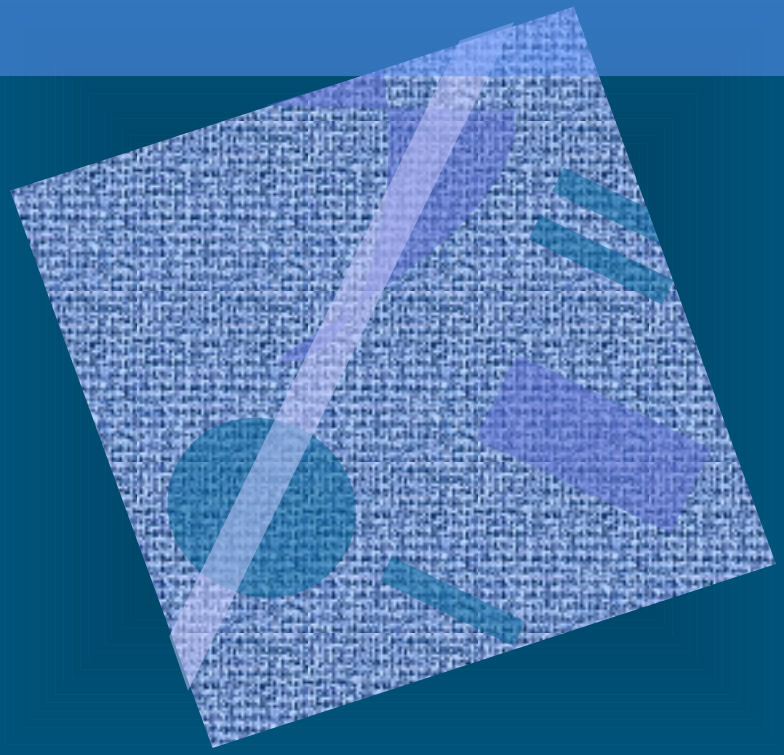
COMS 469: Interactive Media II

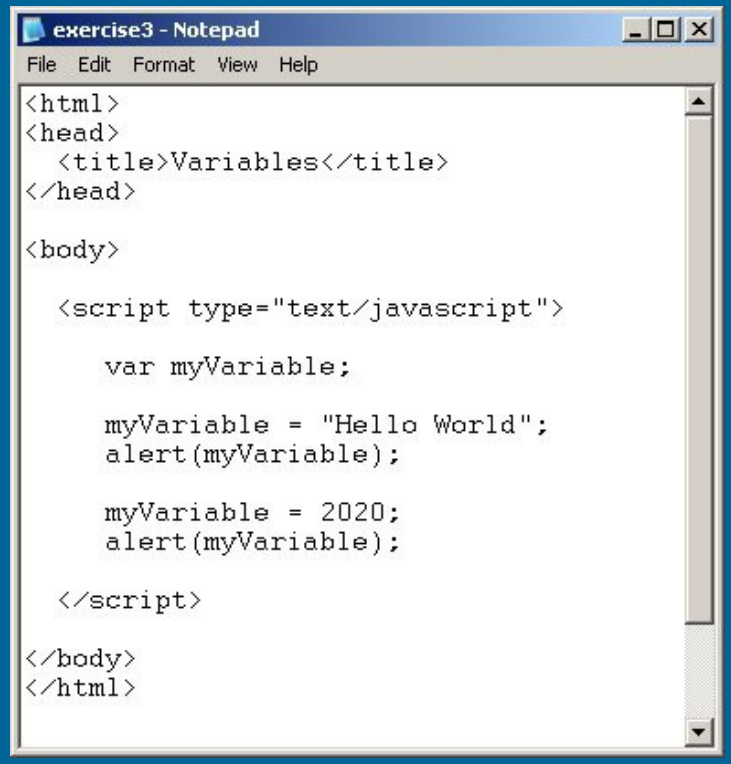


Agenda

- Review
- Ch. 5: JavaScript—An Object-Based Language
- Ch. 6: Programming the Browser

Review

- Data Types & Variables
  - Data Types
    - Numeric
    - String
    - Boolean
  - Variables
    - Declaring a variable
    - Assigning value to a variable



Review

- Data Types & Variables
  - Working with and Using Data
    - Operators
    - Operator precedence
    - String Concatenation
    - Data Conversion

Addition	+
Subtraction	-
Multiplication	*
Division	/
Equals	==

exercise6 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Using Data</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

     var degFahren = prompt("Enter degrees Fahrenheit");
     var degCent;

     degCent = 5 / 9 * (degFahren - 32);

     alert(degCent);


  </script>

</body>
</html>
```

Review

- Data Types & Variables
  - Arrays
    - Multi-element variable
    - 2 methods for constructing arrays

```
var myArray = new Array("hot dog", "beer", 100);
```

```
var myArray = new Array( );
   myArray[0] = "hot dog";
   myArray[1] = "beer";
   myArray[2] = 100;
```

Review

- Data Types & Variables
  - Arrays

exercise9b - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Using Data</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

    var myArray = new Array();
      myArray[0] = "Hot Dog";
      myArray[1] = "Beer";
      myArray[2] = "Fries";

    document.write("<h2>Your Order:</h2> <hr width=200 align=left>" +
                   "<b>Sandwich:</b> " + myArray[0] + "<br>" +
                   "<b>Beverage</b> " + myArray[1] + "<br>" +
                   "<b>Side Dish</b> " + myArray[2] + "<br>");

  </script>

</body>
</html>
```

Review

- Decisions & Functions
  - Conditional statements

exercise12 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Using Data</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

     var degFahren = Number(prompt("Enter degrees Fahrenheit"));
     var degCent;

        degCent = 5 / 9 * (degFahren - 32);

     document.write(degFahren + "\xB0 Fahrenheit is " + degCent + "\xB0 Centigrade");

     if (degCent < 0)
       {
          document.write("<br>That's damn cold.");
       }

     if (degCent > 35)
       {
          document.write("<br>That's way too hot.");
       }

  </script>

</body>
</html>
```

Review

- Decisions & Functions
  - for and while looping statements

exercise15 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Beer Evaluator</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

     var beer = new Array("Pabst","Blatz","Schlitz'
     var loopCounter;

     for (loopCounter = 0; loopCounter <= 3; loopCo
       {
         document.write("<p>" + beer[loopCounter] +
       }
  </script>

</body>
</html>
```

exercise16 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Beer Evaluator</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

     var beer = new Array("Pabst","Blatz","Schlitz","Old Style");
     var loopCounter = 0;

     while (loopCounter < 4)
       {
         document.write("<p>" + beer[loopCounter] + " is an acceptable beverage.</p>");
         loopCounter++;
       }
  </script>

</body>
</html>
```

Review

Pabst = beer[0]
Blatz = beer[1]
Schlitz = beer[2]
Old Style = beer[3]

exercise1 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Beer Evaluator</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

    var beer = new Array("Pabst","Blatz","Schlitz","Old Style");
    var loopCounter;

    for (loopCounter = 0; loopCounter <= 3; loopCounter++)
      {
        document.write("<p>" + beer[loopCounter] + " is an acceptable beverage.</p>");
      }


    </script>

</body>
</html>
```

Review

exercise1 - Notepad

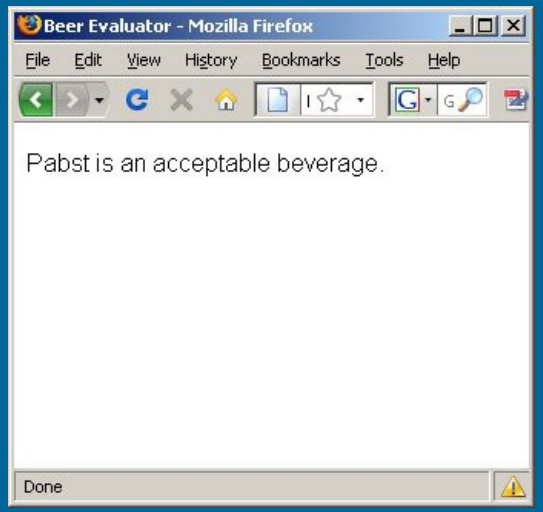
File Edit Format View Help

```
<html>
<head>
 <title>Beer Evaluator</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

     var beer = new Array("Pabst","Blatz","Schlitz","Old Style");
     var loopCounter;

     for (loopCounter = 0; loopCounter <= 3; loopCounter++)
       {
         document.write("<p>" + beer[loopCounter] + " is an acceptable beverage.</p>");
       }


     </script>

</body>
</html>
```

Review

```
for (loopCounter = 0; loopCounter <= 3; loopCounter++)
  {
    document.write("<p>" + beer[loopCounter] + " is an acceptable beverage.</p>");
  }
```

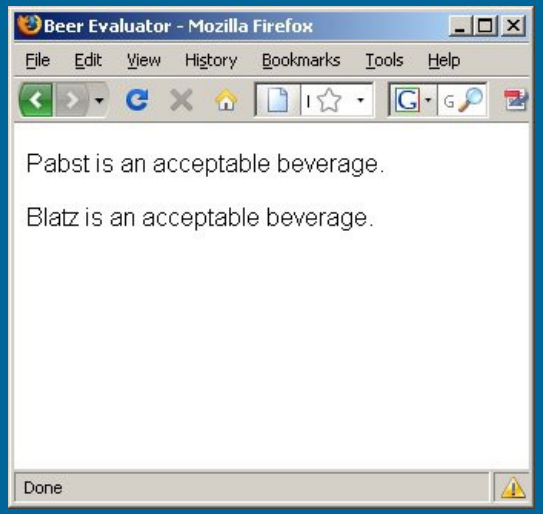
beer[0]



Review

```
for (loopCounter = 1; loopCounter <= 3; loopCounter++)
  {
    document.write("<p>" + beer[loopCounter] + " is an acceptable beverage.</p>");
  }
```

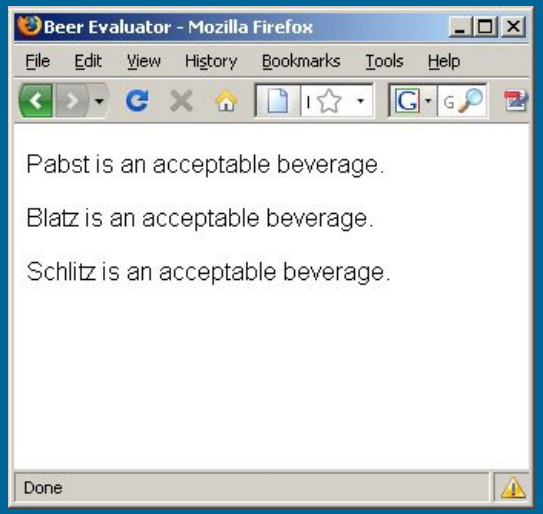
beer[1]



