JS: Random Numbers and comments:

Random Pictures:

So far, every time you click on a picture, you get the appropriate text, but the same two pictures pop up. We may want random pictures to pop up. We can do this using arrays and random numbers.

First, create an array of images (like you did for the previous tutorial). It can be as long as you want (I made mine hold 6 images, or imgArray.length is 6) :

```
imgArray = new Array()
imgArray [0] = "kittysleeping.jpg"
imgArray [1] = "kittymetric.jpg"
imgArray [2] = "kittyfur-back.jpg"
imgArray [3] = "kittysit.jpg"
imgArray [4] = "kittysmiling.jpg"
imgArray [5] = "kittypanda.jpg"
```

Now to display any random image in the array, you can generate a *random number* between 0 and the length of the array, then access that image in the array.

JavaScript allows us to generate random numbers within a range using:

```
randnum = Math.floor(Math.random() * range )
```

Quick explanation:

`Math.random()` generates a random number between 0 and 1 (e.g., 0.4).

We multiply this by a range to generate a random number between 0 and the range, so, for instance, if you wanted to generate a random number between 0 and 9, you'd do the following:

```
Math.random() * 9
```

and the result would be 3.6

To get a whole number, and not a fraction, I'd truncate (chop) off the .6 with:

```
Math.floor(Math.random() * 9)
```

which is the same as saying:

```
Math.floor(3.6)
```

which gives us 3.

Finally, I need a box to put all this in, and I called my box randnum.

So I'm saying `randnum = 3,`

or

`randnum = Math.floor(3.6),`

or

`randnum = Math.floor(Math.random() * 9)`

where the value 9 is the upper value of the range of numbers in which I want to generate a random number (i.e., I want to generate a random number between 0 and 9)

So, if I want to generate a random number between 0 and the length of the list, I'd use:

`randnum = Math.floor(Math.random() * imgArray.length)`

Now the randnum variable holds a random value between 0 and the length of imgArray.

So, putting it together, if you want a function that changes a text element, and changes two pictures to random pictures in an array, you'd have:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html lang="en-US" xml:lang="en-US" xmlns="http://www.w3.org/1999/xhtml">
    <head>
        <title>Our first javascript!</title>
        <meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1" />

        <script type = "text/javascript">
          imgArray = new Array()
          imgArray [0] = "kittyfur-back.jpg"
          imgArray [1] = "kittyhimself.jpg"
          imgArray [2] = "kittybreakfast.jpg"
          imgArray [3] = "kittyno-regrets.jpg"
          imgArray [4] = "kttylemon.jpg"
          imgArray [5] = "kittypanda.jpg"

          function TextRandPic(par1, par2)
           {
              if (par2 == "pic1")
              {  document.getElementById(par1).innerHTML = "You picked the first picture!"
              }
              else if (par2 == "pic2")
              {  document.getElementById(par1).innerHTML = "You picked the second picture!"
              }

              randnum = Math.floor(Math.random() * imgArray.length)
              document.images["pic1"].src = imgArray[randnum]
              randnum = Math.floor(Math.random() * imgArray.length)
              document.images["pic2"].src = imgArray[randnum]

           }
        </script>
    </head>
    <body>
       <table>
          <tr>
             <td>
                <img src = "kittysit.jpg" width = "500" height = "363"
                    alt = "kitty pic" id = "pic1"
                    onClick="TextRandPic('para1', 'pic1')"/>
             </td><td>
                <img src = "kittysleeping.jpg" width = "500" height = "363"
                    alt = "kitty pic" id = "pic2"
                    onClick="TextRandPic('para1', 'pic2')"/>
             </td></tr>
          <tr>
             <td colspan = "2" align = "center">
                <p id = "para1"> New Text Goes Here</p>
             </td>
          </tr>
       </table>
    </body>
</html>
```

Exercise 1: Modify your web page so that when you click on an image, the corresponding text is generated and two new random pictures (from the array) are displayed.

Counter Variable

What if we wanted to count how many times the user selected the first picture, and how many times the user selected the second picture, and to print out that count each time?

We can add two counter variables to hold the count of how many times each picture was selected.

In English, we'd have a first counter variable and a second counter variable, originally set to hold 0. Whenever the user clicks on the first picture, we'd increase the first counter variable by 1, and whenever the user clicks on the second picture, we'd increase the second counter variable by 1.

In Javascript, we'd write this:

```
<script type = "text/javascript">
    imgArray = new Array()
    imgArray [0] = "kittyfur-back.jpg"
    imgArray [1] = "kittyhimself.jpg"
    imgArray [2] = "kittybreakfast.jpg"
    imgArray [3] = "kittyno-regrets.jpg"
    imgArray [4] = "kttylemon.jpg"

    counter1 = 0
    counter2 = 0

    function TextRandPic(par1, par2)
     {
        if (par2 == "pic1")
        {  counter1 = counter1 + 1
           document.getElementById(par1).innerHTML = "You picked the first picture!"
        }
        else if (par2 == "pic2")
        {  counter2 = counter2 + 1
           document.getElementById(par1).innerHTML = "You picked the second picture!"
        }
        randnum = Math.floor(Math.random() * imgArray.length)
        document.images["pic1"].src = imgArray[randnum]
        randnum = Math.floor(Math.random() * imgArray.length)
        document.images["pic2"].src = imgArray[randnum]
     }
</script>
```

Now we have a count of how many times the user selected the first picture, and a separate count of how many times the user selected the second picture (think of the many psychology studies that are run this way…)

But we aren't printing out those counts.

To print out what is inside of a variable, we will use the name of the variable. ***But Be Warned!*** If you want JavaScript to print what's in the variable, and not the name of the variable, you must **not** put the name of the variable in quotes.

So we'd modify the text line to be:

```
if (par2 == "pic1")
{   counter1 = counter1 + 1
    document.getElementById(par1).innerHTML = "You picked the first picture "+ counter1 + "times! "
}
else if (par2 == "pic2")
{   counter2 = counter2 + 1
    document.getElementById(par1).innerHTML = "You picked the second picture " + counter2 + "times!
}
```

Exercise 2: Modify your web page so that it includes a counter for each image on the page and displays a count of how many times the user clicked on each image.

Modify that so that it displays both counts each time so that the user knows how many times s/he has picked the first picture, and how many times s/he has picked the second image.

Comments:

Every programming language allows people to include comments to themselves and to other people using comments. Comments start with /* and end with */. Everything between these opening and closing markers is ignored by the browser, so anything between them won't run in javascript.

Here's an example of a comment:

```
function TextRandPic(par1, par2)
{
 /* This function takes two parameters. The first must hold the id of something with
    text (e.g., a paragraph, a header, etc., and the second parameter holds the id
    of an image on your web page.  The function checks to see which image you
    clicked on based on the id in the second parameter, and changes the innerHTML of
    the text element (using the id in the first parameter). It then displays two new
    random pictures.
 */
    if (par2 == "pic1")
    {  counter1 = counter1 + 1
       document.getElementById(par1).innerHTML = "You picked the first picture!"
    }
    else if (par2 == "pic2")
    {  counter2 = counter2 + 1
       document.getElementById(par1).innerHTML = "You picked the second picture!"
    }
    randnum = Math.floor(Math.random() * imgArray.length)
    document.images["pic1"].src = imgArray[randnum]
    randnum = Math.floor(Math.random() * imgArray.length)
    document.images["pic2"].src = imgArray[randnum]
}
```

The comment is completely ignored by the browser. It is, in essence, a not to myself (or possibly the TA or anyone else who might be reading your code) telling them what you're trying to do.

Because programming languages can't be read quite the same way that English (or other spoken languages) can be read, it is often critical that we leave notes for ourselves and others about what code does.

Comments have another amazingly useful function. They can be used for debugging. A "bug" is a flaw in your code that makes your code either not work at all, or work improperly. A bug can be the result of a typo, or it could be a syntax error e.g.,

- document.images['pic1'] = "cat.jpg";
- forgetting an opening or closing {   }
- if (par1 = 'pic1')

It can also be a logic error – these are the hardest errors to find.

Finding bugs is known as "debugging". You can put comments around portions of your code to see whether that helps or hurts your code. If the uncommented portion of your code works, that means that the problem is in the commented out portion.

Your Turn:

Write appropriate comments, including what the parameters hold and what the function does, similar to how I added comments to the function above, for the functions in the following code:

Add comments (1):

```
<script type = "text/javascript">

    function Changefunc(par1,par2)
    {
     /* fill in comments here…
     */
        document.images[par2].src = par1;
    }
</script>
```
...

Add comments (2):

