JavaScript and AJAX
2nd Edition

Tutorial 3

Working with Arrays, Loops, and Conditional Statements

Objectives

- Create an array
- Populate and reference values from an array
- Work with array methods
- Work with For loops
- Work with While loops

Objectives

- Loop through the contents of an array
- Work with If, If... Else, and multiple conditional statements
- Use arrays, loops, and conditional statements to create a table
- Work with break, continue, and label commands

Working with Arrays

- An **array** is a collection of data values organized under a single name
  - Each individual data value is identified by an **index**
- To create an array:
  - `var array = new Array(length);`
- To populate an array:
  - `array[i] = value;`
  - `var array = [values];`
- To create and populate an array:
  - `var array = new Array(values);`

Specifying Array Length

- To determine the size of an array, use the property:
  - `array.length`
- To add more items to an array, run the command:
  - `array[i] = value;`
- To remove items from an array, run the command:
  - `array.length = value;`

Using Array Methods

Array Method	Description
array.concat(*array1, array2, ...*)	Joins *array* to two or more arrays, creating a single array containing the items from all the arrays.
array.join(*separator*)	Joins all items in *array* into a single text string. The array items are separated using the text in the separator parameter. If no separator is specified, a comma is used.
array.pop()	Removes the last item from *array*.
array.push(*values*)	Appends *array* with new items, where *values* is a comma-separated list of item values.
array.reverse()	Reverses the order of items in *array*.
array.shift()	Removes the first item from *array*.
array.slice(*start, stop*)	Extracts the *array* items starting with the start index up to the *stop* index, returning a new subarray.
array.splice(*start, size, values*)	Extracts *size* items from *array* starting with the item with the index *start*. To insert new items into the array, specify the array item in a comma-separated *values* list.
array.sort(*function*)	Sorts *array* where *function* is the name of a function that returns a positive, negative, or 0. If no *function* is specified, *array* is sorted in alphabetical order.
array.toString()	Converts the contents of *array* to a text string with the array values in a comma-separated list.
array.unshift(*values*)	Inserts new items at the start of *array*, where *values* is a comma-separated list of new values.

Working with Program Loops

- A **program loop** is a set of commands that is executed repeatedly until a stopping condition has been met
  - For loop
    - A **counter variable** tracks the number of times a set of commands is run
    - The collection of commands that is run each time through a loop is collectively known as a **command block**

```
<table border="2">
   <tr>
      <script type="text/javascript">
         for (var i=0; i < 4; i++) {
            document.write("<td>" + i + "</td>");
         }
      </script>
   </tr>
</table>
```

Parts of the For Loop	Expressions	Counter Values	Code Written to the Page
start	var i=0	0	<td>0</td>
continue	i < 4	1	<td>1</td>
		2	<td>2</td>
update	i++	3	<td>3</td>

Working with Program Loops

- For loops are often used to cycle through the different values contained within an array

```
function writeDayNames() {
   var dayName = new Array("Sun", "Mon", "Tue", "Wed", "Thu",
                           "Fri", "Sat");
   document.write("<tr>");
   for (var i = 0;i<dayName.length;i++) {
      document.write("<th class='calendar_weekdays'> "+dayName[i]+
         "</"</th>");
   }
   document.write("</tr>");
}
```

Working with Program Loops

- A while loop does not depend on the value of a counter variable; it runs as long as a specific condition is met

```
var rowNum = 1;
while (rowNum < 4) {
   document.write("<tr>");
   var colNum = 1;
   while (colNum < 5) {
      document.write("<td>"+rowNum+","+colNum+"</td>");
      colNum++;
   }
   document.write("</tr>");
   rowNum++;
}
```


Creating Program Loops

- To create a For loop, use the syntax:

```
for (start; continue; update) {
    commands
}
```

- To create a While loop, use the following syntax:

```
while (continue) {
    commands
}
```

Creating Program Loops

- To create a Do/While loop, use the following syntax:

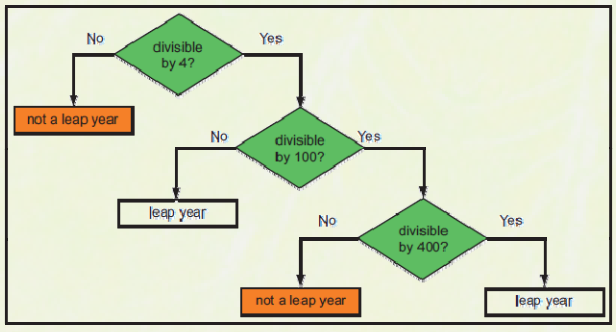
```
do {
    commands
    }
while (continue);
```

- To loop through the contents of an array, enter the For loop:

```
for (var i = 0; i < array.length; i++) {
    commands involving array[i]
}
```


Working with Conditional Statements

- A **conditional statement** is a statement that runs a command or command block only when certain circumstances are met



Working with Conditional Statements

- To test a single condition, use the construction:

```
if (condition) {
    commands
}
```

- To test between two conditions, use the following construction:

```
if (condition) {
    commands if condition is true
} else {
    commands if otherwise
}
```


Working with Conditional Statements

- To test multiple conditions, use the construction:

```
if (condition 1) {
    first command block
} else if (condition 2) {
    second command block
} else if (condition 3) {
    third command block
} else {
    default command block
}
```

Creating a Switch Statement

- To create a Switch statement to test for different values of an expression, use the structure:

```
switch (expression) {
    case label1: commands1
    break;
    case label2: commands2
    break;
    case label3: commands3
    break;
...
    default: default commands
}
```


Managing Program Loops and Conditional Statements

- The break command terminates any program loop or conditional statement
- The syntax for the break command is:
  - `break;`
- The continue command stops processing the commands in the current iteration of the loop and jumps to the next iteration
  - `continue;`

Managing Program Loops and Conditional Statements

- Labels are used to identify statements in JavaScript code so that you can reference those statements elsewhere in a program
  - `label: statement`
  - `break label;`
  - `continue label;`

```
//outer_loop:
for(i=1; i<4; i++) {
   document.write("<br />"+"outer "+i+": ");
   //inner_loop:
   for(j=1; j<4; j++) {
      document.write("inner "+j+" ");
      if(j==x)   //break outer_loop;
   }
}
```


Using Multidimensional Arrays

- A matrix is a multidimensional array in which each item is referenced by two or more index values
- In a matrix, each value is referenced by a row index number and column index number
- Although matrices are commonly used in various programming languages, JavaScript does not support them