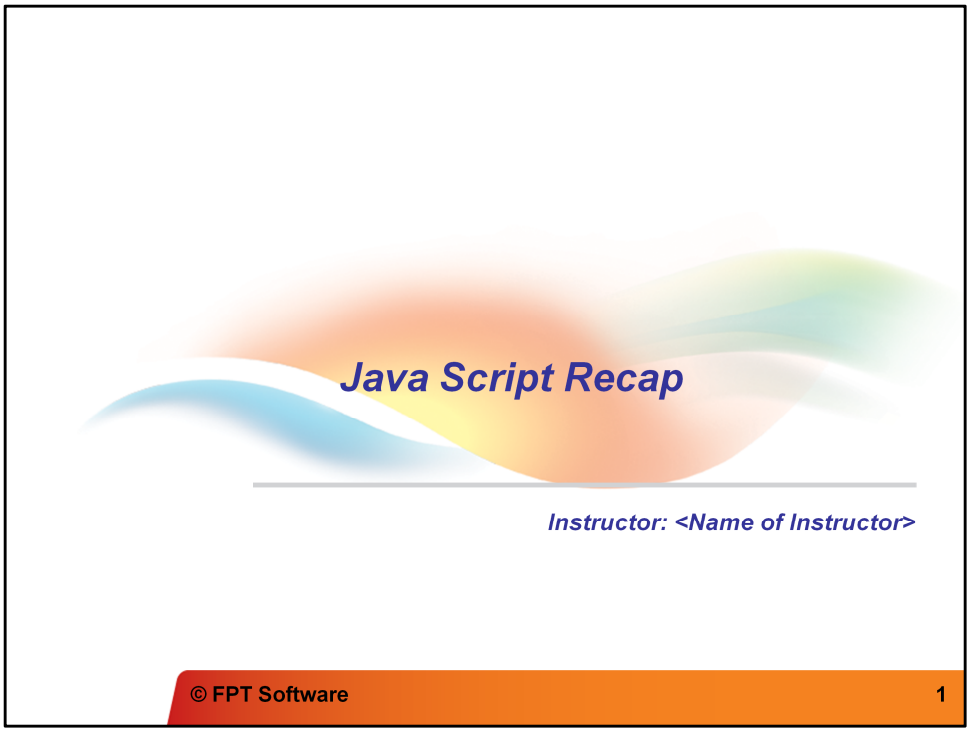


Latest updated by: HanhTT1

Agenda

- Overview of JavaScript
- How does JavaScript work?
- Basic JavaScript syntax
- Examples of JavaScript

What is JavaScript?

- A lightweight programming language that runs in a Web browser
- (client-side).
- Embedded in HTML files and can manipulate the HTML itself.
- Interpreted, not compiled.
- JavaScript is not Java.
- Developed by Netscape, not Sun.
  - Only executed in a browser.
  - Is not a full-featured programming language.
  - However, the syntax is similar.

Why use JavaScript?

- To add dynamic function to your HTML.
- – JavaScript does things that HTML can't—like logic.
- – You can change HTML on the fly.
- • To shoulder some of the form-processing burden.
- – JavaScript runs in the browser, not on the Web server.
- Better performance
- – JavaScript can validate the data that users enter into the form, before it is sent to your Web application.

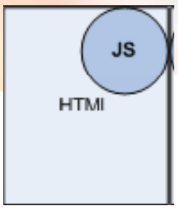
When not to use JavaScript?

- When you need to access other resources.
  - Files
  - Programs
  - Databases
- When you are using sensitive or copyrighted data or algorithms.
  - Your JavaScript code is open to the public.

Add JavaScript to HTML

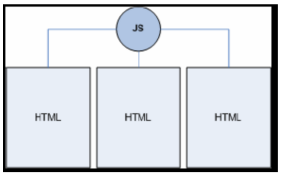
• In the HTML page itself:

```
<html>
<head>
<script language="JavaScript">
// JavaScript code
</script>
</head>
```



• As a file, linked from the HTML page:

```
<head>
<script language="JavaScript" src="script.js">
</script>
</head>
```



Functions

- JavaScript instructions are usually grouped together in a *function*:

```
<script language="javascript">
function myFunction(parameters) {
  // some logical grouping of code
}
</script>
```

- Like a method, procedure, or subroutine.
- Functions are called by *events*.

Events

- JavaScript is event-driven: something has to happen before the JavaScript is executed.
- JavaScript defines various events:
  - onClick – link or image is clicked
  - onSubmit – a form is submitted
  - onMouseOver – the mouse cursor moves over it
  - onChange – a form control is changed
  - onLoad – something gets loaded in the browser
  - etc.
- Events are specified in the HTML code.