Review

```
for (loopCounter = 2; loopCounter <= 3; loopCounter++)
  {
    document.write("<p>" + beer[loopCounter] + " is an acceptable beverage.</p>");
  }
```

beer[2]

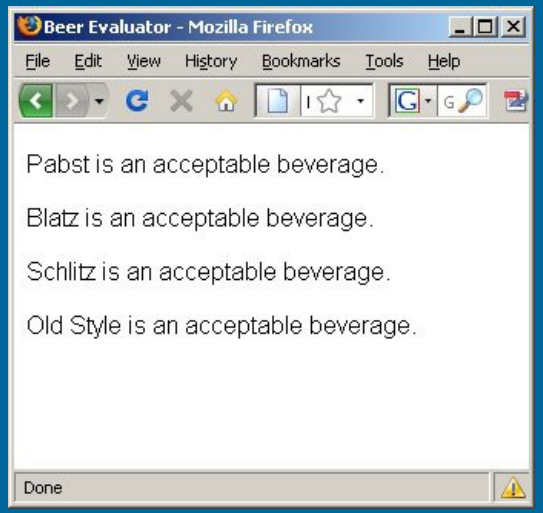


Review

```
for (loopCounter = 0; loopCounter <= 3; loopCounter++)
  {
    document.write("<p>" + beer[loopCounter] + " is an acceptable beverage.</p>");
  }
```

3

beer[3]



Review

- Decisions & Functions
  - break and continue

exercise17 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Beer Evaluator</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

     var beer = new Array("Pabst","Blatz","Miller","Schl
     var loopCounter = 0;

     while (loopCounter < 5)
       {

         if (beer[loopCounter] == "Miller")
           {
             document.write("<p>Miller is an unacceptabl
             break;
           }
         document.write("<p>" + beer[loopCounter] + " is
         loopCounter++;
        }

  </script>

</body>
</html>
```

exercise18 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Beer Evaluator</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

     var beer = new Array("Pabst","Blatz","Miller","Schlitz","Old Style");
     var loopCounter = 0;

     while (loopCounter < 5)
       {
         if (beer[loopCounter] == "Miller")
           {
             document.write("<p>Miller is an unacceptable option.</p>");
             loopCounter++;
             continue;
           }
         document.write("<p>" + beer[loopCounter] + " is an acceptable beverage.</p>");
         loopCounter++;
       }

  </script>

</body>
</html>
```

Review

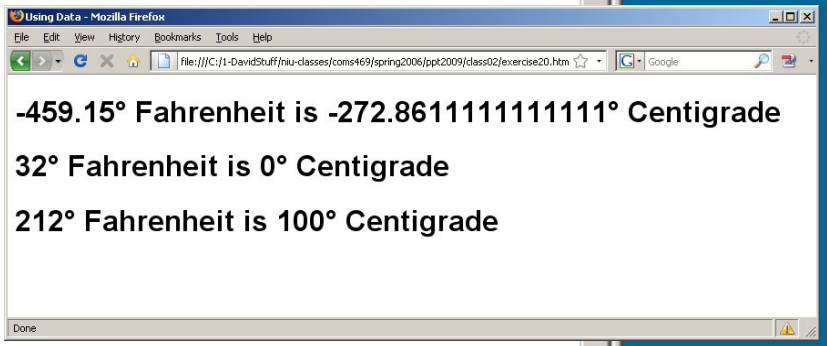
- Decisions & Functions
  - Functions
    - Block of code – performs an action/returns result
    - *Calling* or *invoking*

```
function  tempConvert(degFahren)
  {
     var degCent;
     degCent = 5/9 * (degFahren - 32);

     return degCent;
  }
```

exercise20 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Using Data</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

     function tempConvert(degFahren)
       {
        var degCent;
        degCent = 5 / 9 * (degFahren - 32);

        return degCent;
       }

     var degFahren = new Array(212,32,-459.15);
     var degCent = new Array( );
     var loopCounter;

     for (loopCounter = 0; loopCounter <= 2; loopCounter++)
       {
         degCent[loopCounter] = tempConvert(degFahren[loopCounter]);
       }

     for (loopCounter = 2; loopCounter >= 0; loopCounter--)
       {
         document.write("<h1>" + degFahren[loopCounter] + "\xB0 Fahrenheit is "
                               + degCent[loopCounter] + "\xB0 Centigrade</h1>");
       }

  </script>

</body>
</html>
```

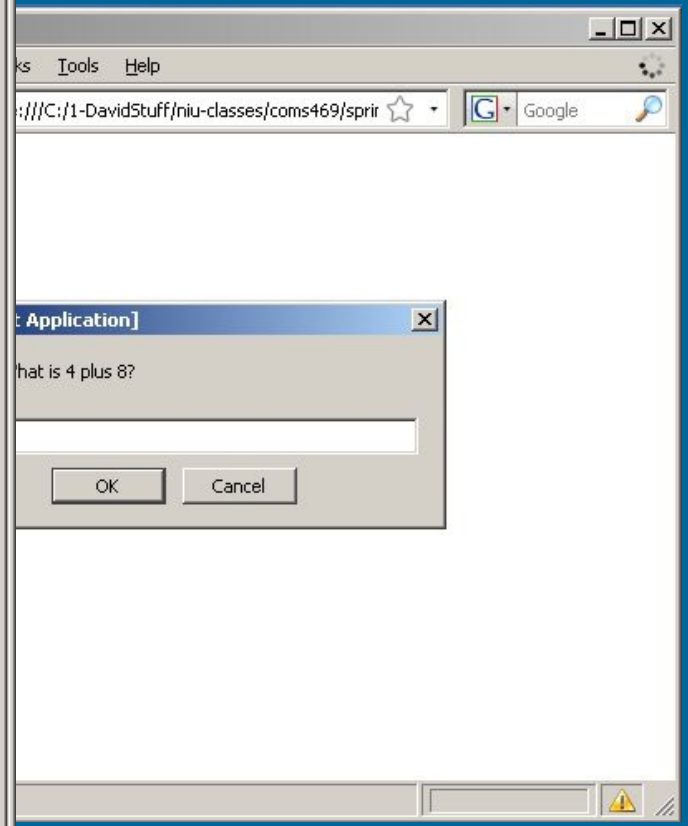


Homework Exercise

quiz_example1 - Notepad

File Edit Format View Help

```
<html>
  <head>
    <title>Using Data</title>
       <script type="text/javascript">

         var score = 0;

         var answer1 = 12;
         var question1 = prompt("What is 4 plus 8?");
         if (answer1 == question1)
           {
             score++;
           }

         var answer2 = "obama";
         var question2 = prompt("Who is president of the US?");
         if (answer2 == question2)
           {
             score++;
           }

         var answer3 = "2010";
         var question3 = prompt("What year is it?");
         if (answer3 == question3)
           {
             score++;
           }

      </script>
  </head>

<body bgcolor="#ffffff">
  <script type="text/javascript">

    document.write("Your score is " + score + ":");

     if (score > 2)
        {
          document.write("<br>Good job...you win!");
        }
     else if (score > 1)
        {
          document.write("<br>Not bad...but you could do better.");
        }
     else
        {
          document.write("<br>You are an idiot!");
        }

  </script>

</body>
</html>
```



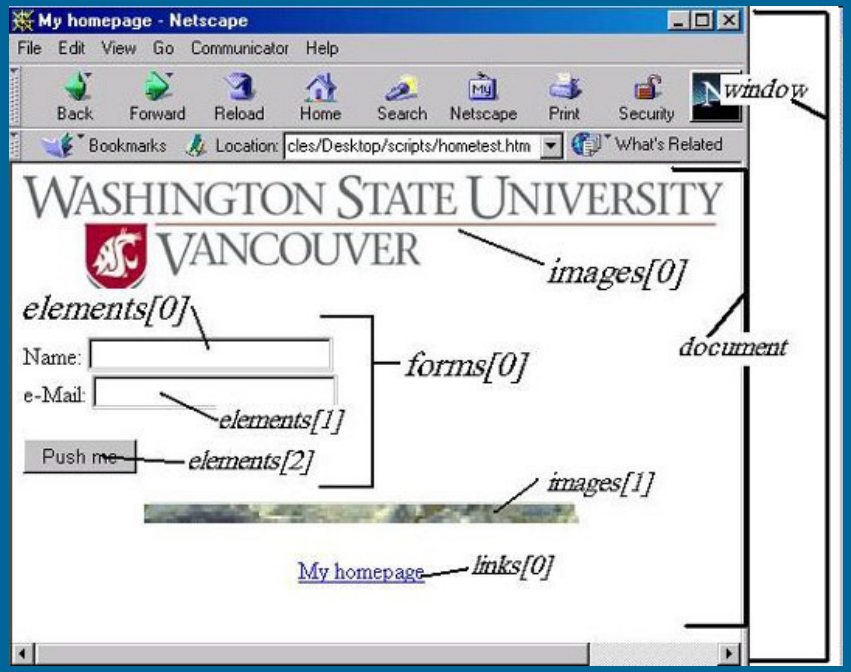
quiz_example2 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Using Data</title>

  <script type="text/javascript">

     var score = 0;
     var loopcounter = 0;
     var question = new Array("What is 4 plus 8?","Who is president of the US?","What year is it?");
     var answer = new Array("12","obama","2010");

     while (loopcounter < 3)
       {
         var response = prompt(question[loopcounter]);
         if (response == answer[loopcounter])
          {
            score++;
          }
         loopcounter++;
       }

   </script>

</head>

<body bgcolor="#ffffff">
  <script type="text/javascript">

    document.write("Your score is " + score + ":");

    if (score > 2)
      {
        document.write("<br>Good job...you win!");
      }
    else if (score > 1)
      {
        document.write("<br>Not bad...but you could do better.");
      }
    else
      {
        document.write("<br>You are an idiot!");
      }

  </script>

</body>
</html>
```

Object Oriented Language

- Intro to OOP
- JavaScript Native Objects



Object Oriented Language

- JavaScript is an OOP
  - Object Oriented Programming Language
  - 4th Generation Languages: Java, C, C++
- Terminology
  - *Object*
  - *Properties*
  - *Methods*

object = car
property = black
methods = drive, reverse, turn, brake

Object Oriented Language

- JavaScript Objects = *things* associated with the browser or HTML document
  - Array
  - Date
- Creating an Object

```
var beer = new Array( )
```

  - Define a variable called beer
  - Keyword new followed by the name of the object you want to create, i.e. Array
  - Parameters (data to be used and contained by the new object) goes inside the parenthesis

Object Oriented Language

- Properties

```
myArray.length
```

Access object properties by writing the name of the variable referencing the object followed by a dot and then the name of the property.

- Methods

```
myArray.sort( )
```

Call an object's method by appending the name of the method to the name of the variable that references the object, separated by a dot.

