

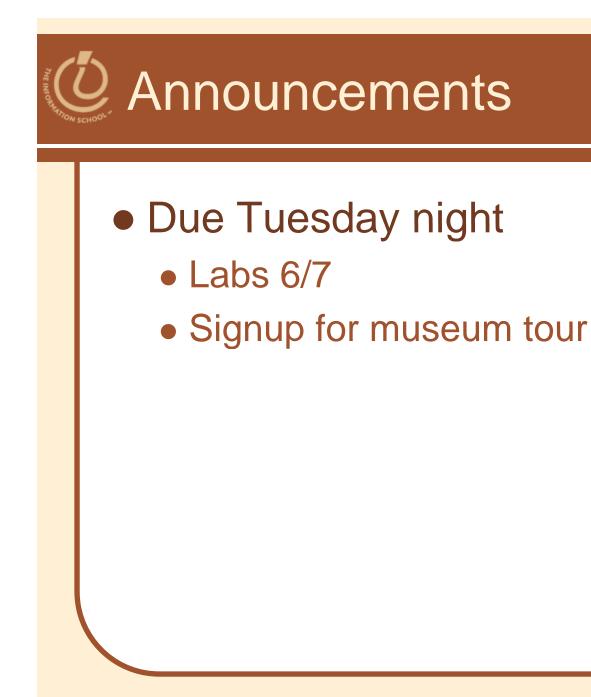
CLUE Tutoring

- Wednesday nights 7-8:30PM MGH 058
- 2 extra-credit points for each session you attend from last week through the end of the quarter
- Sign the attendance list to get credit!

