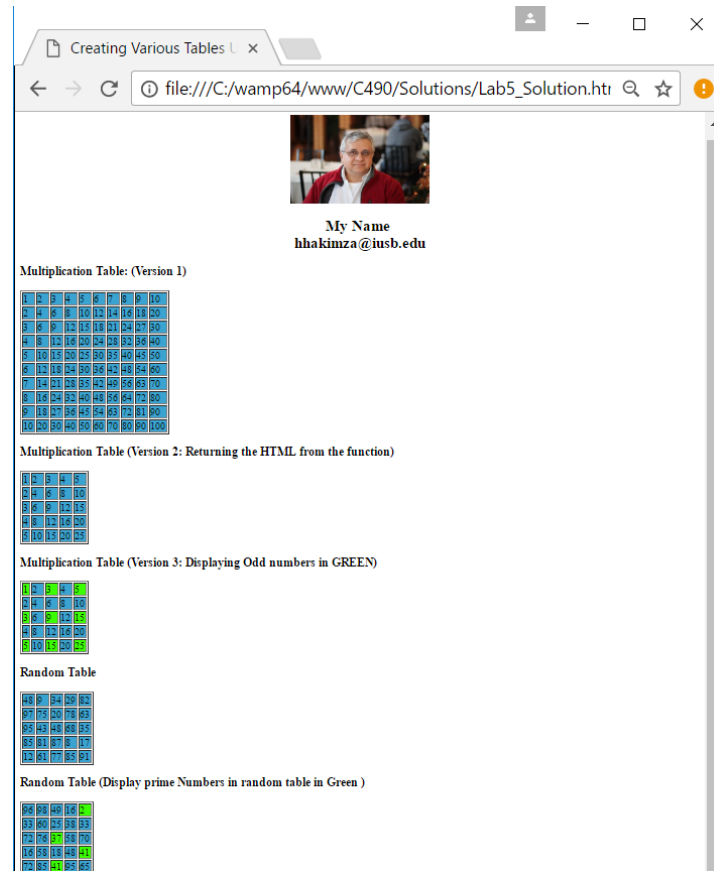


Laboratory Session #5

LAB GOALS

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

- Using your text editor (Notepad++ / TextWrangler) create a web page like 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:

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

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

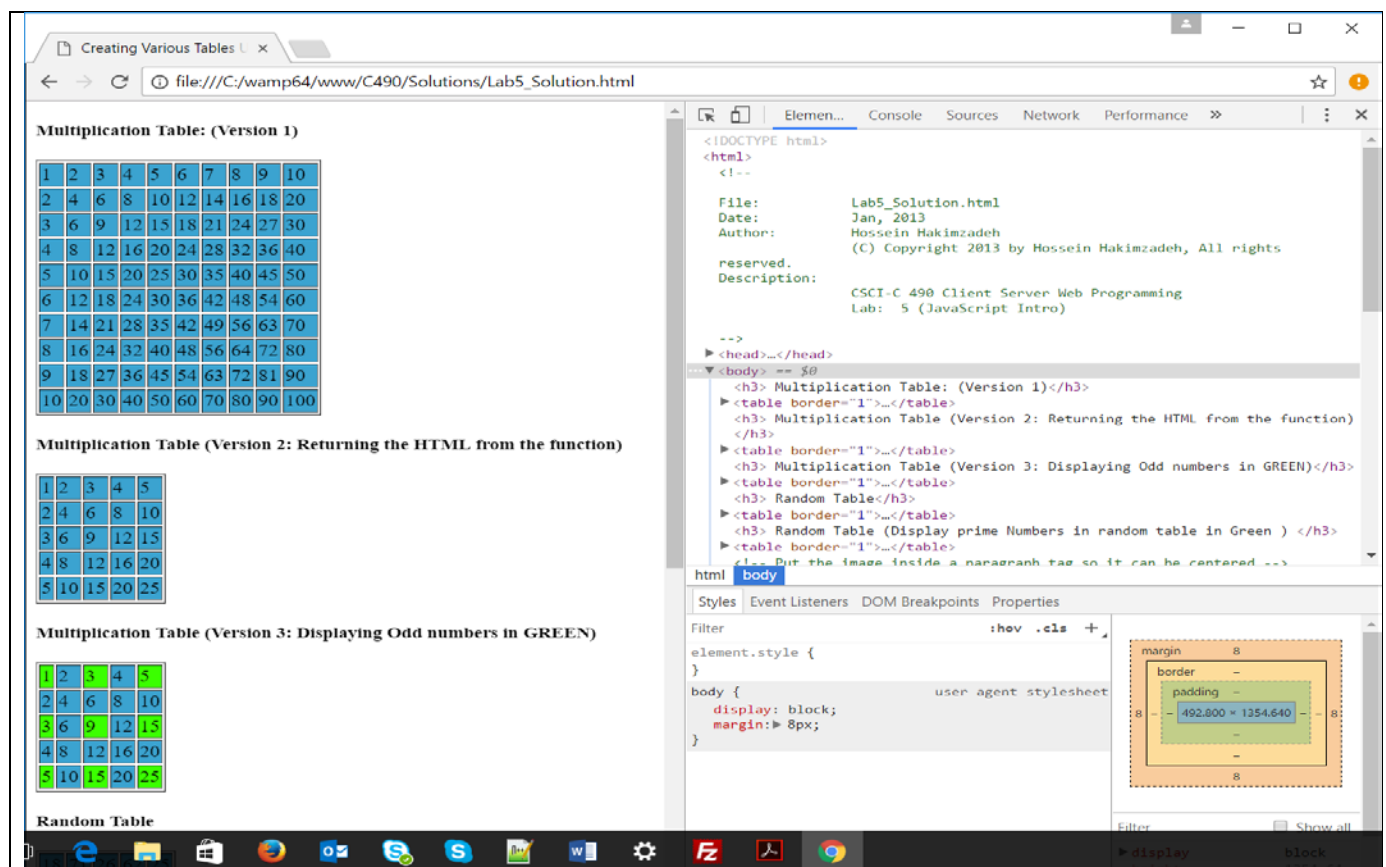
Step 2: Place the following documentation lines in the HTML file, right below the <!DOCTYPE html>. Make sure these are placed in the HTML documentation tag.

```
Your name
Web Programming
Lab: 5 (Creating tables using JavaScript)
Semester, Year
```