All JavaScript *objects* and their valid *properties* and available *methods* are contained in the JavaScript specification

Object Oriented Language

- JavaScript Native Objects
  - String
  - Math
  - Array
  - Date

Note: JavaScript native objects usually begin with a capital letter. Like a proper name.

Object Oriented Language

- String
  - Two ways to create a string object

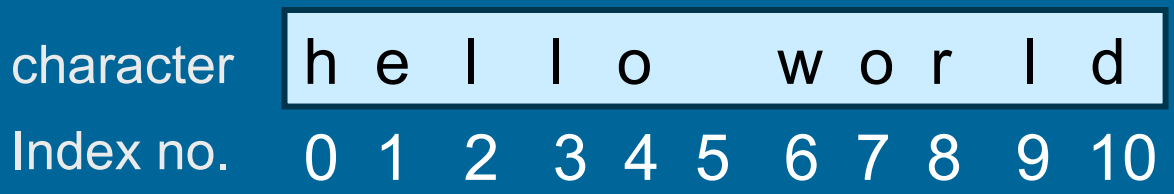
```
var string1 = new String("hello, world");
```

```
var string1 = "hello, world";
```

  - Many *properties* and *methods*

Object Oriented Language

- String
  - Character position and index number



  - Many string *methods* will access and manipulate string information by referencing the index number

Object Oriented Language

- String
  - length property
    - Returns the number of characters in a string

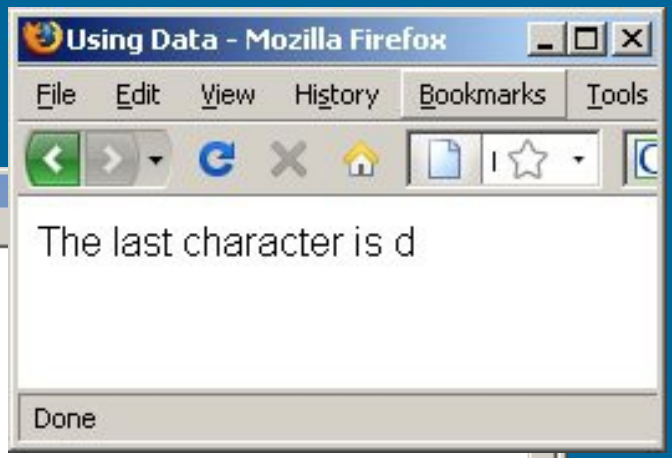
```
var  stupidPhrase = new String("hello world");
document.write(stupidPhrase.length);
```

    - This example will return the number 11

Object Oriented Language

- Methods of the **String** Object
  - charAt( )
    - Used to access a single character in a string; useful for validating user input (HTML forms)
    - Take one parameter, the index position of the character in the string
    - Returns the specified character

Object Oriented Language



example1 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Using Data</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

     var  stupidPhrase = new String("hello world");

     var lastCharacter = stupidPhrase.charAt(stupidPhrase.length -1);

     document.write("The last character is " + lastCharacter);

  </script>

</body>
</html>
```

Object Oriented Language

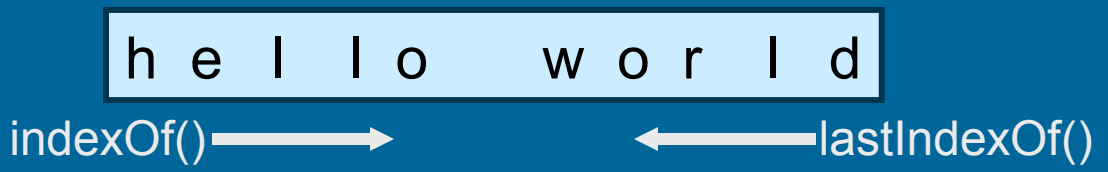
Use the charAt() method to retrieve the last character in the string "hello world" Use the index position of (stupidPhrase.length -1), which targets the last character in the string. We use length -1, because the length property returns the number of characters in the string but the string index begins numbering the string at 0.

example1 -
File Edit For

```
<html>
<head>
 <title
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

     var  stupidPhrase = new String("hello world");

     var lastCharacter = stupidPhrase.charAt(stupidPhrase.length -1);

     document.write("The last character is " + lastCharacter);

  </script>

</body>
</html>
```

Object Oriented Language

- Methods of the **String** Object
  - indexOf( ) *and* lastIndexOf( )
    - Used for finding a substring – a portion of a string inside a string
    - Takes two parameters
      - The string you want to find
      - Character position at which the search begins (optional)
    - Returns a number, which indicates the character position at which the substring was found
    - Direction of the search:



Object Oriented Language

example4 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Using Data</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

     var stupidPhrase = new String("hello world");
     var substring;

     substring = stupidPhrase.indexOf("world");

     document.write(substring);

  </script>

</body>
</html>
```

Using Data - Mozilla Firefox

File Edit View History Bookmarks Tool

6

Done

h	e	l	l	o		w	o	r	l	d
0	1	2	3	4	5	6	7	8	9	10

Object Oriented Language

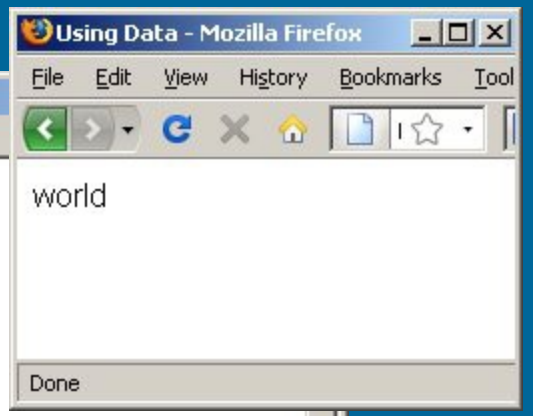
- Methods of the **String** Object
  - substr( ) *and* substring( )
    - Used for copying part of a string
    - Two Parameters – the index location of the *beginning* and *end* of the substring
    - Results in a chunk of the string that can be used elsewhere

Object Oriented Language

example6 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Using Data</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

     var  stupidPhrase = new String("hello world");

     var substring = stupidPhrase.substring(6,11);

     document.write(substring);

  </script>

</body>
</html>
```



h	e	l	l	o		w	o	r	l	d
0	1	2	3	4	5	6	7	8	9	10

Object Oriented Language

- Methods of the **String** Object
  - toLowerCase( ) *and* toUpperCase( )
    - Used for changing a string to all lower or all upper case; useful for comparing strings

example7 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Using Data</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

     var  stupidPhrase = new String("hello world");

     var newString = stupidPhrase.toUpperCase();

     document.write(newString);

  </script>

</body>
</html>
```

Using Data - Mozilla Firefox

File Edit View History Bookmarks Tool

HELLO WORLD

Done

Object Oriented Language

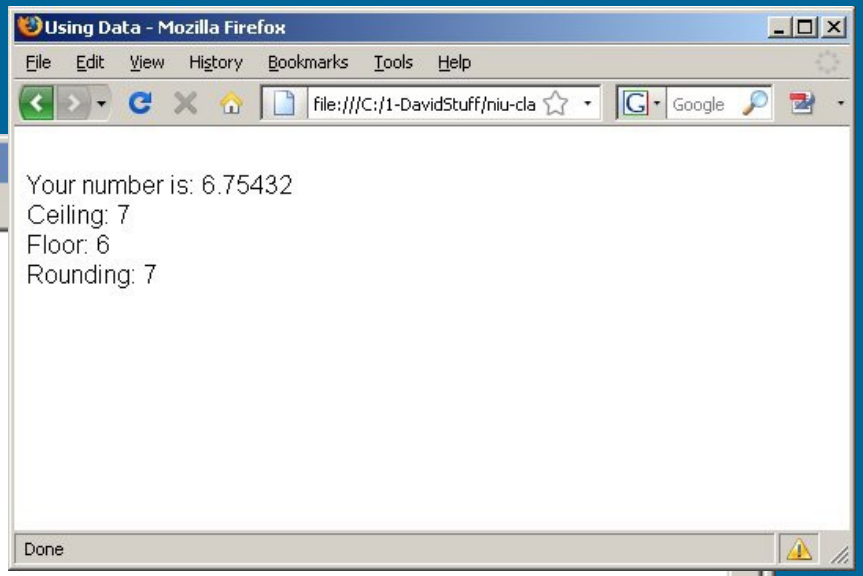
- Math
  - Object useful for mathematical functions and numeric calculations
  - Unlike other JavaScript objects, JavaScript will create a Math object automatically whenever it encounters a number; streamlines code writing

```
var myNumber = new Math(4.56);
```

```
var myNumber = 4.56;
```

Object Oriented Language

- Methods of the **Math** Object
  - abs( )
    - Returns the absolute value of a number; a positive number (i.e. -45 would be 45)
  - ceil( )
    - Rounds a number up to the next largest whole number (i.e. 10.01 would be 11)
  - floor( )
    - Rounds a number down to the next whole number (i.e. 10.01 would be 10)
  - round( )
    - Rounds a number up if the number is greater than *n*.5; otherwise it rounds the number down.



example8 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Using Data</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

     var myNumber = prompt("Enter a number");

     document.write("<br>Your number is: " + myNumber);

     document.write("<br>Ceiling: " + Math.ceil(myNumber));

     document.write("<br>Floor: " + Math.floor(myNumber));

     document.write("<br>Rounding: " + Math.round(myNumber));

  </script>

</body>
</html>
```

Object Oriented Language

- Methods of the **Math** Object
  - random( )
    - Random number generator
    - Returns a random floating-point (decimal) number between 0 and 1
  - pow( )
    - Raises a number to a specified power, i.e. 11^2
    - Two parameters – the number and the power to which it should be raised, i.e. (11,2)

example9 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Vegas Baby!</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

     var diceThrow;

     diceThrow = (Math.floor(Math.random() * 6) +1);

     document.write("<h1>" + diceThrow + "</h1>");


  </script>

</body>
</html>
```

Because the random( ) method of the Math object returns a random number between 0 and 1, we need to multiply the random number by 6 and add one to it. Then we have to round this number down by using the floor( ) method so that we have a whole number. This will result in random numbers between 1 and 6.

