Chapter 20
Iteration Principles
Iteration

• Process of repetition:

  looping through a series of statements to repeat them
<table>
<thead>
<tr>
<th>Syntax</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>while ( &lt; condition &gt; ) )</td>
<td>var j = 0;</td>
</tr>
<tr>
<td>{</td>
<td>while ( j &lt; 3 )</td>
</tr>
<tr>
<td>&lt;statement(s)&gt;</td>
<td>document.write(&quot;hi&quot;);</td>
</tr>
<tr>
<td>}</td>
<td>j = j + 1;</td>
</tr>
</tbody>
</table>

1. var j = 0;
2. while ( j < 3 )
3. document.write("hi");
4. j = j + 1;
5. }
for Loop Syntax and Example

for ( < init > ; < condition > ; < increment > )
{
    <statement(s)>
}

var j;
for ( j = 0 ; j < 3 ; j++ )
{
    true
    document.write("ho");
}
Table 20.1

Operations on j: for (j = 0; j < 3; j = j+1)

<table>
<thead>
<tr>
<th>Operation</th>
<th>Operation Result</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>j = 0</td>
<td>j's value is 0</td>
<td>Initialize iteration variable</td>
</tr>
<tr>
<td>j &lt; 3</td>
<td>true; j is less than 3</td>
<td>First &lt;continuation&gt; test, do statements, continue</td>
</tr>
<tr>
<td>j = j + 1</td>
<td>j's value is 1</td>
<td>First &lt;next iteration&gt; operation</td>
</tr>
<tr>
<td>j &lt; 3</td>
<td>true; j is less than 3</td>
<td>Second &lt;continuation&gt; test, do statements, continue</td>
</tr>
<tr>
<td>j = j + 1</td>
<td>j's value is 2</td>
<td>Second &lt;next iteration&gt; operation</td>
</tr>
<tr>
<td>j &lt; 3</td>
<td>true; j is less than 3</td>
<td>Third &lt;continuation&gt; test, do statements, continue</td>
</tr>
<tr>
<td>j = j + 1</td>
<td>j's value is 2</td>
<td>Third &lt;next iteration&gt; operation</td>
</tr>
<tr>
<td>j &lt; 3</td>
<td>false; j is equal to 3</td>
<td>Fourth &lt;continuation&gt; test, terminate</td>
</tr>
</tbody>
</table>
text = "She said ";
for (j = 1; j <= 3; j = j + 1) {
    text = text + "Never! ";
}
alert(text);

//Set text to a string
//Define a 3 cycle loop
//Concatenate on a string
//... end of loop
//Show result

which produces the following alert box.
for Loop Rules

• Continuation/Termination Test
  – Any expression resulting in a Boolean value
  – Must involve iteration variable to avoid infinite loop

• Step Size
  – Amount of change from one iteration to next
  – Often called increment or decrement