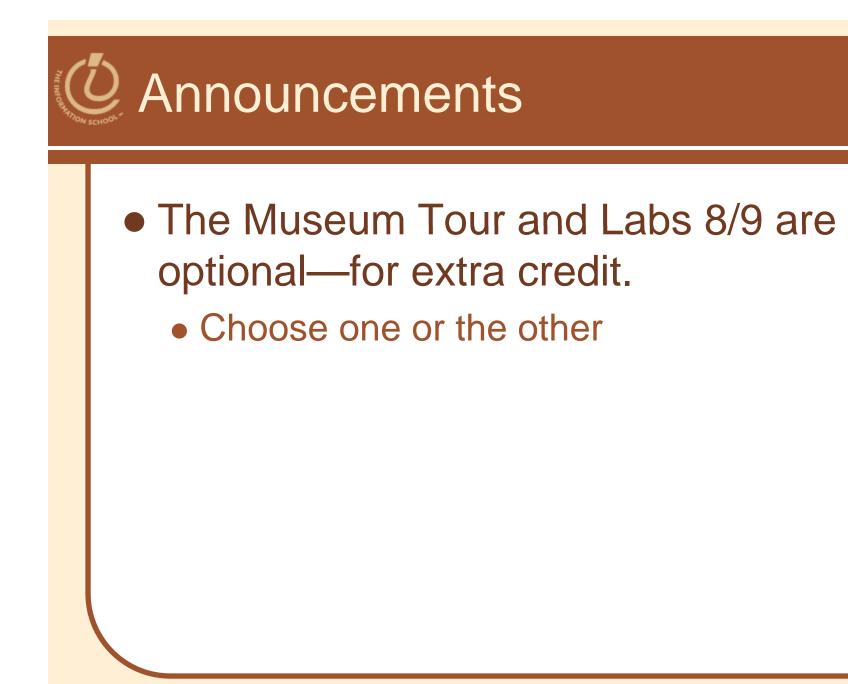


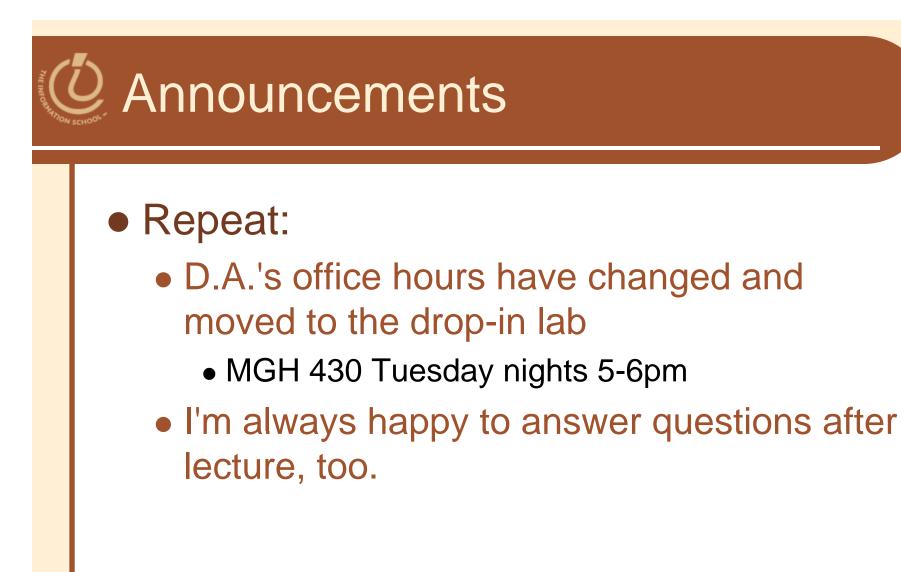
- If you have Wednesday lab section,
 - Attend a drop-in lab this week
 - Get 2 points extra credit for attending CLUE Tutoring—sign the attendance sheet