Object Oriented Language

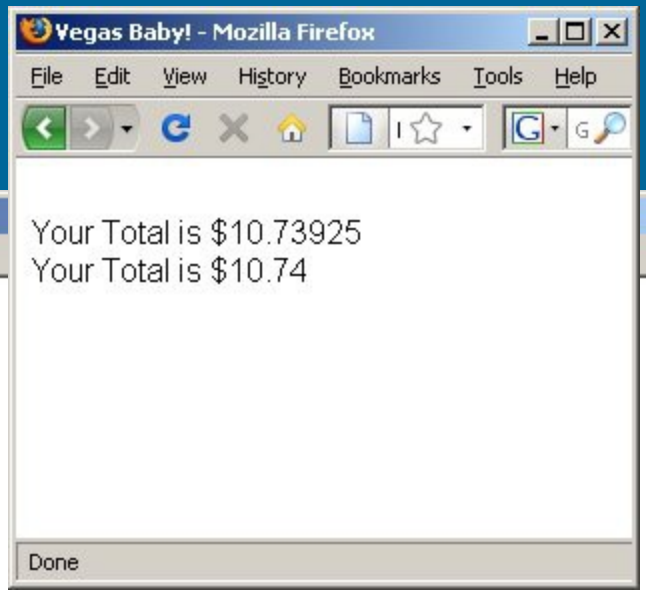
- Number
  - Two ways to create a Number object

```
var myNumber = new Number(456.92);
```

```
var myNumber = 456.92;
```

Object Oriented Language

- Methods of the **Number** Object
  - toFixed( )
    - Cuts a number off at a certain point after the decimal point and rounds it up or down
    - Useful for numerical calculations with money
    - Takes one parameter, a number which indicates the number of decimal places



example10 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Shopping Spree</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

     var itemPrice = 9.99;
     var salesTax = 1.075;
     var totalCost = itemPrice * salesTax;

     document.write("<br>Your Total is $" + totalCost);
     document.write("<br>Your Total is $" + totalCost.toFixed(2));


  </script>

</body>
</html>
```

Object Oriented Language

- Array
  - Already covered how to create Arrays

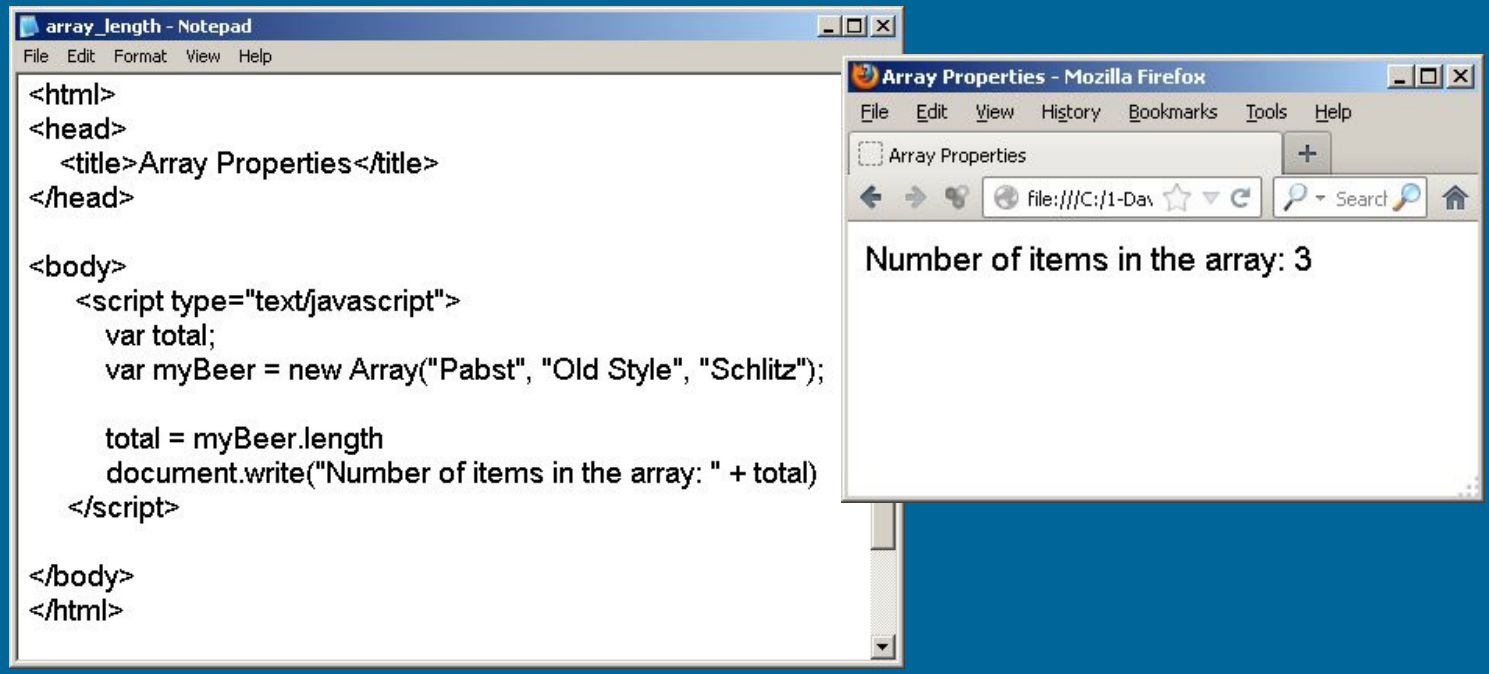
```
var myArray = new Array("hot dog", "beer", 100);
```

```
var myArray = new Array( );
   myArray[0] = "hot dog";
   myArray[1] = "beer";
   myArray[2] = 100;
```

  - Now look at Array *properties* and *methods* for manipulating Array data

Object Oriented Language

- Property of the **Array** Object
  - length
    - Used to find the number of elements in an array
    - Returns a whole number



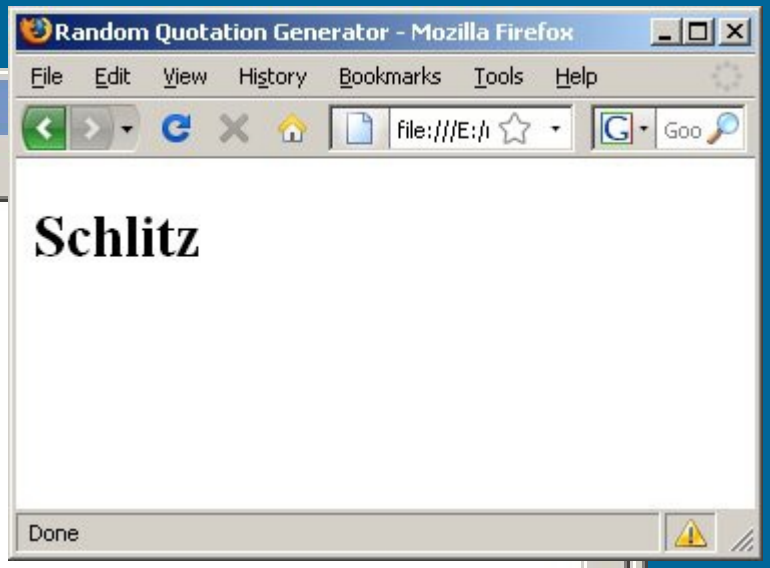
Object Oriented Language

- Methods of the **Array** Object
  - concat( )
    - Used to join two separate arrays together
  - slice( )
    - Used to copy part of an array; slice out a portion of an array
  - join( )
    - Used to convert an array to a single string
  - sort( )
    - Used to arrange array elements in order (numerical or alphabetical)
  - reverse( )
    - Reverses the order of the elements in the array

random_quote - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Random Quotation Generator</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

        var quoteNumber;

        var quote = new Array("Pabst","Old Style","Schlitz",
                              "Meister Brau","Blatz","Point");

        var arrayLength = quote.length - 1;

        quoteNumber = Math.round(Math.random() * arrayLength);

        document.write("<h1>" + quote[quoteNumber] + "</h1>");

  </script>

</body>
</html>
```



Exercise #1

Create a random quotation generator.
Use Array, Math, and String objects

Declare three variables.

quoteNumber - will be assigned a random value.

quote - a new Array containing string values.

arrayLength – uses the length property of the Array object to get the total number of elements in the Array. Subtract 1 from this value, because array element numbering begins at 0 while length starts numbering at 1.

random_quote - Notepa

File Edit Format View He

```
<html>
<head>
 <title>Random Quot
</head>

<body bgcolor="#fff

  <script type="text/javascript">

        var quoteNumber;

        var quote = new Array("Pabst","Old Style","Schlitz",
                              "Meister Brau","Blatz","Point");

        var arrayLength = quote.length - 1;

        quoteNumber = Math.round(Math.random() * arrayLength);

        document.write("<h1>" + quote[quoteNumber] + "</h1>");

  </script>

</body>
</html>
```

random_quote - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Random
</head>

<body bgcolor="

  <script type=

        var quo

        var quo


        var arrayLength = quote.length - 1;

        quoteNumber = Math.round(Math.random() * arrayLength);

        document.write("<h1>" + quote[quoteNumber] + "</h1>");

  </script>

</body>
</html>
```

Assign a value to the quoteNumber variable. This value will be a random number between 0 and 5 (which is one less than the total number of elements in the Array).

Generate the random number by using the random( ) method of the Math object multiplied by the value of the arrayLength variable. Use the round( ) method of the Math object to obtain a whole number.

random_quote - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Random Quotation Generator</title>
</head>

<body bgcolor="

  <script type=

        var quoteNumber;

        var quote = new Array("Pabst","Old Style","Schlitz",
                              "Meister Brau","Blatz","Point");

        var arrayLength = quote.length - 1;

        quoteNumber = Math.round(Math.random() * arrayLength);

        document.write("<h1>" + quote[quoteNumber] + "</h1>");

  </script>

</body>
</html>
```

Use the write method( ) of the document object to display the result. Concatenate some HTML string data with the randomly generated Array element.

random_quote - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Random Quotation Generator</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

        var quoteNumber;

        var quote = new Array("Pabst","Old Style","Schlitz",
                              "Meister Brau","Blatz","Point");

        var arrayLength = quote.length - 1;

        quoteNumber = Math.round(Math.random() * arrayLength);

        document.write("<h1>" + quote[quoteNumber] + "</h1>");

  </script>

</body>
</html>
```

Exercise #1
random_quote.html

Object Oriented Language

- Date
  - Four ways to creating a Date object

```
var theDate1 = new Date( );
```

Set to the current date and time on the client's PC

```
var theDate2 = new Date(974998998989898);
```

Number of milliseconds since 1 January 1970

```
var theDate3 = new Date("20 January 2013" );
```

Use a string value to specify the date