```
    <script type = "text/javascript">
       function Changefunc(par1,par2)
       {
       /* fill in comments here…
       */
          document.images['pic'].width = par1 * 0.5;
          document.images['pic'].height = par2 * 0.5;
       }
    </script>
```

Add comments (3):

```
    <script type = "text/javascript">

       sArray = new Array()
       sArray [0] = "umbrella.jpg"
       sArray [1] = "mittens.jpg"
       sArray [2] = "bathingsuit.jpg"
       sArray [3] = "sweater.jpg"

       function Changefunc(par1)
       {
       /* fill in comments here…
       */
         if (par1 == 'spring')
         {
            document.images['pic'].src = sArray[0];
         }
         else if (par1 == 'winter')
         {
            document.images['pic'].src = sArray[1];
         }
         else if (par1 == 'summer')
         {
            document.images['pic'].src = sArray[2];
         }
         else if (par1 == 'fall')
         {
            document.images['pic'].src = sArray[3];
         }
       }
    </script>
```

Add comments (4):

```
<script type = "text/javascript">

        sArray = new Array()
        sArray [0] = "on.jpg";
        sArray [1] = "off.jpg";
        num = 0;

        function Changefunc(par1)
         {
         /* fill in comments here…
         */
           if (num == 0)
           {
              document.images[par1].src = sArray[num];
              num = 1;
           }
           else if (num  == 1)
           {
              document.images['pic'].src = sArray[num];
              num = 0;
           }
      </script>
```

Add comments (5):

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-
transitional.dtd">
<html lang="en-US" xml:lang="en-US" xmlns="http://www.w3.org/1999/xhtml">
    <head>
        <title>Our first javascript!</title>
        <meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1" />
          <script type = "text/javascript">
          hArray = new Array()
          hArray [0] = "p1"
          hArray [1] = "p2"
          hArray [2] = "p3"
          hArray [3] = "p4"

          sArray = new Array()
          sArray [0] = "Stop smoking!"
          sArray [1] = "eat vegetables"
          sArray [2] = "exercise daily"
          sArray [3] = "drink plenty of water"
          sArray [4] = "maintain friendships"
          sArray [5] = "get enough sleep"

          function Changefunc()
           {
           /* fill in comments here…
           */
             randnum = Math.floor(Math.random() * hArray.length)
             randnum2 = Math.floor(Math.random() * sArray.length)
             document.getElementById(hArray[randnum]).innerHTML = sArray[randnum2]
           }
        </script>
    </head>
    <body>
        <h1 id = "head1"> Healthy Living! </h1>
        <h2 id = "head2" onClick ="Changefunc()" > Click here to get healthy living instructions!
```

```
            </h2>
            <p id = "p1">Here's an idea! </h1>
            <p id = "p2">Here's another idea!</p>
            <p id = "p3">Here's another idea!</p>
            <p id = "p4">  Here's another idea! </p>
            <h2 id = "head3" onClick = "Changefunc()"> Click here for more healthy living instructions!
            </h2>
    </body>
</html>
```

NOTE: If you cannot figure out what each of the above functions does without running the code, you should go back and reread ALL the javascript tutorials until you understand them. Then fill in the comments for what each of the above functions does. Understanding these functions is a good review for the Celebration of Technology.

To turn in:

1. Exercises 1 and 2

2. Comments for functions 1-5

Extra Info:

You can change the url you are linking to using the getElementById and then setting href.

So, for instance you could write javascript code that would look something like this:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-
transitional.dtd">
<html lang="en-US" xml:lang="en-US" xmlns="http://www.w3.org/1999/xhtml">
    <head>
        <title>Our first javascript!</title>
        <meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1" />
          <script type = "text/javascript">
           hrefArray = new Array()
           hrefArray [0] = "http://udel.edu"
           hrefArray [1] = "http://cutecats.com"
           hrefArray [2] = "http://lolcats.org"
           hrefArray [3] = "http://cutedogs.com"

           function Changehref(par1)
            {  randnum = Math.floor(Math.random() * imgArray.length)
               document.getElementById(par1).href = hrefArray[randnum]
            }
        </script>
    </head>
    <body>

        <h1 id = "headofpage">Your Choice! </h1>
      <p id = "firsttext">This is the first paragraph on the page </p>
       <p id = "secondtext">This is another paragraph.
            <a href = "http://www.amazon.com" id = "firstlink" >link </a>
      </p>

        <h2 onClick = "Changehref('firstlink')"> Click here for new link </h2>

    </body>
```

```
</html>
```