Event example

```
<html>
<head>
<script language="javascript">
function funct() {
   // code
}
</script>
</head>
<body>
<img src="pic.gif"
     onClick="funct();">
</body>
</html>
```

Variables

- JavaScript has untyped variables.
- Variables are declared with the var keyword:

```
var num = “1”;
var name = “Mel”;
var phone = “123-456-7890”;
```

The DOM

- Unlike other programming languages, JavaScript understands HTML and can directly access it.
- JavaScript uses the HTML Document Object Model to manipulate HTML.
- The DOM is a hierarchy of HTML things.
- Use the DOM to build an “address” to refer to HTML elements in a web page.
- Levels of the DOM are dot-separated in the syntax.

Part of the DOM

Part of the DOM
•window (browser window)
• location (URL)
• document (HTML page)
• anchors <a>
• body <body>
• images <img>
• forms <form>
• elements <input>, <textarea>, <select>
• frames <frame>
• tables <table>
• rows <tr>
• cells <th>, <td>
• title <title>

Referencing the DOM

- Levels of the DOM are dot-separated.
- By keyword and array number (0+)

window.document.images[0]

window.document.forms[1].elements[4]

- By names (the name attribute in HTML)

window.document.mygif

(<img src="file.gif" name="mygif">)

window.document.catform.fname

(<form name="catform" . . .>

<input name="fname" . . .>)

Alerts

- A JavaScript alert is a little window that contains

some message:

alert(“This is an alert!”);

- Are generally used for warnings.
- Can get annoying—use sparingly.

Alerts Sample

```
<html>
<head>
<script language="javascript">
function showAlert(text) {
alert(text);
}
</script>
</head>
<body onload="showAlert('This alert displays when
the page is loaded!');">
. . .
OR <body onload="alert('This alert…');">
```

Write to the browser

• JavaScript can dynamically generate a new HTML page. Use document.writeln("*text*");
– Cannot add to the current page.
• When you're done, use document.close();
– This flushes the buffer, and the generated document is then loaded into the browser.
• If the HTML code you're generating contains quotation marks, you must escape them with a backslash:
document.writeln("<a href=\"file.html\">");

Write to the browser - Sample 1

```
function writeHTML() {
document.writeln("<html><body>");
document.writeln("<h1>This page was " +
"dynamically generated</h1>");
document.writeln("</body></html>");
document.close();
}
. . .
<a href="javascript:writeHTML();">Generate
HTML</a>
```

Write to the browser - Sample 2

```
<script language="javascript">
function dynamicName() {
var who = window.document.myform.name.value;
document.writeln("<html><body>");
document.writeln("<h1>Hello, " + who + "!</h1>");
document.writeln("</body></html>");
document.close();
}
</script>
</head>
<body>
. . .
<form name="myform" onSubmit="dynamicName();">
Enter your name: <input type="text" name="name">
<input type="submit" value="Submit">
</form>
```

Page navigation

- Use the location API to change the HTML file that

is loaded in the window.

- Just set location to another value:

location = "*page.html*";

Page navigation - Sample

```
<script language=“javascript”>
function goPage() {
var pg = document.theForm.aPage.value;
location = "page" + pg + ".html";
}
</script>
. . .
<form name="theForm">
<select name="aPage" onChange="goPage();">
<option selected>Choose a page</option>
<option value="1">Page 1</option>
<option value="2">Page 2</option>
<option value="3">Page 3</option>
<option value="4">Page 4</option></select>
<input type=“reset”>
</form>
. . .
```

Image swap

- The image swap is really a sleight-of-hand trick.
- There are two images, each slightly different than

the other one.

- Use the src API in JavaScript to replace one image

with the other.

Image swap - Sample

```
<script language="javascript">
function swap(file) {
document.globe.src=file;
}
</script>
. . .
<img name="globe" src="globe.jpg"
onMouseOver="swap('globe2.jpg');"
onMouseOut="swap('globe.jpg');">
```

Form validation

• Have JavaScript validate data for the server-side program—more efficient.

– Processing done on the client.

– Data sent to server only once.