```
var theDate4 = new Date(2013,0,20,12,04,36);
```

Specify year, month, day, hours, minutes, seconds

Note: January is not 1; it is 0. This is because JavaScript begins counting at 0.

Object Oriented Language

- Date
  - get( ) Methods

Method	Returns
getDate( )	The day of the month (1-31)
getDay( )	The day of the week as an integer, beginning with Sunday as 0
getMonth( )	The month as an integer with beginning with January as 0
getFullYear( )	The year as a four-digit number
toDateString( )	Full date based on the current time zone as a human readable string

Object Oriented Language

- Date
  - set( ) Methods

Method	Description
setDate( )	The numeric day of the month passed in as the parameter to set the date
setMonth( )	The month of the year is passed in as an integer parameter, where 0 is January.
setFullYear( )	Sets the year to the four-digit integer number passed as a parameter

Object Oriented Language

- Date
  - get( ) Methods for time

Method	Returns
getHours( )	The hour of the date object; 24 hour clock
getMinutes( )	The minutes of the date object
getSeconds( )	The seconds of the date object
getMilliseconds( )	The milliseconds of the date object
toTimeString( )	Time in string form, i.e. 13:03:51 CST

Object Oriented Language

- Date
  - set( ) methods for time

Method	Description
setHours( )	Hour is passed in as the parameter to set the hour
setMiniutes( )	Number of minutes is passed in as an integer parameter.
setSeconds( )	Seconds is passed in as an integer parameter

the_date - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>What's the Date</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

     var months = new Array("January","February","March","April",
                            "May","June","July","August","September",
                            "October","November","December");
     var dateNow = new Date();
     var yearNow = dateNow.getFullYear();
     var monthNow = months[dateNow.getMonth()];
     var dayNow = dateNow.getDate();
     var daySuffix;

     switch (dayNow)
      {
        case 1:
        case 21:
        case 31:
          daySuffix = "st";
          break;

        case 2:
        case 22:
          daySuffix = "nd";
          break;

        case 3:
        case 23:
          daySuffix = "rd";
          break;

        default:
          daySuffix = "th";
          break;
       }

     document.write("<h2>Today is the " + dayNow + daySuffix +
                    " of " + monthNow + " " + yearNow + "</h2>");

  </script>
</body>
</html>
```

What's the Date - Mozilla Firefox

File Edit View History Bookmarks Tools Help

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file:///C:/1-DavidStuff/n

Search F

Today is the 3rd of February 2013

the_date - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>What's the Date</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

    var months = new Array("January","February","March","April",
                           "May","June","July","August","September",
                           "October","November","December");
    var dateNow = new Date();
    var yearNow = dateNow.getFullYear();
    var monthNow = months[dateNow.getMonth()];
    var dayNow = dateNow.getDate();
    var daySuffix;

    switch (dayNow)
     {
       case 1:
       case 21:
       case 31:
         daySuffix = "st";
         break;

       case 2:
       case 22:
         daySuffix = "nd";
         break;

       case 3:
       case 23:
         daySuffix = "rd";
         break;

       default:
         daySuffix = "th";
         break;
      }

    document.write("<h2>Today is the " + dayNow + daySuffix +
                   " of " + monthNow + " " + yearNow + "</h2>");

  </script>
</body>
</html>
```

Declare a variable **months** and assign to it the value of a new **Array** containing the names of all 12 months.

the_date - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>What's the Date</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

     var months = new Array("January","February","March","April",
                            "May","June","July","August","September",
                            "October","November","December");
     var dateNow = new Date();
     var yearNow = dateNow.getFullYear();
     var monthNow = months[dateNow.getMonth()];
     var dayNow = dateNow.getDate();
     var daySuffix;

     switch
      {
        ca
        ca
        ca

        ca
        ca

        ca
        ca

        de

      }

     docum


  </script
</body>
</html>
```

Create a new Date object and give it the name dateNow.

Set the yearNow variable to the current year as returned by the getFullYear method of the dateNow object.

Set the monthNow variable to the month. Do this by obtaining an element from the months array using the getMonth( ) method of the dateNow object. (Because this method returns an integer where Jan. is 0 and Dec. is 11, no adjustment is needed for the array numbering).

Set the dayNow variable to the current day by using the getDate( ) method of the dateNow object.

Declare a variable called daySuffix, leave it undefined.

the_date - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>What's the Date</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

     var months = new Array("January",
                            "May","Jun
                            "October",
     var dateNow = new Date();
     var yearNow = dateNow.getFullYear
     var monthNow = months[dateNow.get
     var dayNow = dateNow.getDate();
     var daySuffix;

     switch (dayNow)
      {
        case 1:
        case 21:
        case 31:
          daySuffix = "st";
          break;

        case 2:
        case 22:
          daySuffix = "nd";
          break;

        case 3:
        case 23:
          daySuffix = "rd";
          break;

        default:
          daySuffix = "th";
          break;
       }

     document.write("<h2>Today is the " + dayNow + daySuffix +
                    " of " + monthNow + " " + yearNow + "</h2>");

  </script>
</body>
</html>
```

Use a *switch* conditional statement to add the correct suffix (*st, rd, th*) to the day number. A *switch* statement is like the *if* conditional but tests whether a particular case is true or not.

1) If the dayNow value is 1,21 or 31 assign "st" to the daySuffix variable and break off. If not, then continue to the next set of cases.

2) If the dayNow value is 2 or 22 assign "nd" to the daySuffix variable and break off. If not, then continue to the default case.

3) If the dayNow value is anything else, assign "th" to the daySuffix variable and break or stop the switch test.

the_date - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>What's the Date</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

     var months = new Array("January","February","March","April",
                            "May","June","July","August","September",
                            "October","November","December");
     var dateNow = new Date();
     var yearNow = dateNow.getFullYear();
     var monthNow = months[dateNow.getMonth()];
     var dayNow = dateNow.getDate();
     var daySuffix;

     switch (dayNow)
      {
        case 1:
        case 21:
        case 31:
          daySuffix = "st";
          break;

        case 2:
        case 22:
          daySuffix = "nd";
          break;

        case 3:
        case 23:
          daySuffix = "rd";
          break;

        default:
          daySuffix = "th";
          break;
      }

     document.write("<h2>Today is the " + dayNow + daySuffix +
                    " of " + monthNow + " " + yearNow + "</h2>");

  </script>
</body>
</html>
```

Display the results by using the write method of the document object. This statement is composed of string data concatenated with the various date variables.

the_date - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>What's the Date</title>
</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

     var months = new Array("January","February","March","April",
                            "May","June","July","August","September",
                            "October","November","December");
     var dateNow = new Date();
     var yearNow = dateNow.getFullYear();
     var monthNow = months[dateNow.getMonth()];
     var dayNow = dateNow.getDate();
     var daySuffix;

     switch (dayNow)
      {
        case 1:
        case 21:
        case 31:
          daySuffix = "st";
          break;

        case 2:
        case 22:
          daySuffix = "nd";
          break;

        case 3:
        case 23:
          daySuffix = "rd";
          break;

        default:
          daySuffix = "th";
          break;
       }

     document.write("<h2>Today is the " + dayNow + daySuffix +
                    " of " + monthNow + " " + yearNow + "</h2>");

  </script>
</body>
</html>
```

Exercise #2
the_date.html

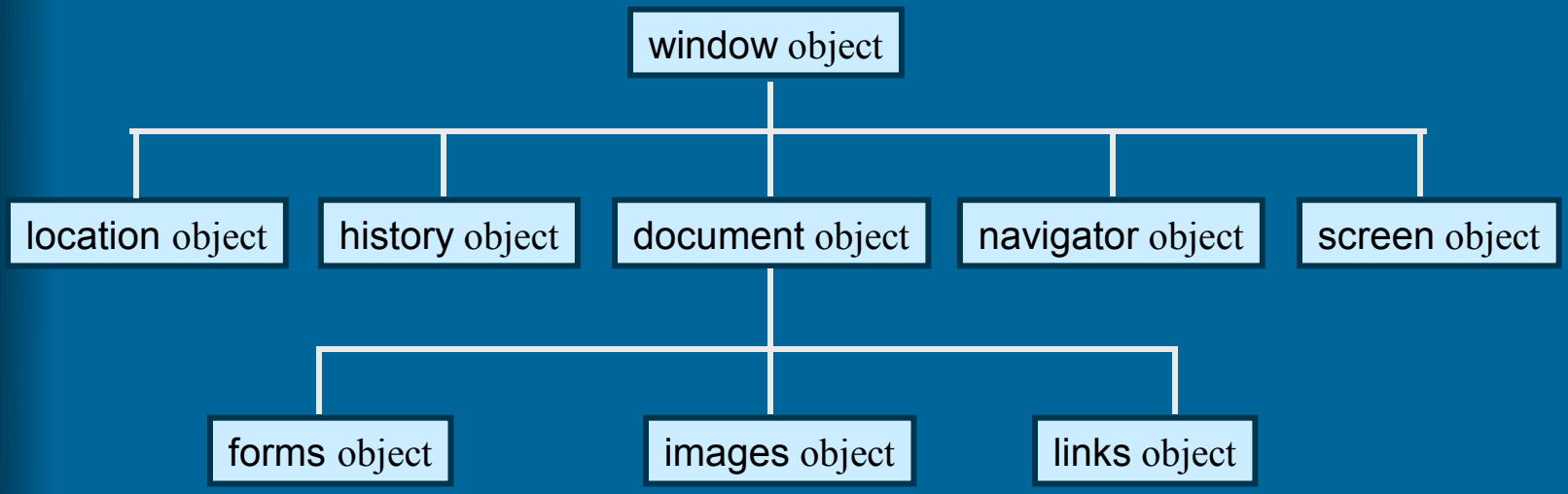
Browser Objects

- window
- history
- location
- navigator
- screen
- document

Browser Objects

- **BOM**
  - Browser Object Model
  - Total number of objects available in the browser that can be manipulated by JavaScript
  - BOM Variations
    - The MS-IE BOM is a little different from the FireFox BOM
    - Some browser objects are specific to a particular browser
    - Cross browser compatibility issues

Browser Objects



Common elements of the JavaScript BOM

Objects are arranged in an hierarchical order

Browser Objects

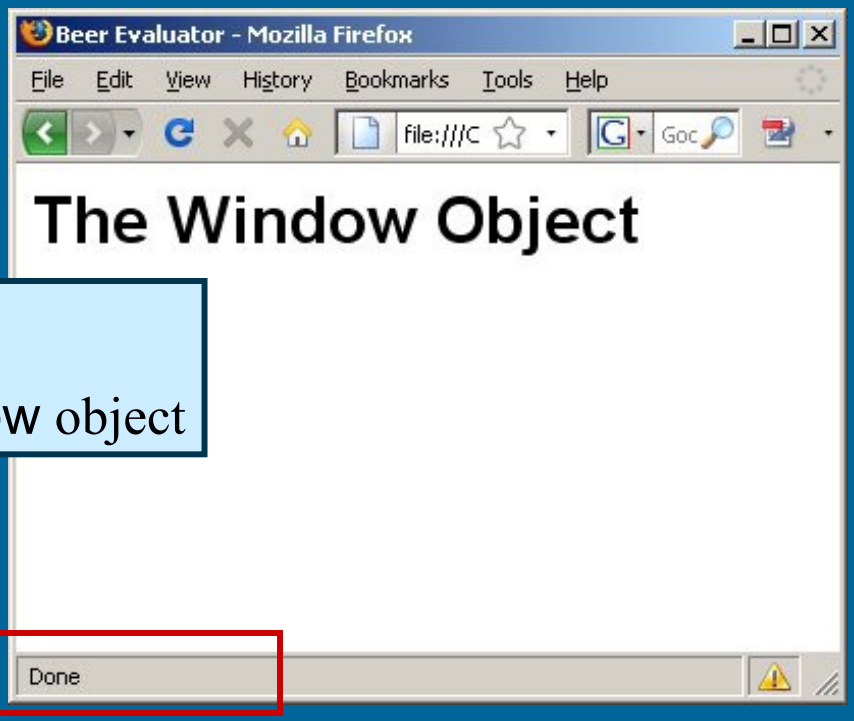
- window
  - Browser's window
  - Access & Manipulate
    - browser type
    - window size
    - window status bar
  - Global object
    - Access properties and methods of this object without having to use the object name

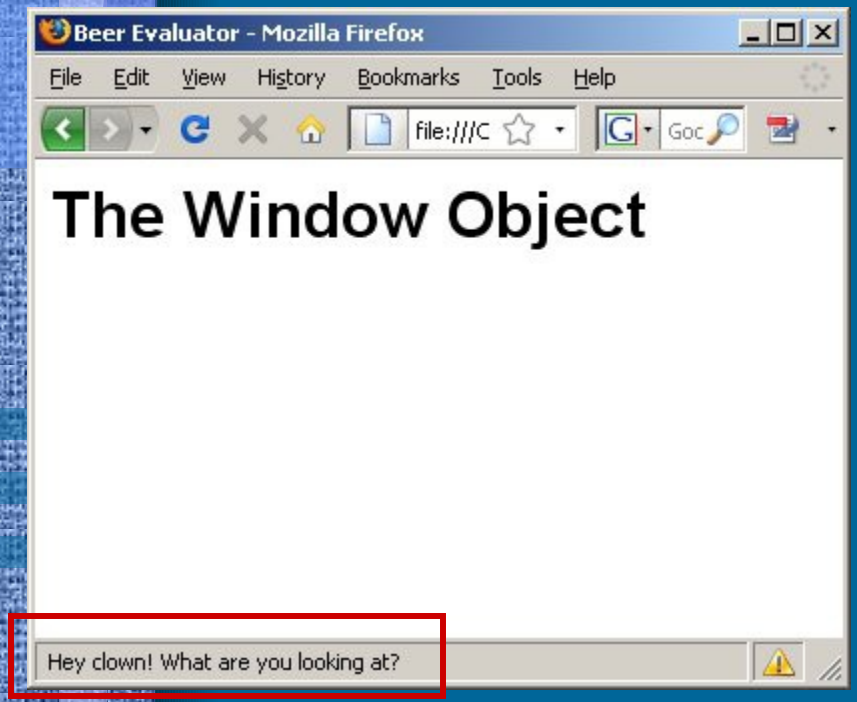
```
window.alert("go away");
```