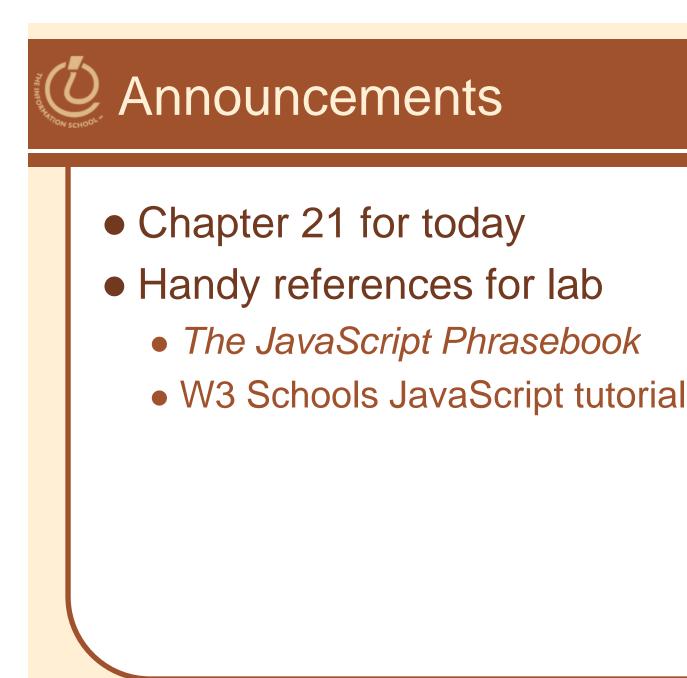


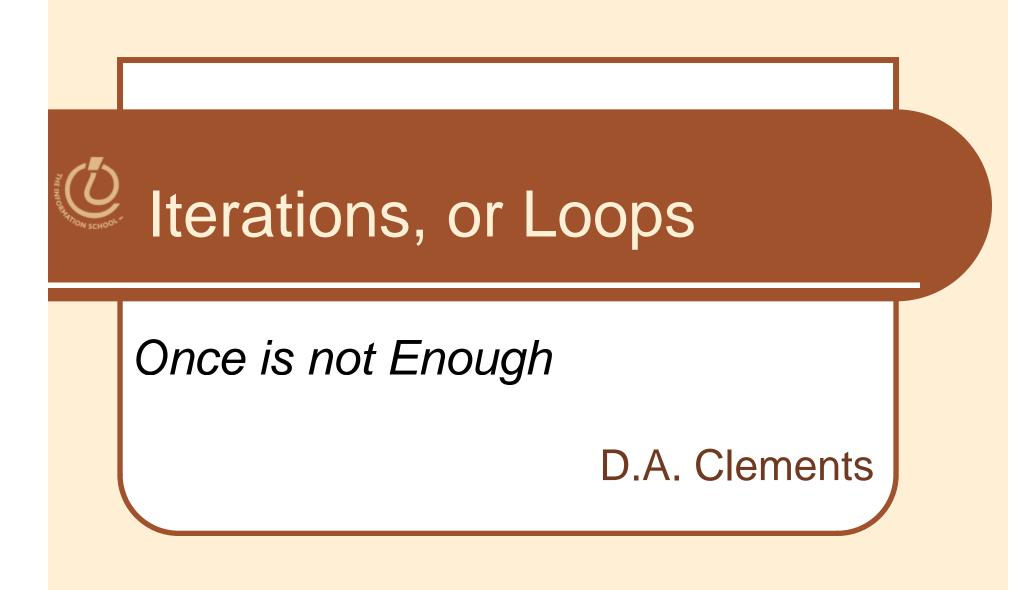












D.A. Clements, MLIS, UW Information School



• Learn the syntax of loops

- Use loops to count down or count up
- Recognize the World-Famous Iteration
- Learn how to start, increment, and end a loop
- Describe the structure of nested loops



Play it again, Sam.



D.A. Clements, MLIS, UW Information School

11/9/2009



- Iteration, or looping, is the process of repetition:
 - looping through a sequence of statements to repeat them

Of Major Types of Iterations

- For loop
 - 1. Baby
 - 2. Count up
 - 3. Count down
- While loop
 - 4. Count up
 - 5. Count down

Try the examples in Week 5 on the course Web site!

