Programming Basics

INFO/CSE 100, Autumn 2004
Fluency in Information Technology

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

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

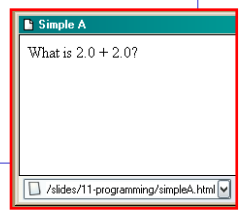
JavaScript is a way to make HTML "dynamic"

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>
```



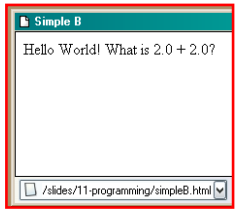
Add some "dynamic" content

Scripting languages let us create active pages

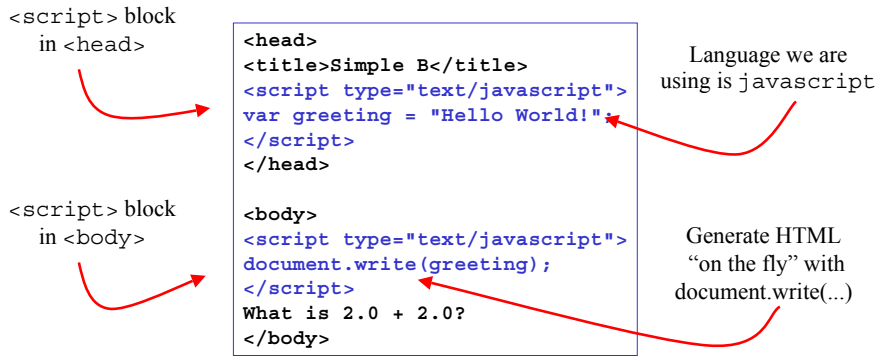
» implement actions to be taken at run-time when the page is loaded or in response to user event

```
<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>
```

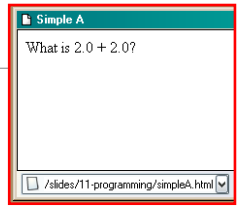


JavaScript in an HTML page



Browser interprets your page

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



This page is written in the HTML language.

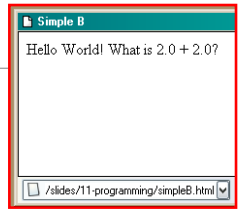
Here is some header information about the page.

Here is the main body of the page.

```
<html>
<head>
<title>Simple A</title>
</head>
<body>
What is 2.0 + 2.0?
</body>
</html>
```


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

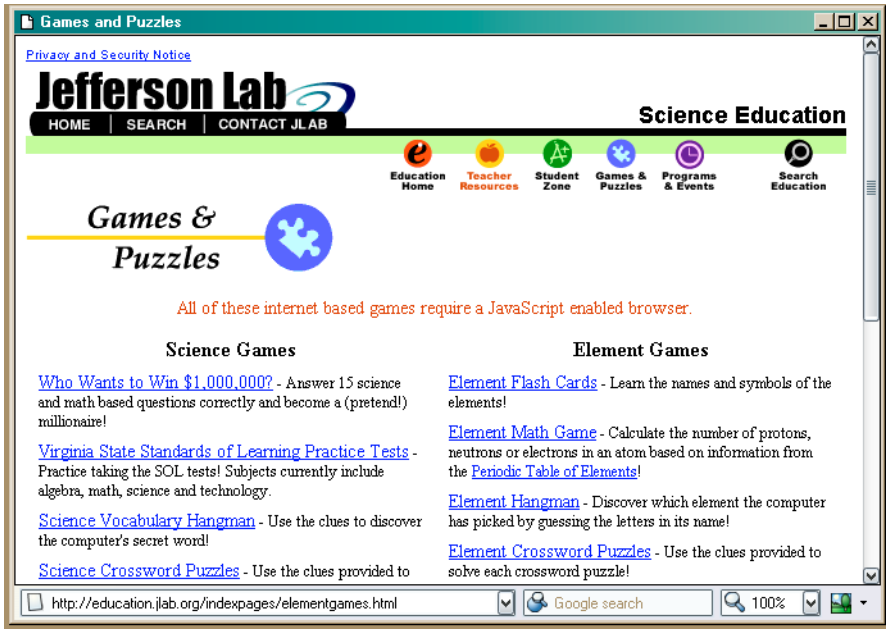


Here is some script initialization information.

Here is some script for the body of the page.

```
<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>
```



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"!

Variable **Name**	Current **Value**	Previous **Value**
#1 Single	My Boo, Usher And Alicia Keys	Goodies, Ciara
AL Champion	Boston Red Sox	New York Yankees
#1 Box Office	Shark Tale	Shark Tale
Day of the Week	Monday	Sunday
Husky Card Balance	$52	$60

Variables In Programming

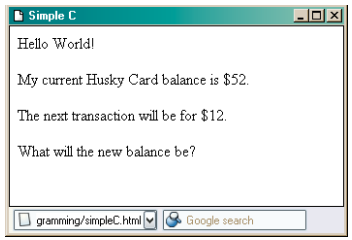
- Program variables have names and values
  - » Names (also called identifiers)
    - generally start with a letter and can contain letters, numbers, and underscore characters "_"
    - Names are *case sensitive*
  - » Values
    - can be numbers, strings, boolean, etc
    - change as the program executes

Variable **Name**	Current **Value**	Previous **Value**
n1_single	"My Boo"	"Goodies"
championAL	"Boston Red Sox"	"New York Yankees"
n1_box_office	"Shark Tale"	"Shark Tale"
dayOfTheWeek	"Monday"	"Sunday"
balance	52	60

JavaScript Variables

```
<html>
<head>
<title>Simple C</title>
<script type="text/javascript">
var greeting = "Hello World!";
var balance = 52;
var transaction = 12;
</script>
</head>

<body>
<script type="text/javascript">
document.writeln("<p>"+greeting+"<\/p>");
document.writeln("<p>My current Husky Card balance is $"+balance+".<\/p>");
document.writeln("<p>The next transaction will be for $"+transaction+".<\/p>");
document.writeln("<p>What will the new balance be?<\/p>");
</script>
</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

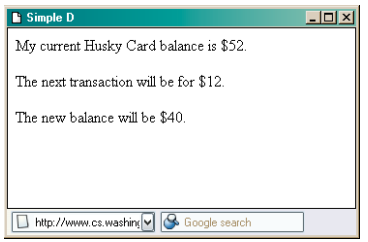
» Relational operators

< <= == != >= > *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;
document.writeln("<p>The new balance will be $"+balance+".<\/p>");
</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