```
alert("go away");
```

Status bar

property of the window object





example11 - Notepad

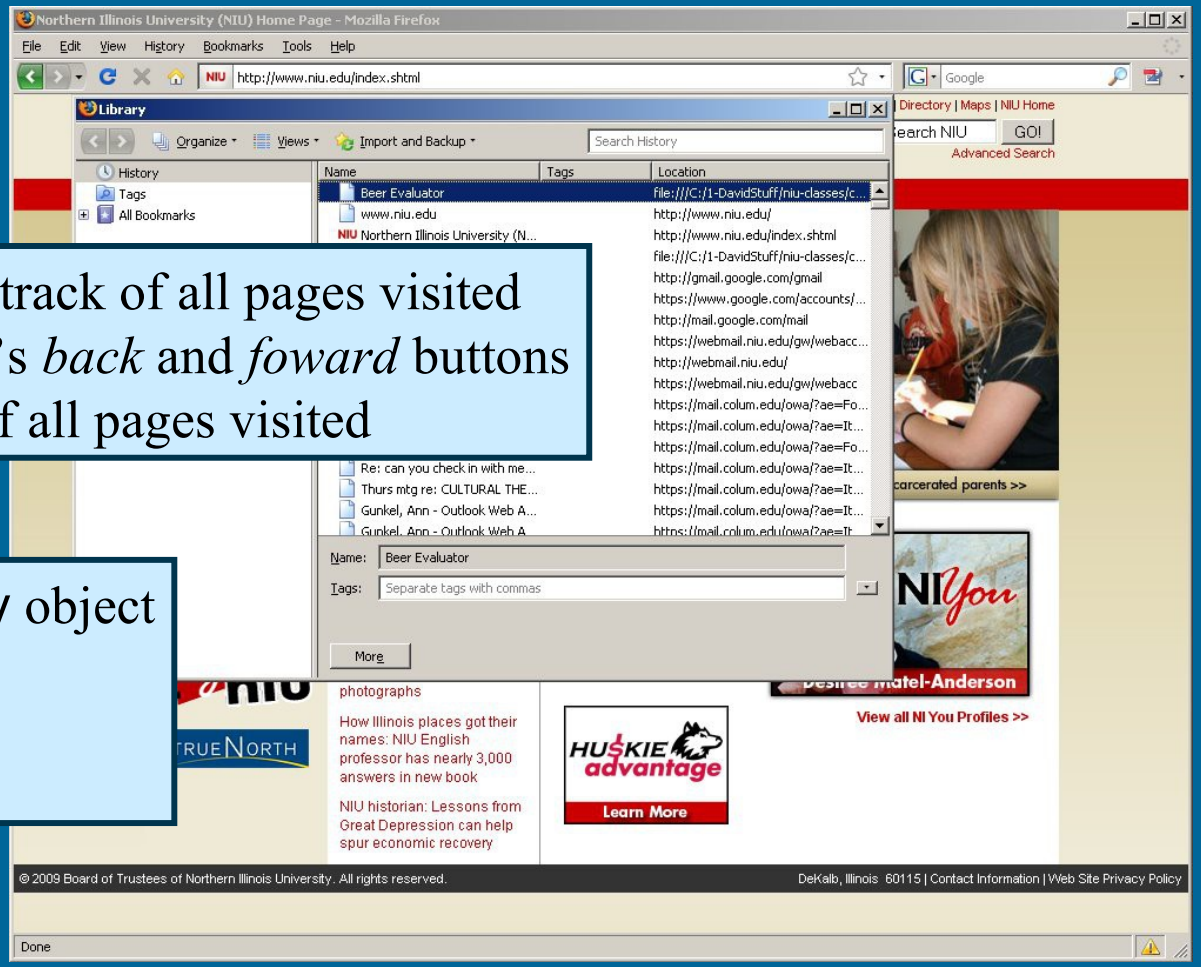
File Edit Format View Help

```
<html>
<head>
 <title>Beer Evaluator</title>

  <script type="text/javascript">

   window.defaultStatus = "Hey clown! What are you looking at?";


  </script>

</head>

<body bgcolor="#ffffff">

 <h1>The Window Object</h1>

</body>
</html>
```

Assign a string value to the window object's defaultStatus property.

Browser Objects

- history



- history object keeps track of all pages visited
- Used by the browser's *back* and *foward* buttons
- *History Stack* – list of all pages visited

Methods of the history object

back( )
forward( )
go(2) or go(-2)

Browser Objects

- location
  - Info about the current page's location
    - URL
    - Server hosting the page
    - Port number of server connection
    - Protocol currently being used
  - Change the location – 2 approaches

replace( ) method

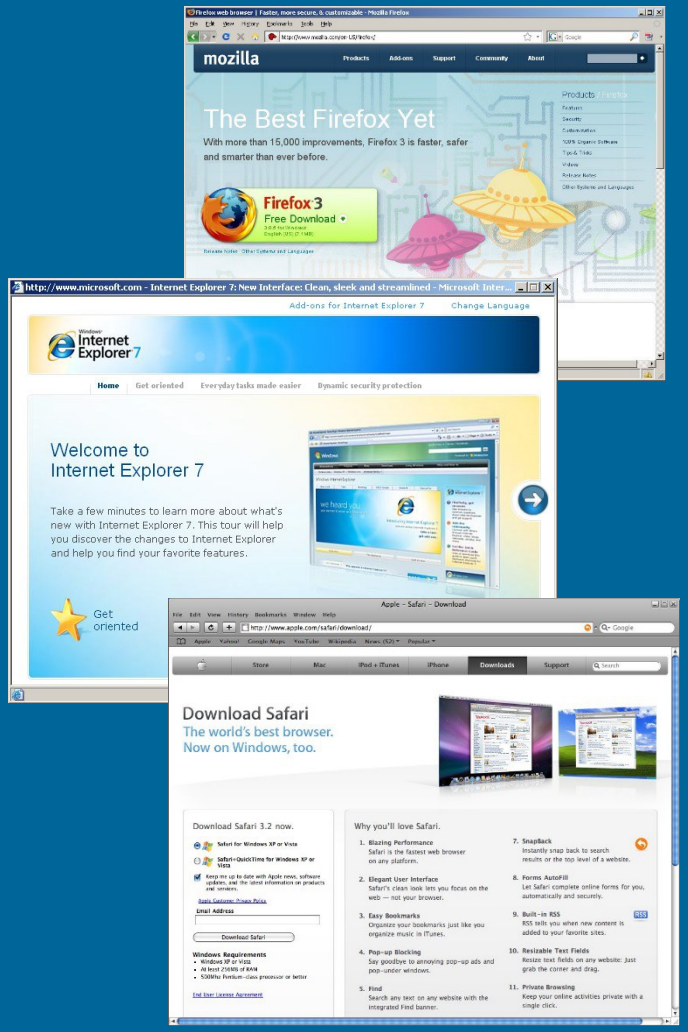
```
window.location.replace("beer_evaluator.html");
```

href property