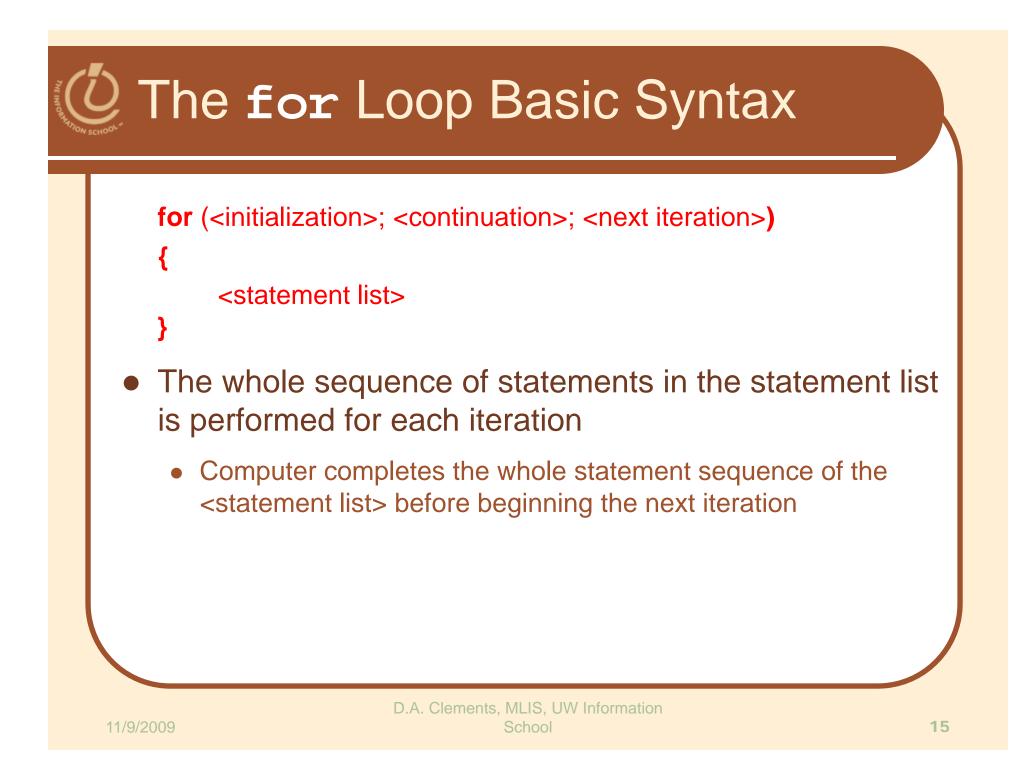


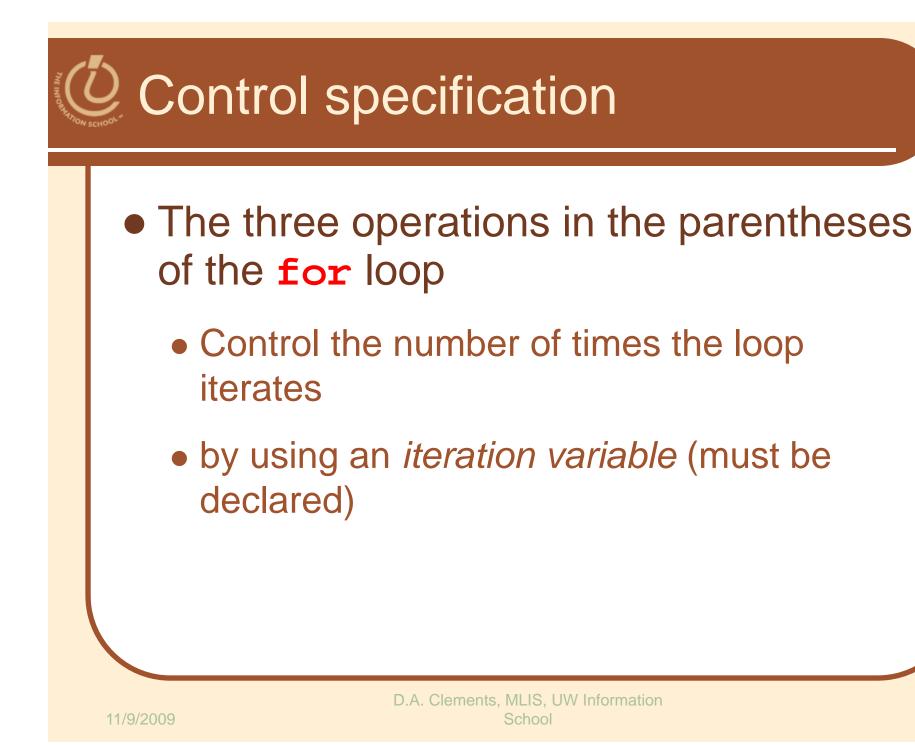
Repetition is good

