Review: Variables, Values, Assignment

- Variables
  - Locations in memory
- Variable names
  - The way we refer to the locations in memory in our program
- Variable declaration
  - Listing the names of variables to be used in a program
- Data types of variables
  - String, Number, Boolean - there are other types but we won't cover them in this course
- Variable initialization
  - Assigning a value to a variable to begin with so that we control content
- Variable values
  - The data stored in those memory locations, subject to change
- Assignment statements
  - The command to change the value of a variable

<VariableName> <Assignment Symbol> <Expression>

  - x= 127;
  - x = x + 1;

A Series of Assignments

- Work it out on paper …

```
var rock;
var paper;
var scissor;
rock = 2;
scissor = 8;
rock = 4;
rock = scissor;
scissor = 10;
paper = scissor;
rock = scissor + paper;
rock = scissor / paper;
```

Question:

What's in rock?

What's in paper?

What is the Value of Dude?

```
var dude = 0;        //you can also declare variables and
                     // assign them values at the same time
dude = dude + 1;
dude = dude + 1;
dude = dude + 1;
```

- Questions:

1. What value does the variable *dude* contain at the end of this code?
2. What is this code doing?
3. What would be a better variable name for *dude*?

Expressions

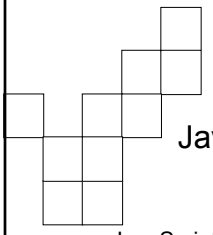
- CONCEPT: Expressions are a means of performing the actual computation in a program. They are formulae made from variables and operators, e.g. calculator operations: +, -, *, /, ^
  - weeks = days / 7; //divide value of days by 7
  - totalAfterTax = totalPrice * 1.087; //multiply the two values
  - FullName = "Grace " + " Whiteaker"; // add 2 strings together-
    // this is called
    // concatenation
    // result: "Grace Whiteaker"
    // stored in FullName

Assignment and Expressions

- Assigning values to variables using expressions is a basic task used throughout programming
- But assignment doesn't just place or change the values of variables
  - It is more general than that
  - Any task that requires a change or manipulation of a value will use the idea of assignment

  Remember this?

  <BODY BGCOLOR="red" >
  <H1 ALIGN="center">



JavaScript, Objects and Events

JavaScript is a scripting language that is used to create dynamic web pages. This is done through the control and manipulation of property values of objects on a web page in response to certain events.

What the HECK does all that mean?

What is JavaScript?

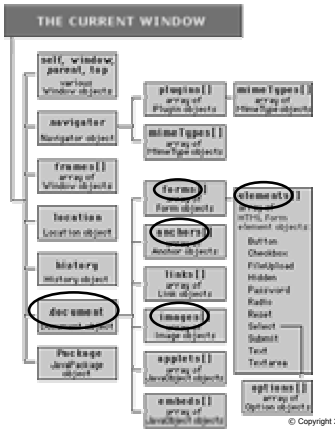
- A scripting language built into most web browsers
  - So they already have an understanding of the language you will use!
  - JavaScript is CASE-SENSITIVE, while HTML is NOT
- Scripting languages, like JavaScript, VBScript, Perl, etc. are interpreted
- C, C++, Java, Visual Basic and others are compiled languages
- JavaScript (and other scripting languages) allow us to make dynamic web pages. Pages that change on the fly and/or interact with a user.

Dynamic Web Pages

- For web pages to be dynamic, code needs to be used to interact with "things" on the page.
- Those "things" are called Objects.
  - Some objects you can see: a text box, radio button, check box
  - Some are built-in, but you can make use of them: Date, Math, String
- Objects have properties
  - Objects can also have sub-objects, which have properties
- Properties contain Values
  - Properties and values are similar to variables and values, but properties are for objects that are part of the web page
  - Variables are created as we need them and are not seen

How are all the objects accounted for?

- The Document Object Model
- An abstract way to look at all elements of a file
- For our purposes, it is a way to identify the location of every single element (object) on a web page
  - And allows us to use code (JavaScript in this case) to manipulate each object and it's properties
- Always double check on how the object and its properties are referenced by JavaScript
  - A big help in debugging



How do you reference an object?

- Dot syntax
- An example using something in the real world:
  - You are an instance of a human, an object. You each have properties, each of which has particular values.
  - To reference the color of Jason's hair, using dot syntax:

    Jason.Hair.hairColor.value
  - To assign Jason a new hair color:

    Jason.Hair.hairColor.value="blond"
- Examples in JavaScript:

```
document.bgColor="red";        \\ the document is the HTML
                               \\ file we are currently in and we're
                               \\ assigning the body background color
```


Objects also do things

- Sometimes the objects on a page must do something
- Actions by Objects are called Methods
- Methods often look just like Properties, but they are followed by ( ) so you know the difference:
  - lastModified is a property:

    document.lastModified
  - Write is a method, an action that an object can take:

    document.write("Hello World")

Objects, cont'd:

- There are MANY, MANY objects, properties and methods
- We will work with some, not all of them
- Think of objects and properties as nouns and methods as verbs, or actions.
- A list of some of them is linked on our web reference page
  - Also a list in the back of the JavaScript book

Events

- Much of JavaScript's power is the ability to respond to specific events that occur on a web page.
- Some events are triggered by users, some by the web page itself
  - What are some familiar events that you trigger when using a web page?
  - What are events that the web page can take care of?
- When the web page or a user triggers an event, then we can write code in an "event handler" to respond to it

Some Common Event Handlers

onClick (triggered by a mouse click)

onMouseover (triggered by a mouseover)

onMouseout (triggered by mouseout)

onLoad (triggered when page loads, goes with the <body> tag)

onSubmit (triggered when a form is submitted)

onMousemove (triggered when mouse is moved)

There are many more, but they aren't necessarily cross-browser friendly and we won't necessarily be using them

Common uses of JavaScript

- Dynamic interaction with users
  - Giving feedback to their use of page
- Form validation
  - Did the user enter anything into the name text box before submitting the form?
  - Did they remember the required information?
    - Name
    - Address
    - Email
    - Answer quiz questions correctly….?

Summary

- Programming Concepts:
  - Variable must be declared
  - Variables have Names and Values
  - Assignment is how values of variables are changed
  - Expressions are used to perform computations in programs and manipulate values in variables
- Other important concepts:
  - Web Pages are Objects that contain other objects
  - Objects have Names and Properties
  - Properties have Values
  - Assignment is used to change values of Properties
  - Expressions…
  - Objects can perform certain actions, called Methods
  - Events are actions by users or the system on the web page.
  - Event handlers contain code to execute specific instructions

Notice anything here????