```
window.location.href = "beer_evaluator.html";
```

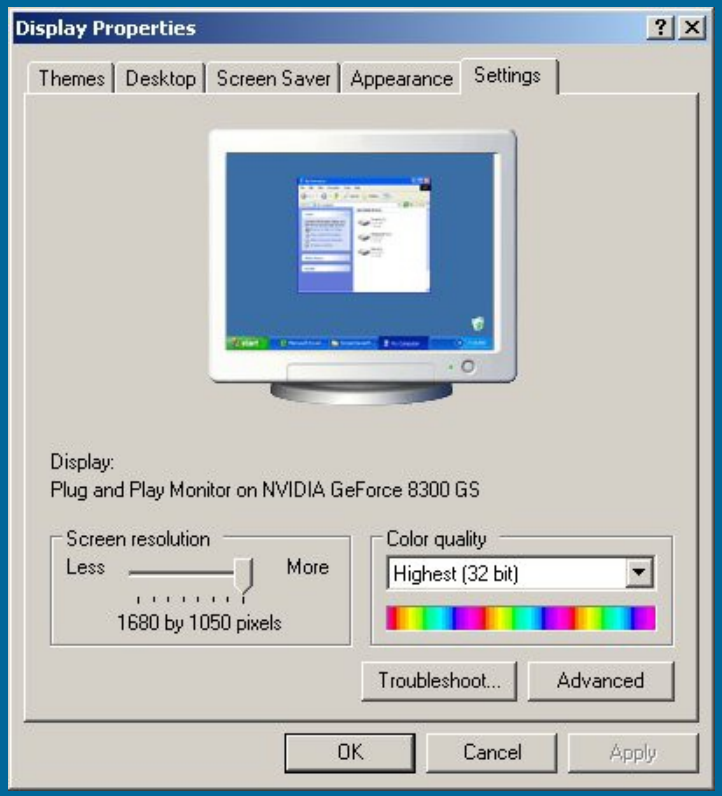
Browser Objects

- navigator
  - Info about the browser and the user's operating system
  - Used to detect browser types and to deal with browser incompatibilities



Browser Objects

- screen
  - Info about the display system
  - Properties
    - height
    - width
    - colorDepth



Browser Objects

- document
  - The HTML document
    - Access and manipulate objects defined by the various tags in the HTML document
  - Common Properties (which are also arrays)
    - forms array
    - images array
    - links array
  - Source of differences in the BOM; different *properties* and *methods* in different browsers

Browser Objects

- Events and Event Handlers
  - Objects have *events* associated with them
    - *Event* = User activity
    - open a page, click a link, move the mouse over something, etc.
  - Use JavaScript to respond to events
    - Provide interactivity/feedback
    - Generate dynamic content
  - *Event Handler*
    - JavaScript code to deal with and respond to events

Browser Objects

- Event Handlers – 2 approaches
  - Attribute – use event handler as an attribute of an HTML tag

```
<a href="page2.html" onClick="alert('you want to leave?')">
```

  - Properties – use event handler as a property of a JavaScript object

```
window.document.links[0].onClick = doSomething
```

Attribute
Basic approach

example12 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Event Handlers</title>
</head>

<body bgcolor="#ffffff">

  <h1>Event Handlers</h1>

  <a href="http://gunkelweb.com/coms469"
     onClick="alert('Are you sure you want to leave?')">

    Visit COMS 469</a>

</body>
</html>
```

Attribute
Basic approach

example12 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Event Handlers</title>
</head>

<body bgcolor="#ffffff">

  <h1>Event Handlers</h1>

  <a href="http://gunkelweb.com/coms469"
     onClick="alert('Are you sure you want to leave?')">

    Visit COMS 469</a>

</body>
</html>
```

Add the event handler onClick as an attribute of the anchor tag. The value of the event handler attribute is assigned to an alert method of the window object, which pops up an alert box when the user clicks on the link

Attribute
More Advanced

example13 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Event Handlers</title>

  <script type="text/javascript">

    function linkClick()
      {
        alert("Are you sure you want to leave?");
        return true;
      }

  </script>

</head>

<body bgcolor="#ffffff">

  <h1>Event Handlers</h1>

  <a href="http://gunkelw
     onClick="return link

    Visit COMS 469</a>

</body>
</html>
```

In the <head> of the document, define a function. The function is given the arbitrary name linkClick and has two lines of code: an alert( ) and a return statement. (The latter is set to true so that the user is taken to the new web page after clicking the alert's OK button.)

Attribute
More Advanced

example13 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Event Handlers</title>

  <script type="text/javascript">

    function linkClick()
      {
        alert("Are you
        return true;
      }

  </script>

</head>

<body bgcolor="#ffffff

  <h1>Event Handlers</h1>

  <a href="http://gunkelweb.com/coms469"
     onClick="return linkClick()">

    Visit COMS 469</a>

</body>
</html>
```

Modify the anchor tag by changing the value of the onClick attribute to return linkClick(). This calls the function defined above.

The **advantage** to this more advanced approach is that the alert will now work with one or more links.

Property

example14 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Event Handlers</title>

   <script type="text/javascript">

    function linkClick()
      {
        alert("Are you sure you want to leave?");
        return true;
      }

   </script>

</head>

<body bgcolor="#ffffff">

 <h1>Event Handlers</h1>

 <a href="http://gunkelweb.com/coms469">Visit COMS 469</a>

   <script type="text/javascript">

      window.document.links[0].onclick = linkClick;

   </script>

</body>
</html>
```

Standard HTML anchor tag.

Property

example14 - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Event Handlers</title>

   <script type="text/javascript">

    function linkClick()
      {
        alert("Are you sure yo
        return true;
      }

   </script>

</head>

<body bgcolor="#ffffff">

 <h1>Event Handlers</h1>

 <a href="http://gunkelweb.com/coms469">Visit COMS 469</a>

   <script type="text/javascript">

      window.document.links[0].onclick = linkClick;

   </script>

</body>
</html>
```

Add script in the <body> of the document.

document.links[0] accesses the first element of the links array property of the document object, which is the first link on the page.

Set the onclick property (notice the letter case) of this object to be assigned to the function linkClick, which calls the function defined above.

Property

example14 - Notepad

File Edit Format View Help

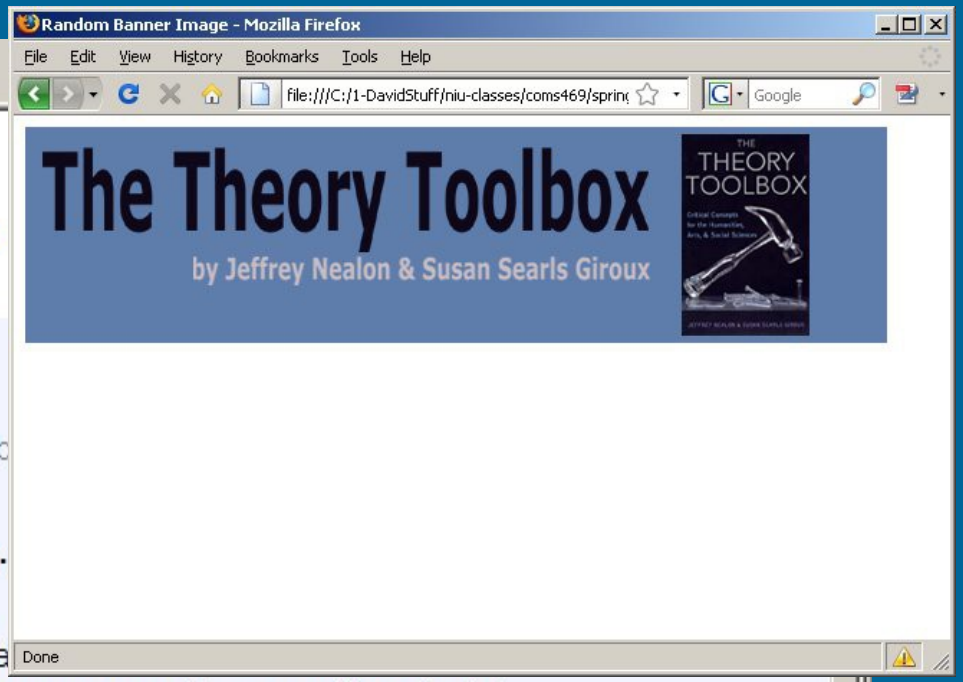
```
<html>
<head>
 <title>Event Handlers</title>

   <script type="text/javascript">

    function linkClick()
      {
        alert("Are you sure you want to leave?");
        return true;
      }

   </script>

</head>

<body bgcolor="#ffffff">

 <h1>Event Handlers</h1>

 <a href="http://gunkelweb.com/coms469">Visit COMS 469</a>

   <script type="text/javascript">

      window.document.links[0].onclick = linkClick;

   </script>

</body>
</html>
```

This is the more difficult approach. Consequently, most designers use the *Attribute* approach for handling events.

random_image.html

```
1  <html>
2  <head>
3   <title>Random Banner Image</title>
4    <script type="text/javascript">
5       function selectImage()
6        {
7          var bannerImg = new Array("b
8
9          var arrayLength = bannerImg.
10
11         randomNumber = Math.round(Ma
12
13         document.banner.src = bannerImg[randomNumber];
14       }
15   </script>
16 </head>
17 <body bgcolor="#ffffff" onLoad="selectImage()">
18   <img src="banner1.jpg" width="600" height="150" name="banner">
19 </body>
20 </html>
21
22
23
```

Hyper Text Markup Language fil | length : 586 lines : 33 | Ln : 21 Col : 1 Sel : 0 | 0 | Dos\Windows | ANSI as UTF-8 | INS



Exercise #3
Random banner image

http://gunkelweb.com/coms469/exercises/banner.html

banner1.jpg

banner2.jpg

banner3.jpg

random_image.html

```
1  <html>
2  <head>
3   <title>Random Banner Image</title>
4    <script type="text/javascript">
5       function selectImage()
6        {
7          var bannerImg = new Array("banner1.jpg","banner2.jpg","banner3.jpg");
8
9          var arrayLength = bannerImg.length -1;
10
11         randomNumber = Math.round(Math.random() * arrayLength);
12
13         document.banner.src = bannerImg[randomNumber];
14
15   </s
16 </hea
17 <body
18   <im
19 </bod
20 </htm
21
22
23
```

Define a function called selectImage( )
Begin by creating a new Array called bannerImg and populate it with our three banner images. Initialize an arrayLength variable, which will take as its value the number of elements in the array -1. (We could use a number here, but this way the number is automatically generated, so we can add to and delete from the array without making further changes.)

Hyper Text Markup Language fil | length : 586 lines : 33 | Ln : 21 Col : 1 Sel : 0 | 0 | Dos\Windows | ANSI as UTF-8 | INS

random_image.html

Generate a random number. This code is the same as in the random quote generator with the exception that we are now using the value of the arrayLength instead of an integer as our multiplier.
Set the src of the document object named banner to the value of the a randomly selected array element. The name banner refers to the banner image, and this name is assigned in the HTML code below.

```
1  <html>
2  <
3
4
5
6
7
8
9          var arrayLength = bannerImg.length -1;
10
11         randomNumber = Math.round(Math.random() * arrayLength);
12
13         document.banner.src = bannerImg[randomNumber];
14       }
15   </script>
16 </head>
17 <body bgcolor="#ffffff" onLoad="selectImage()">
18   <img src="banner1.jpg" width="600" height="150" name="banner">
19 </body>
20 </html>
21
22
23
```

Hyper Text Markup Language fil | length : 586 lines : 33 | Ln : 21 Col : 1 Sel : 0 | 0 | Dos\Windows | ANSI as UTF-8 | INS

random_image.html

Use the onLoad event handler to call the function selectImage when the page loads. Use the <img> tag to insert the image into the page and name this element banner. This name can be used by JavaScript to directly access and manipulate this image object. In this case, JavaScript is used to change the image object's src (the source file of the image), which changes the banner image that appears on the page.