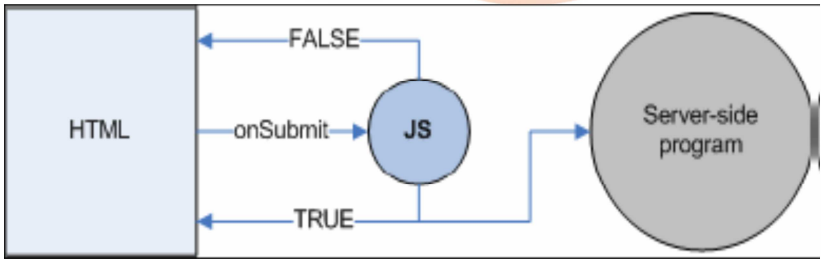
– JavaScript can update the original HTML if errors occur—server-side program would have to regenerate the HTML page.

– Server-side program gets the data in the format it needs.

Form validation

1. Add an onSubmit event for the form.
2. Use the return keyword to get an answer back from JavaScript about whether the data is valid or not.
   – return false: server-side program is not called, and the user must fix the field(s).
   – return true: the valid data is sent to the server-side program.

Form validation



Form validation - Sample

All fields: HTML code

```
. . .
<form method="post" name="fields" action="/cgi-
    bin/pgm"
onsubmit="javascript: return checkAll();">
<p>Field 1: <input type="text" name="f1">
<br>Field 2: <input type="text" name="f2">
<br>Field 3: <input type="text" name="f3">
<br>Field 4: <input type="text" name="f4"></p>
<input type="reset">
<input type="submit" value="Submit">
</form>
. . .
```

Form validation – Sample
All fields: JavaScript code

```
<script language="javascript">
function checkAll() {
for (i = 0; i < document.fields.elements.length; i++)
    {
var f = document.fields.elements[i];
if (f.value == "") {
alert("Please enter a value for Field " + (i + 1));
f.style.borderColor="#FF0000";
f.focus();
return false;
}
}
return true;
}
</script>
```

Form validation - Sample
Phone number: HTML code

```
. . .
<form onsubmit="javascript: return validPhone();”
action=“/cgi-bin/getphone" method="post" name="phone">
<p>Please enter your phone number:
(<input type="text" name="area" size="3" maxlength="3">)
<input type="text" name="pre" size="3" maxlength="3"> -
<input type="text" name="last" size="4" maxlength="4">
</p>
<input type="reset">
<input type="submit" value="Submit”>
</form>
. . .
```

Form validation – Sample
Phone number: JavaScript code

```
function validPhone() {
var phNum = document.phone.area.value +
document.phone.pre.value + document.phone.last.value;
// Check for numbers only
for (i = 0; i < phNum.length; i++) {
if (phNum.charAt(i) < "0" || phNum.charAt(i) > "9") {
alert(“Please enter only numbers.”);
return false;
}
}
// Check for 10 digits
if (phNum.length < 10) {
alert("Please enter your 10-digit phone number.");
return false;
}
return true;
}
```

Cookies

• JavaScript provides some limited, persistent storage, called *cookies*:
– Data is stored in a text file on the client
– *name=value*
–Multiple values are delimited by a semicolon
• Use sparingly. There are limits (generally):
– Up to 300 cookies per browser, 20 cookies per web server, and 4 KB of data per cookie
• Don't depend on cookies—users can block or delete them.

Cookies

- By default, cookies are destroyed when the browser window is closed, unless you explicitly set the expires attribute.
  - To persist a cookie, set the expires attribute to a future date.
  - To delete a cookie, set the expires attribute to a past date.
- By default, cookies can only be read by the web page that wrote them unless you specify one or more of these attributes:
  - path – allows more than one page on your site to read a cookie.
  - domain – allows multiple servers to read a cookie.

Cookies - Sample

```
<body onload=“readCookie();”>
<form name="cookieForm" onsubmit=“javascript: return
setCookie();" action=“/cgi-bin/login" method="post">
User ID: <input type="text" name="username"><br>
Password: <input type="password" name="pwd"><br>
<input type="checkbox" name="persist"> Remember user ID
<br>
<input type="submit" value="Submit">
</form>
```

Cookies - Sample (set the cookie)

```
function setCookie() {
if (window.document.cookieForm.persist.checked)
    {
// Get the date and set it to next year
var expDate = new Date();
expDate.setFullYear(expDate.getFullYear() + 1);
var who =
    window.document.cookieForm.username.value;
document.cookie = "username=" + who + ";" +
"expires=" + expDate.toGMTString();
} else {
deleteCookie();
}
return true;
}
```

Cookies - Sample (read the cookie)

```
function readCookie() {
if (document.cookie) {
var theCookie = document.cookie;
var pos = theCookie.indexOf("username=");
if (pos != -1) {
var cookie_array = theCookie.split("=");
var value = cookie_array[1];
// Load the stored username into the form
window.document.cookieForm.username.value=va
    lue;
window.document.cookieForm.persist.checked=tru
    e;
}
}
}
```

Cookies - Sample (delete the cookie)

```
function deleteCookie() {
if (document.cookie) {
// Get a date and set it to last year
var expDate = new Date();
expDate.setFullYear(expDate.getFullYear() - 1);
document.cookie = "username=" + "" + ";" +
"expires=" + expDate.toGMTString();
}
}
```

JavaScript Graph Builder

• Can use JavaScript for dynamic content:

– Put JavaScript code within the <body> tag.