Step 3: Set the title of the web page to "Creating Various Tables Using JavaScript". Then set the keywords for the page to HTML Tables Using Java Script, Web Programming, Java Script Math Object, Finding Prime Numbers. Finally make sure the character set for the web page is set to UTF-8.

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 ELEMENT (Or Ctrl+Shift+I). 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 tag and place a function which displays a multiplication table:

```

<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>

```

Multiplication Table: (Version 1)

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

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.

```

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);
}

document.write("<H3> Multiplication Table (Version 2: Returning the HTML from the function)</H3>");
result = MultiplicationTable_2(5,5);
document.write(result);

```

Multiplication Table (Version 2: Returning the HTML from the function)

1	2	3	4	5
2	4	6	8	10
3	6	9	12	15
4	8	12	16	20
5	10	15	20	25

Call the function and test it.

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

```
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);
}

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

Multiplication Table (Version 3: Displaying Odd numbers in GREEN)

1	2	3	4	5
2	4	6	8	10
3	6	9	12	15
4	8	12	16	20
5	10	15	20	25

Call the function and test it.

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.

```
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);
}

document.write("<H3> Random Table</H3>");
result = RandomTable(5,5);
document.write(result);
```

Random Table

74	21	43	67	43
21	26	24	75	16
70	53	7	73	38
35	30	78	23	25
4	21	68	82	70

Call the function and test it.

Step 10: Finding prime numbers in the table

```
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;
}

document.write("<H3> Random Table (Display prime Numbers in random table in Green ) </H3>");

result = FindPrimeInRandomTable(5,5);
document.write(result);
```

Random Table (Display prime Numbers in random table in Green)

47	84	29	21	93
68	52	44	41	98
97	58	94	7	9
21	20	73	76	29
80	14	24	63	78

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" >
        
    </p>

    <H2 align="center"> My Name <br>hhakimza@iusb.edu</H2>

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

        document.write("<H3> Multiplication Table (Version 2: Returning the HTML from the function)</H3>");

        result = MultiplicationTable_2(5,5);
        document.write(result);

        document.write("<H3> Multiplication Table (Version 3: Displaying Odd numbers in GREEN)</H3>");

        result = MultiplicationTable_3(5,5);
        document.write(result);

        document.write("<H3> Random Table</H3>");
        result = RandomTable(5,5);
        document.write(result);

        document.write("<H3> Random Table (Display prime Numbers in random table in Green ) </H3>");

        result = FindPrimeInRandomTable(5,5);
        document.write(result);

    </script>

</body>

```