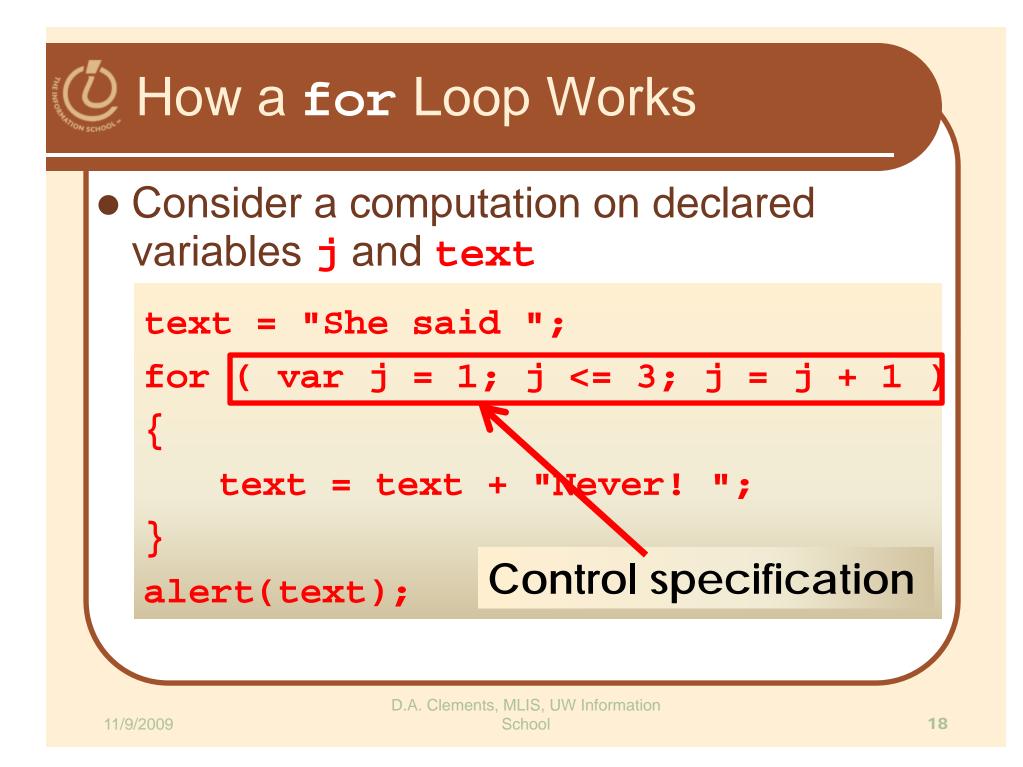
FOR LOOPS

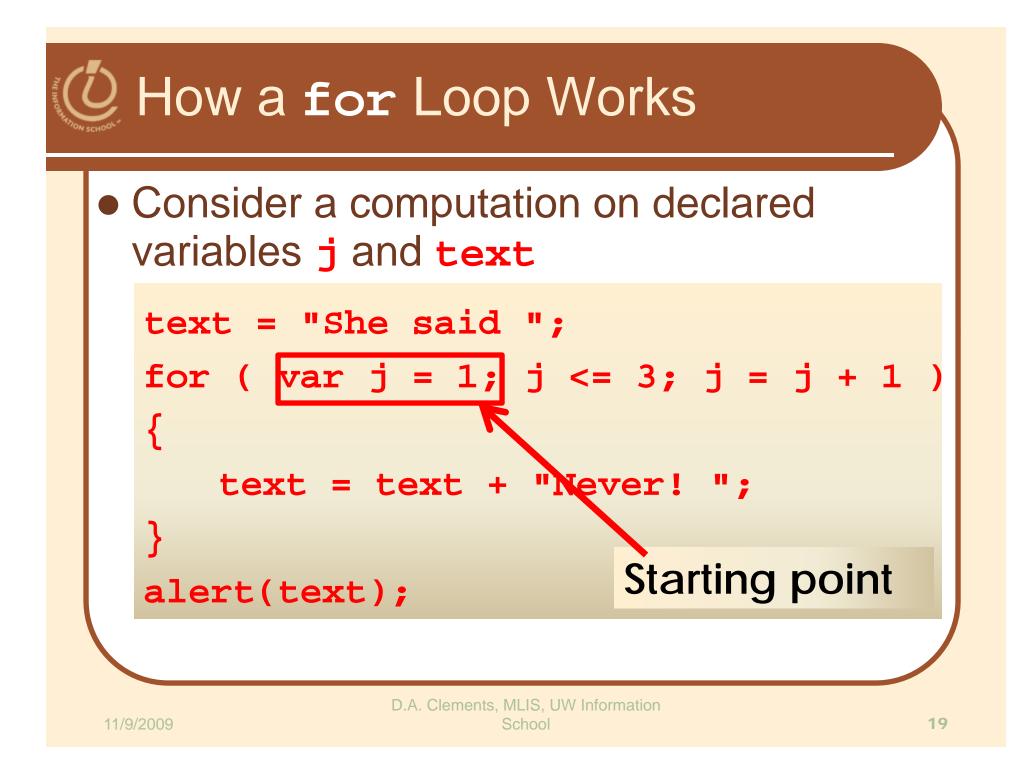
