a Web page when using the script element

```
<script type="mime-type">
    script commands
</script>
```

Inserting JavaScript into a Web Page File

- Each statement—also known as a command—is a single line that indicates an action for the browser to take
- The semicolon notifies the browser that it has reached the end of the statement

---

Writing Output to the Web Page

- An object is any item—from the browser window itself to a document displayed in the browser to an element displayed within the document
- A method is a process by which JavaScript manipulates or acts upon the properties of an object

---

Writing Output to the Web Page

- To write text to a Web page, use the following JavaScript commands:

```
document.write("text");
or
document.writeln("text")'
```

where *text* is the content to be written to the page. The doucment.write() and document.writeln() methods are identical, except that the document.writeln() method preserves any line breaks in the text string

Understanding JavaScript Syntax

- JavaScript is case sensitive
- Ignores most occurrences of extra white space
- Do not break a statement into several lines
- The + symbol used in this command combines several text strings into a single text string

Working with Variables

- A variable is a named item in a program that stores information
- Most JavaScript programs use variables to represent values and text strings

Declaring a JavaScript Variable

- You can declare variables with any of the following JavaScript commands:

```
var variable;
var variable = value;
variable = value;
```

where *variable* is the name of the variable and *value* is the initial value of the variable. The first command creates the variable without assigning it a value; the second and third commands both create the variable and assign it a value

Working with Variables and Data

- JavaScript variable types:
  - Numeric variables
  - String variables
  - Boolean variables
  - Null variables
- You must **declare** a variable before using it

Working with Variables and Data

- Numeric variable- any number, such as 13, 22.5, etc.
  - Can also be expressed in scientific notation
- String variable- any group of text characters, such as "Hello" or "Happy Holidays!"
  - Must be enclosed within either double or single quotations (but not both)
- Boolean variable- accepts only true and false values
- Null variable- has no value at all

Working with Variables and Data

- JavaScript is a weakly typed language
- The + symbol can be used with either numeric values or text strings

```
var total = 5 + 4;

var emLink = "cadler" + "@" + "mpl.gov";
```

Creating a JavaScript Function

- A function is a collection of commands that performs an action or returns a value
- A function name identifies a function
- Parameters are values used by the function
- The function is executed only when called by another JavaScript command

function_name(parameter values)

Creating a JavaScript Function

```
<title>Monroe Public Library</title>
<link href="mplstyles.css" rel="stylesheet" type="text/css" />

<script type="text/javascript">
    function showEM(userName, emServer) {
        var emlink = userName + "@" + emServer;
        document.write("<a href='mailto:" + emlink + "'>");
        document.write(emlink);
        document.write("</a>");
    }
</script>
</head>
```

Creating a Function to Return a Value

- For a function to return a value, it must include a return statement

```
function function_name(parameters){
    JavaScript commands
    return value;
}
```

Accessing an External JavaScript File

- The code to access an external script file is:

```
<script src="url" type="mime-type"></script>
```

- Place all script elements that reference external files in the document head

---

Accessing an External JavaScript File
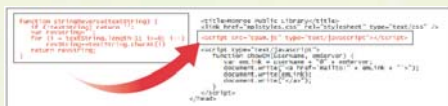
Commenting JavaScript Code

- Commenting your code is an important programming practice

// comment text

```
<script type="text/javascript">
    function showEM(userName, emServer) {
        /*
           The showEM() function displays a link to the user's e-mail address.
           The text of the user and e-mail server names are entered in
           reverse order to thwart e-mail harvesters.
        */

        userName = stringReverse(userName); // reverse the text of the username parameter
        emServer = stringReverse(emServer); // reverse the text of the emserver parameter

        var emlink = userName + "@" + emServer; // combine the text of username and emserver
        document.write("<a href='mailto:" + emlink + "'>");
        document.write(emlink);
        document.write("</a>");
    }
</script>
```

Using Comments to Hide JavaScript Code
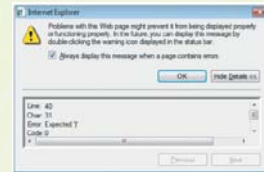
```
<script type="text/javascript">
   <!--Hide from nonJavaScript browsers
          JavaScript commands
   // Stop hiding from older browsers -->
   </script>
```

Debugging Your JavaScript Programs

- Debugging is the process of searching code to locate a source of trouble
- There are three types of errors:
  – Load-time errors
  – Run-time errors
  – Logical errors

Debugging Your JavaScript Programs

- Modular code entails breaking up a program's different tasks into smaller, more manageable chunks
- An alert dialog box is a dialog box generated by JavaScript that displays a text message with an OK button
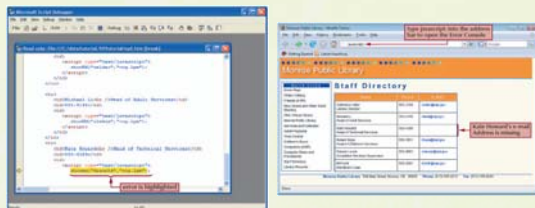
```
alert(text);
```

Debugging Your JavaScript Programs

- Microsoft offers the Microsoft Script Debugger
- Firefox also provides the Firefox Error Console

Debugging Your JavaScript Programs