Programming Basics
INFO/CSE 100, Autumn 2004
Fluency in Information Technology

http://www.cs.washington.edu/100

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Readings and References

• Reading
  » Fluency with Information Technology
    • Chapter 18, Fundamental Concepts Expressed in JavaScript
• Other References
  » Games and Puzzles
    • Thomas Jefferson National Accelerator Facility, Office of Science Education
    • http://education.jlab.org/indexpages/elementgames.html

The Plan

• We will learn JavaScript over the next few lectures
  • JavaScript is used with HTML in Web pages
  • JavaScript is a contemporary programming language -- we will learn only its basics
  • You will program in a text editor and run your program with your browser

Begin with HTML

Basic HTML is static
the contents of the file are displayed as given

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
  "http://www.w3.org/TR/html4/loose.dtd">
<html>
<head>
<title>Simple A</title>
</head>
<body>
What is 2.0 + 2.0?
</body>
</html>
```

JavaScript is a way to make HTML “dynamic”
**Add some “dynamic” content**

Scripting languages let us create active pages

» implement actions to be taken at run-time when the page is loaded or in response to user event

```html
<head>
  <title>Simple B</title>
  <script type="text/javascript">
    var greeting = "Hello World!";
  </script>
</head>
<body>
  <script type="text/javascript">
    document.write(greeting);
  </script>
  What is 2.0 + 2.0?
</body>
```

**JavaScript in an HTML page**

Language we are using is javascript

Generate HTML “on the fly” with document.write(...)

**Browser interprets your page**

- You are telling the browser what to do
  » using HTML for the static parts of the page
  » using JavaScript for the more dynamic parts
Variables

In Real Life

- A variable is a "container" for information you want to store
  » The name of the variable stays the same, but the value associated with that name can change
    That's why it's called a "variable!"

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Current Value</th>
<th>Previous Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>n1_single</td>
<td>&quot;My Boo&quot;</td>
<td>&quot;Goodies&quot;</td>
</tr>
<tr>
<td>championAL</td>
<td>&quot;Boston Red Sox&quot;</td>
<td>&quot;New York Yankees&quot;</td>
</tr>
<tr>
<td>n1_box_office</td>
<td>&quot;Shark Tale&quot;</td>
<td>&quot;Shark Tale&quot;</td>
</tr>
<tr>
<td>dayOfWeek</td>
<td>&quot;Monday&quot;</td>
<td>&quot;Sunday&quot;</td>
</tr>
<tr>
<td>balance</td>
<td>52</td>
<td>60</td>
</tr>
</tbody>
</table>

Variables

In Programming

- Program variables have names and values
  » Names (also called identifiers)
    - generally start with a letter and can contain letters, numbers, and underscore characters "_"
    - Names are case sensitive
  » Values
    - can be numbers, strings, boolean, etc
    - change as the program executes

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</tr>
</tbody>
</table>

JavaScript Variables

```html
<html>
<head>
<title>Simple C</title>
</head>
<body>
  <p>Hello World!</p>
  var greeting = "Hello World!";
  var balance = 52;
  var transaction = 12;
  <p>What will the new balance be?</p>
</body>
```
**Assign a value to a variable**

The universal form of the assignment statement

- variable gets value
  - greeting gets the value “Hello World!”
  - balance gets the value 52

Each language expresses “gets” in a particular way

- JavaScript uses the single equals sign =
  - greeting = "Hello World!";
  - balance = 52;

**NOTE:** The equals sign = is used differently in math and programming.

**Expressions**

- The right-hand side of an assignment statement can be any valid expression
- Expressions are “formulas” saying how to manipulate existing values to compute new values

```
balance = balance - transaction;
seconds = 60*minutes;
message = "Status code is " + codeValue;
```

**Operators**

Use operators to build expressions

- **Numeric operators**
  + - * / mean add, subtract, multiply, divide

- **String operator**
  + means concatenate strings

- **Relational operators**
  < <= == != => mean less than, less than or equal to, equal to, not equal to, greater than or equal to, greater than

- **Boolean operators**
  && || ! mean and, or, not

**JavaScript Expressions**

```
<html>
<head>
<title>Simple D</title>
<script type="text/javascript">
var balance = 52;
var transaction = 12;
</script>
</head>
<body>
<script type="text/javascript">
document.writeln("<p>My current Husky Card balance is $"+balance+".</p>);
document.writeln("<p>The next transaction will be for $"+transaction+".</p>);
balance = balance - transaction;
seconds = 60*minutes;
message = "Status code is " + codeValue;
</script>
</body>
</html>
```
Practice, practice, practice

- Write a simple web page with a simple script like the ones here
- Save it to disk
- Open the web page with your browser
- Does it look like what you expected?
  » Edit, save, reload
  » Edit, save, reload
  » ...

http://www.w3schools.com/js/js_examples.asp