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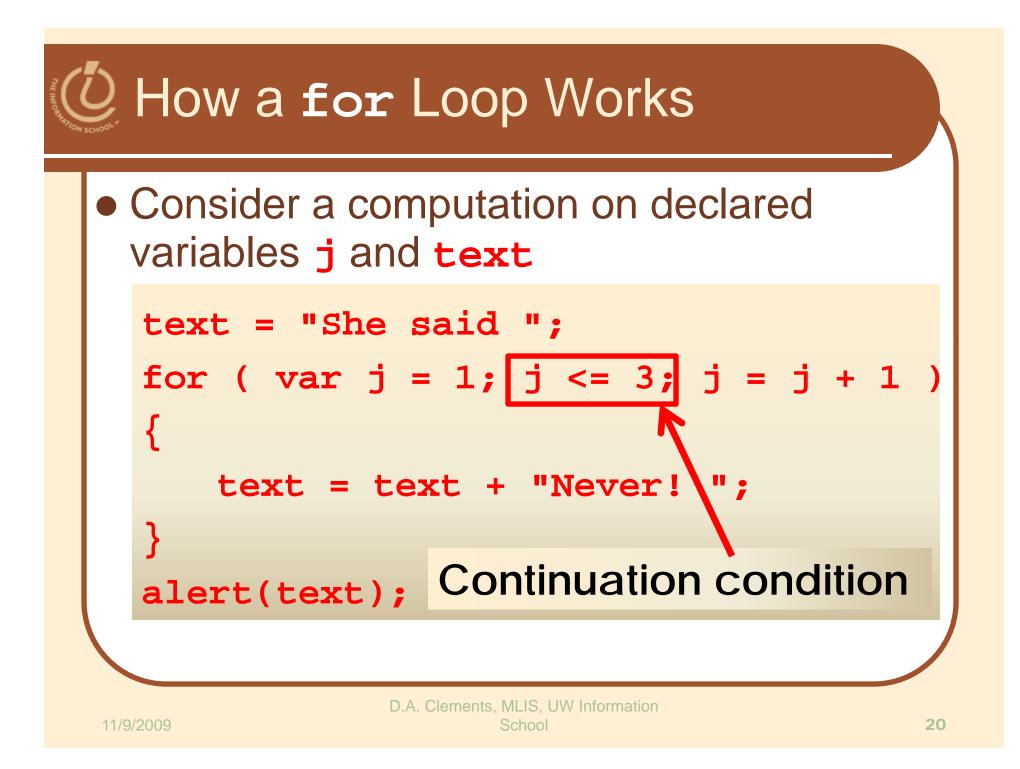


