JavaScript Christmas Tree

SKILLS OUTCOME

JavaScript, For Loop, concatenation, Arrays, CSS, HTML

INTRODUCTION

This tutorial is about the For Loop and how to use it. Loops are a great for running the same code multiple times; the For Loop is the most commonly used. Loops are often used alongside arrays to access their values. Arrays are used to store lots of values into a single variable. This tutorial will show you how to use both arrays and for loops to create a lovely JavaScript Christmas tree!

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STEP 1. CREATE THE WEBPAGE THAT WILL BE USED TO DISPLAY THE TREE.

Using the text editor of your choice, for example notepad++ or sublime text, create a basic HTML page. The code for this can be found in the example below. Save the page as **index.html** into a folder on your computer.

STEP 2. CREATE A JAVASCRIPT FOR LOOP.

Inside the body of the HTML page add the javaScript For Loop as displayed below. The javaScript is added inside <script> tags. Load the page and see the numbers 0 to 9 printed out.

```
<!DOCTYPE html>
<html>
<head>
     <title>Javascript loop</title>
</head>
<body>

<script>
for(i=0; i<10; i++)
{
     document.write("number " + i + "<br>");
}
</script>

</body>
</html>
```

How it works

for(i = 0; i < 10; i++)

- i is a variable in the for loop and could be named as any other variable. The first part (i = 0;) means that the value has been initially set to zero.
- The next part (i < 10;) means that the loop will run while i is less than 10. Because 'i' is initially set at zero, it will run until it reaches the value of 9.
- (i++) This increments the value of i by one. (same as writing i=i+1)

The number value of i is printed out using the document.write function. The example also prints out the text and html "number " and the "
" tag to insert a new line. The + operator is used to join (concatenate) the items together.

STEP 3. ADD AN ARRAY AND LOOP THROUGH IT.

Add an array to the javaScript above the for loop you have written. You can create your own array or use the one in the example.

```
var carols = ['Deck the Hall', 'The first Noel', 'Silent night', 'Good King Wencless', 'The Holly and the Ivy'];
```

Adjust the For Loop as shown so that it will loop through the array. Note that the name of the array is used in the for loop and in the document.write function.

```
for(i=0; i<carols.length; i++)
{
     document.write(carols[i] + "<br>");
}
```

How it works

The first position of an array is zero, the For Loop begins there then runs the full length of the array. This is done by using the array.length function.

The screen prints out each index of the array by calling the array followed by the i variable in the square brackets. **carols[i].** The + operator is again used to concatenate the HTML break tag with the array index that is printed out.

STEP 4. CREATE THE TREE!

Replace everything in your javaScript so far with the loop below and reload the page.

```
<script>
for(outer=1; outer<30; outer+=2)
{
     for(tree=0; tree < outer; tree++)
     {
          document.write("*");
     }
     document.write("<br>");
}
</script>
```

This is a nested loop (a loop within a loop). The outer loop runs until it reaches 30 and increments by 2. The inner loop gets activated on each pass. Each iteration causes the inner loop to draw 2 stars. You will notice that it doesn't look quite right yet.

Add another nested loop to draw the spaces

```
for(outer=1; outer<30; outer+=2)
{
     for(space=0; space < (30-outer)/2; space++)
     {
          document.write("  ");
     }
     for(tree=0; tree < outer; tree++)
     {
          document.write("*");
     }
     document.write("<br>");
}
```

The space loop works out how many spaces to put in. It does this by taking the value of outer, subtracting it from a value and dividing it by 2 to create the Christmas tree shape.

0123456789*
012345678***
01234567*****
0123456*******
012345*********
01234***********
0123*************
012***************
01*****************
0*******************

STEP 5 DECORATE THE TREE!

Add the decorations array, the index variable and adjust the loop as shown to include the if statement. You add your own text to the array if you like.

```
<script>
var decorations = ['C', 'o', 'd', 'e', 'r', 'D', 'o', 'j','o','*'];
var index = 0;

for(outer=1; outer<40; outer+=2)
{
      for(space=0; space < (40-outer)/2; space++)
      {
            document.write("  ");
      }
      for(counter=0; counter < outer; counter++)
      {
        document.write(decorations[index++]);

        if (index == decorations.length)
        {
            index = 0;
        }
      }
      document.write("<br>");
}
</script>
```

The **if statement** makes the loop go to the start of the **array** when the last element is reached. Without this the loop would continue to make the tree but with undefined values.

STEP 5 LIGHT THE TREE!

Make stylesheet by creating new document. Add the following styles and save it in the same folder as styles.css

```
body {
background-color:black;
}

.blink {
animation: blinker 1s linear infinite;
}

@keyframes blinker {
50% { opacity: 0.4; }
}

.lights {
color: yellow;
}

.display {
margin: 0px auto;
width: 400px;
}
```

Link to the stylesheet by adding the following code inside the head of the HTML page

```
<link rel="stylesheet" type="text/css" href="styles.css">
```

Inside the body of the HTML page add the <p> tag as shown below.

```
<p class="blink lights display" id="content"></p>
```

Finally, adjust the javaScript so that it prints to the new <p> element.

```
<script>
var decorations = ['C', 'o', 'd', 'e', 'r', 'D', 'o', 'j','o','*'];
var content = document.getElementById('content');
var index = 0;

for(outer=1; outer<40; outer+=2)
{
      for(space=0; space < (40-outer)/2; space++)
      {
            content.innerHTML+= "  ";
      }
      for(counter=0; counter < outer; counter++)
      {
         content.innerHTML+= decorations[index++];
        if (index == decorations.length)
        {
            index = 0;
        }
      }
      content.innerHTML+= "<br>";
}
</script>
```