A340 Laboratory Session #5

LAB GOALS

- Creating multiplication table using JavaScript
- Creating Random numbers using the Math object

☐ Using your text editor (Notepad++ / TextWrangler) create a web page similar to the picture shown below:

Step 1: Start with a simple HTML web site similar to figure below, just make sure you put in a <script> tag in it:

```html
<!DOCTYPE html>
<html>
<head>
  <script type="text/javascript">
  </script>
</head>
<body>
</body>
</html>
```

Step 2: Place the following documentation lines in the HTML file, right below the <!DOCTYPE html>. Make sure these are placed in the HTML documentation tag.

```
Your name
CSCI-A 340 Introduction to Web Programming
Lab: 5 (Creating tables using JavaScript)
Semester, Year
```


Step 4: Include an image of yourself at the top of the page and center it. Set the height of the image to 140 pixels, and adjust the width of the image to whatever makes the images properly proportioned. Include a tooltip attribute for the image (try both “alt” and “title” attributes), so that when the user hovers over your images, your name will appear as alternate text for the picture. Below the picture, put your “name” and email on two separate lines. Make sure these lines are centered, and are <H2> size.

Step 5: Make sure you are using Google Chrome for this lab. Chrome (as well some of the other browsers) have some basic debugging capability. Before starting step 6, open a browser TAB, and start the debugger for Javascript in “chrome”. You can do this by clicking TOOLS, JavaScript CONSOLE (Or Ctrl+Shift+J). The figure below shows what the
debugging console looks like. As you work on your java script program, there are times when you have a syntax error and the browser may not display the web page. In such cases, you can open the debugging console and see if the debugger can identify the location and type of error. One suggestion that will save you a lot of time is to reload your browser page very frequently to identify and fix your errors as soon as possible! This is the same idea as compiling your code very frequently to make sure errors are identified at an early stage.

Step 6: Inside the <HEAD> tag, create a java script function which displays a multiplication table:

```html
<script type="text/javascript">
function MultiplicationTable_1()
{
    document.write("<table border='1'>");
    for (var row=1; row <=10; row++)
    {
        document.write("<tr>");
        for (var col=1; col <=10; col++)
        {
            document.write("<td bgcolor='#3BA3D0'>");
            document.write( row*col);
            document.write("</td>");
        }
        document.write("</tr>");
    }
    document.write("</table>");
}

document.write("<H3> Multiplication Table: (Version 1)</H3>");
MultiplicationTable_1();
</script>
```

Call the function and test it.
Step 7: Note that the above function automatically creates a 10x10 multiplication table and displays it. Let’s make a similar function that is a little more sophisticated. First, let’s parameterize this new function so that the user can provide the number of rows and columns. Second, let’s make the function prepare the HTML for the multiplication table (as one long string), but not display the table. Instead the function should simply return the HTML (string) needed to display the table. The returned value from the function could then be used at any time to display the table.

```javascript
function MultiplicationTable_2(numRow, numCol)
{
    HTML = "";
    HTML = HTML + "<table border='1'>";
    for (var row=1; row <=numRow; row++)
    {
        HTML = HTML + "<tr>";
        for (var col=1; col <=numCol; col++)
        {
            HTML = HTML + "<td bgcolor='#3BA3D0'>";
            HTML = HTML + row*col;
            HTML = HTML + "</td>";
        }
        HTML = HTML + "</tr>";
    }
    HTML = HTML + "</table>";
    return(HTML);
}
```

Call the function and test it.
Step 8: Let's create a similar function which will display the odd numbers in GREEN.

```javascript
function MultiplicationTable_3(numRow, numCol) {
    HTML = "";
    HTML = HTML + "<table border='1'>";
    for (var row=1; row <= numRow; row++) {
        HTML = HTML + "<tr>";
        for (var col=1; col <= numCol; col++) {
            if (row*col %2 == 1) {
                HTML = HTML + "<td bgcolor='#3BFF00'>";   // Odd numbers
            } else {
                HTML = HTML + "<td bgcolor='#3BA3D0'>";   // Even numbers
            }
            HTML = HTML + row*col;
            HTML = HTML + "</td>";
        }
        HTML = HTML + "</tr>";
    }
    HTML = HTML + "</table>";
    return(HTML);
}
```

```html
<code class="javascript">document.write("<H3> Multiplication Table (Version 3: Displaying Odd numbers in GREEN)";
result = MultiplicationTable_3(5,5);
document.write(result);
</code>
```