1. Download the supporting code (images and graph.js):

http://www-adele.imag.fr/~donsez/cours/exemplescourstechnoweb/js_graphimg/

2. Put them in the same directory as your HTML file.
3. Add the code to customize the graph in the body section

of your HTML.

JavaScript Graph Builder - Sample

```
<script language="javascript" src="graph.js"></script>
</head>
<body>
<script>
var g = new Graph(370, 200);
g.scale = 10000;
g.xLabel = "Month";
g.yLabel = "Number of Rants";
g.title = "Rants 2005";
g.setXScaleValues("Jan", "Feb", "Mar", "Apr", "May", "Jun",
"Jul", "Aug", "Sep", "Oct", "Nov", "Dec");
g.addRow(90000, 80000, 60000, 20000, 10000, 30000,
    28000,
15000, 18000, 68000, 92000, 75000);
g.build();
</script>
```

Tips for debugging JavaScript

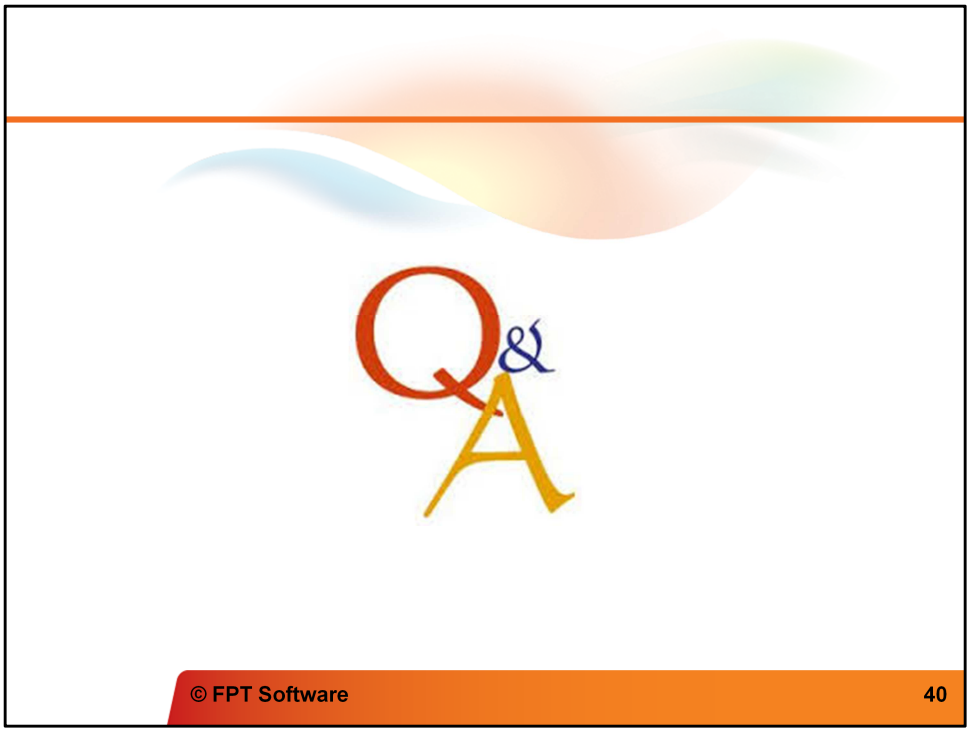
- Difficult because the language is interpreted.
  - No compiler errors/warnings.
  - Browser will try to run the script, errors and all.
- Make each line as granular as possible (use variables).
- Use alerts to get values of variables and see which lines are not getting processed.
- When testing form validation, set the action attribute to a dummy HTML page—not the server-side form. If you get the page, the script works.

Tools for debugging JavaScript

- Use Netscape, Mozilla, or Firefox browsers.
  - Load the page in the browser.
  - Type javascript: in the URL window or select Tools Web Development JavaScript Console to bring up the console.
  - You can also view cookie content from the browser settings.
- Download a JavaScript debugger:

http://www.mozilla.org/projects/venkman/

- The JavaScript debugger for Internet Explorer is avaliable in MS VisualStudio.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