```
<html>
<head>

        randomNumber = Math.round(Math.random() * arrayLength);

        document.banner.src = bannerImg[randomNumber];
      }
  </script>
</head>
<body bgcolor="#ffffff" onLoad="selectImage()">
  <img src="banner1.jpg" width="600" height="150" name="banner">
</body>
</html>
```

Hyper Text Markup Language fil | length : 586 lines : 33 | Ln : 21 Col : 1 Sel : 0 | 0 | Dos\Windows | ANSI as UTF-8 | INS

random_image.html

```
1  <html>
2  <head>
3   <title>Random Banner Image</title>
4    <script type="text/javascript">
5       function selectImage()
6        {
7          var bannerImg = new Array("banner1.jpg","banner2.jpg","banner3.jpg");
8
9          var arrayLength = bannerImg.length -1;
10
11         randomNumber = Math.round(Math.random() * arrayLength);
12
13         document.banner.src = bannerImg[randomNumber];
14       }
15   </script>
16 </head>
17 <body bgcolor="#ffffff" onLoad="selectImage()">
18   <img src="banner1.jpg" width="600" height="150" name="banner">
19 </body>
20 </html>
21
22
23
```

Exercise #3
random_image.html

Hyper Text Markup Language fil | length : 586 lines : 33 | Ln : 21 Col : 1 Sel : 0 | 0 | Dos\Windows | ANSI as UTF-8 | INS

browser_version - Notepad

File Edit Format View Help

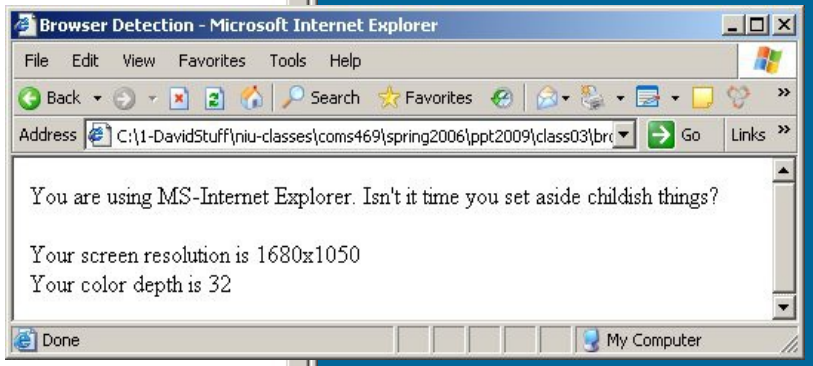
```
<html>
<head>
 <title>Browser Detection</title>

  <script type="text/javascript">
    function getBrowserName()
      {
        var browserName = navigator.userAgent;
        if (browserName.indexOf("MSIE") >= 0)
          {
            browserName = "MS-Internet Explorer";
          }
        else if (browserName.indexOf("Firefox") >= 0)
          {
            browserName = "Firefox";
          }
        else if (browserName.indexOf("Safari") >= 0)
          {
            browserName = "Safari";
          }
        else
          {
            browserName = "other";
          }
        return browserName;
       }
  </script>

</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

    var theBrowser = getBrowserName();

    if (theBrowser == "MS-Internet Explorer")
      {
        document.write("You are using " + theBrowser +
                       ".  Isn't it time you set aside childish things?");
      }
    else
      {
        document.write("You are using " + theBrowser +
                       ".  Thank you for being a grown-up.");
      }

    document.write("<p>Your screen resolution is " + screen.width +
                   "x" + screen.height + "<br>" + "Your color depth is " +
                    window.screen.colorDepth + "<br>");

    </script>

</body>
</html>
```

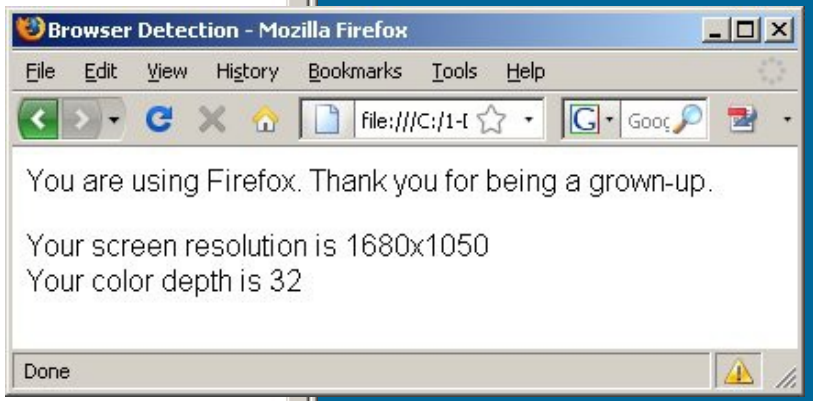
Exercise #4
Browser detection

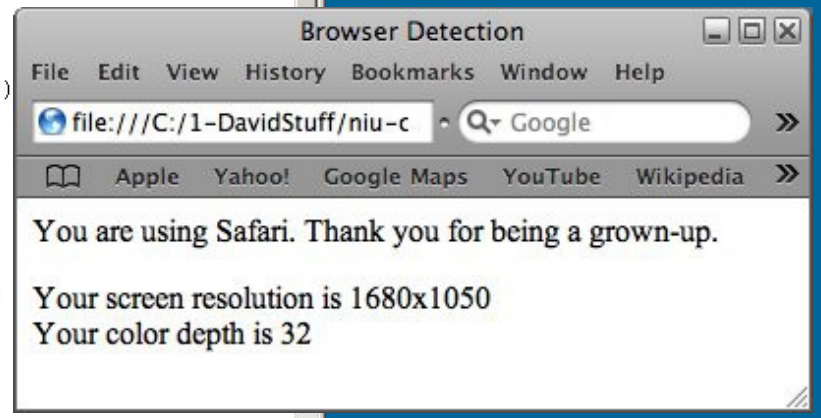
browser_version - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Browser Detection</title>

  <script type="text/javascript">
    function getBrowserName()
      {
        var browserName = navigator.userAgent;
        if (browserName.indexOf("MSIE") >= 0)
          {
            browserName = "MS-Internet Explorer";
          }
        else if (browserName.indexOf("Firefox") >= 0)
          {
            browserName = "Firefox";
          }
        else if (browserName.indexOf("Safari") >= 0)
          {
            browserName = "Safari";
          }
        else
          {
            browserName = "other";
          }
        return browserName;
       }
  </script>

</head>

<body bgcolor="#ffffff">

  <script type="text/javascript">

    var theBrowser = getBrowserName();

    if (theBrowser == "MS-Internet Explorer")
      {
        document.write("You are using " + theBrowser +
                       ".  Isn't it time you set aside childish things?")
      }
    else
      {
        document.write("You are using " + theBrowser +
                       ".  Thank you for being a grown-up.");
      }

    document.write("<p>Your screen resolution is " + screen.width +
                   "x" + screen.height + "<br>" + "Your color depth is "
                    window.screen.colorDepth + "<br>");

    </script>

</body>
</html>
```







browser_version - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Browser Detection</title>

  <script type="text/javascript">
    function getBrowserName()
      {
        var browserName = navigator.userAgent;
        if (browserName.indexOf("MSIE") >= 0)
          {
            browserName = "MS-Internet Explorer";
          }
        else if (browserName.indexOf("Firefox") >= 0)
          {
            browserName = "Firefox";
          }
        else if (browserName.indexOf("Safari") >= 0)
          {
            browserName = "Safari";
          }
        else
          {
            browserName = "other";
          }
        return browserName;
      }
  </script>

</hea
<body
  <sc
    v
    i
    e
    d
    <
</bod
</html>
```

In the <head> of the document, define a function called getBrowserName. Use a series of conditional statements, which access the userAgent property of the navigator object. The information returned by this is a string that can be quite long and complex, so we use the indexOf( ) method to find the instance of a substring (i.e. “MSIE” or “Firefox”). If the indexOf value of this substring is 0 or greater (meaning there is one or more occurrences of the substring), then you have found the substring in the userAgent string and can set the browserName value accordingly

browser_version - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>Browser Detection</title>

  <script type="text/javascript">
    function getBrowserName()
      {
        var browserName = navigator.userAgent;
        if (browserName.indexOf("MSIE") >= 0)
          {
            browserName = "MS-Internet Explorer";
          }
        else if (browserName.indexOf("Firefox") >= 0)
          {
            browserName = "Firefox";
          }
        else if (browserName.indexOf("Safari") >= 0)
          {
            browserName = "Safari";
          }
        else
          {
            browserName = "other";
          }
        return browserName;
      }
  </script>
```

browser_version - Notepad

File Edit Format View Help

```
<html>
<head>
 <title>
  <scrip
    func
      {
      }
  </script>
</head>
<body bgcolor="#ffffff">
  <script type="text/javascript">

    var theBrowser = getBrowserName();

    if (theBrowser == "MS-Internet Explorer")
      {
        document.write("You are using " + theBrowser +
                       ".  Isn't it time you set aside childish things?");
      }
    else
      {
        document.write("You are using " + theBrowser +
                       ".  Thank you for being a grown-up.");
      }

    document.write("<p>Your screen resolution is " + screen.width +
                   "x" + screen.height + "<br>" + "Your color depth is " +
                    window.screen.colorDepth + "<br>");

    </script>

</body>
</html>
```

In the <body> call the function. If the value of theBrowser is MSIE, then use a document.write to display a message. If the value of theBrowser is something else, then use a different document.write to write out an alternative message.

Also use a document.write to display the user's screen resolution and color depth. Access this information by using the screen object and a number of its properties: width, height, and colorDepth. Display the data by concatenating these values with string literals.

browser_version - Notepad

File Edit Format View Help

<html>

browser_version - Notepad

File Edit Format View Help

```
<body bgcolor="#ffffff">

  <script type="text/javascript">

    var theBrowser = getBrowserName();

    if (theBrowser == "MS-Internet Explorer")
      {
        document.write("You are using " + theBrowser +
                       ".  Isn't it time you set aside childish things?");
      }
    else
      {
        document.write("You are using " + theBrowser +
                       ".  Thank you for being a grown-up.");
      }

    document.write("<p>Your screen resolution is " + screen.width +
                   "x" + screen.height + "<br>" + "Your color depth is " +
                    window.screen.colorDepth + "<br>");

    </script>

</body>
</html>
```

Exercise #4
Browser_version.html


```
</body>
</html>
```

Dynamic Content

- Random quote
- Random banner image
- Current date
- User's system settings

Preview

- Text/Topics
  - Ch. 7: HTML Forms (pp. 219-262)
  - Ch. 9: String Manipulation (pp. 301-345)