Step 9: Let's create another function which will populate the table with random numbers. In order to do that we need to learn about the built-in Math object and its methods and properties.

```javascript
function RandomTable(numRow, numCol) {
    HTML = "";
    HTML = HTML + "<table border='1'>";
    for (var row=1; row <= numRow; row++) {
        HTML = HTML + "<tr>";
        for (var col=1; col <= numCol; col++) {
            randomNumber = Math.floor((Math.random() * 100));
            HTML = HTML + "<td bgcolor='#3BA3D0'>";
            HTML = HTML + randomNumber;
            HTML = HTML + "</td>";
        }
        HTML = HTML + "</tr>";
    }
    HTML = HTML + "</table>";
    return(HTML);
}
```

```html
<code class="javascript">document.write("<H3> Random Table";
result = RandomTable(5,5);
document.write(result);
</code>
```
Step 10: Finding prime numbers in the table

```javascript
function FindPrimeInRandomTable(numRow, numCol)
{
    HTML = "";
    HTML = HTML + "<table border='1'>";
    for (var row=1; row <=numRow; row++)
    {
        HTML = HTML + "<tr>";
        for (var col=1; col <=numCol; col++)
        {
            randomNumber = Math.floor( (Math.random() * 100));
            if (isPrime(randomNumber))
                HTML = HTML + "<td bgcolor='#3BFF00'>"; // prime number
            else
                HTML = HTML + "<td bgcolor='#3BA3D0'>"; // non-prime number
            HTML = HTML + randomNumber;
            HTML = HTML + "</td>";
        }
        HTML = HTML + "</tr>";
    }
    HTML = HTML + "</table>";
    return(HTML);
}

function isPrime (number)
{
    // A prime number (or a prime) is a natural number greater
    // than 1 that has no positive divisors other than 1 and itself.
    // http://en.wikipedia.org/wiki/Prime_number
    if (number < 2) return false;
    var limit = Math.floor(Math.sqrt (number));
    for (var i = 2; i <= limit; i++)
    {
        if (number % i == 0)
            return false;
    }
    return true;
}
```

Call the function and test it.
Step 11: Note that all the above code was placed inside the `<HEAD>` tag within `<script>` ....</script>. Also note that this caused your photo and your name (which is placed in the `<BODY>` of the document see GREEN highlighting) to appear at the end of the web page not at the beginning. One way to fix this situation is to move the following lines (see yellow highlighting) from the `<HEAD>` to the `<BODY>` of the document. Of course when you move JavaScript code to the body of the document, you will have to add another `<script>` .....</script> tag to let the browser know that the text is JavaScript and not HTML.

```
<body>
  <!-- Put the image inside a paragraph tag so it can be centered -->
  <p align='center' >
    <img src='http://cs.iusb.edu/~hhakimza/hossein_2013.jpg' height='140' width='120' alt='My name' title='If the alt tag does not work, use title to display My name'>
  </p>
  <H2 align='center'> My Name <br> hhakimza@iusb.edu</H2>
  <script>
    document.write("<H3> Multiplication Table: (Version 1)<br>
    MultiplicationTable_1(); </H3>");
    document.write("<H3> Multiplication Table (Version 2: Returning the HTML from the function)<br>
    result = MultiplicationTable_2(5,5);
    document.write(result);
    document.write("<H3> Multiplication Table (Version 3: Displaying Odd numbers in GREEN)<br>
    result = MultiplicationTable_3(5,5);
    document.write(result);
    document.write("<H3> Random Table<br>
    result = RandomTable(5,5);
    document.write(result);
    document.write("<H3> Random Table (Display prime Numbers in random table in Green )<br>
    result = FindPrimeInRandomTable(5,5);
    document.write(result);
  </script>
</body>
```