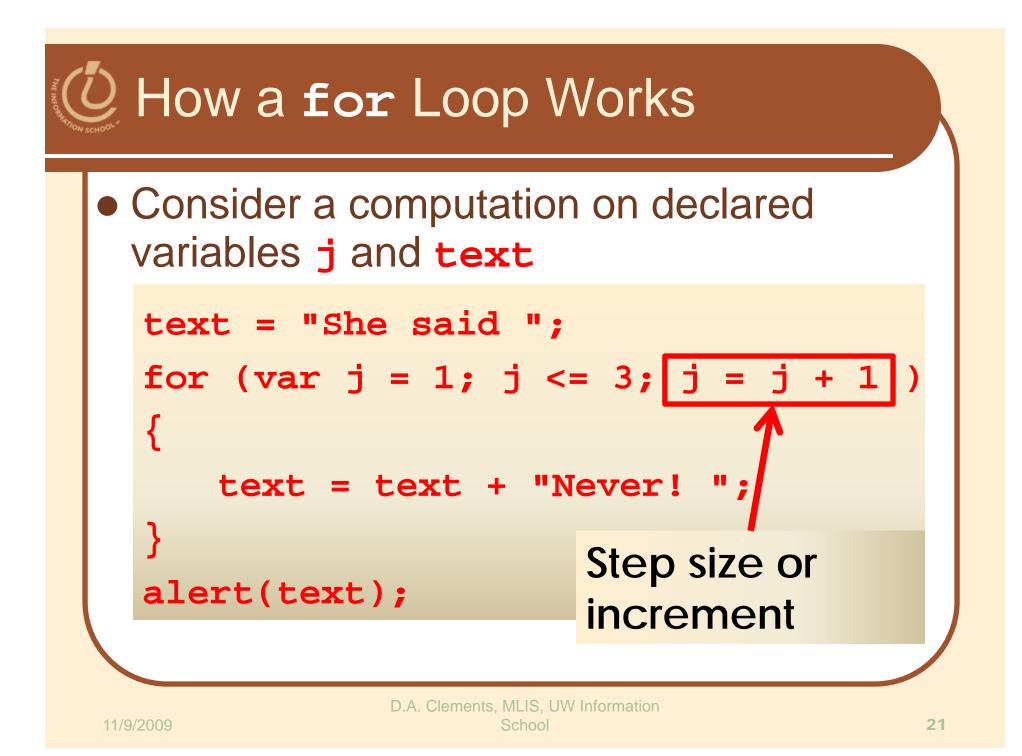


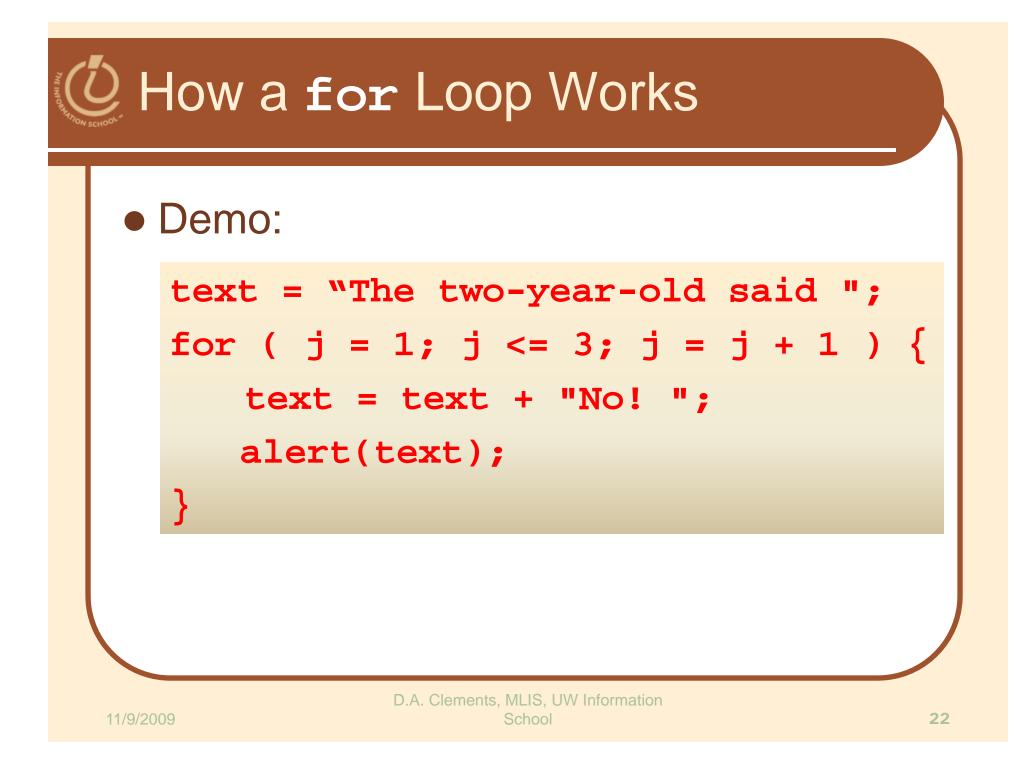


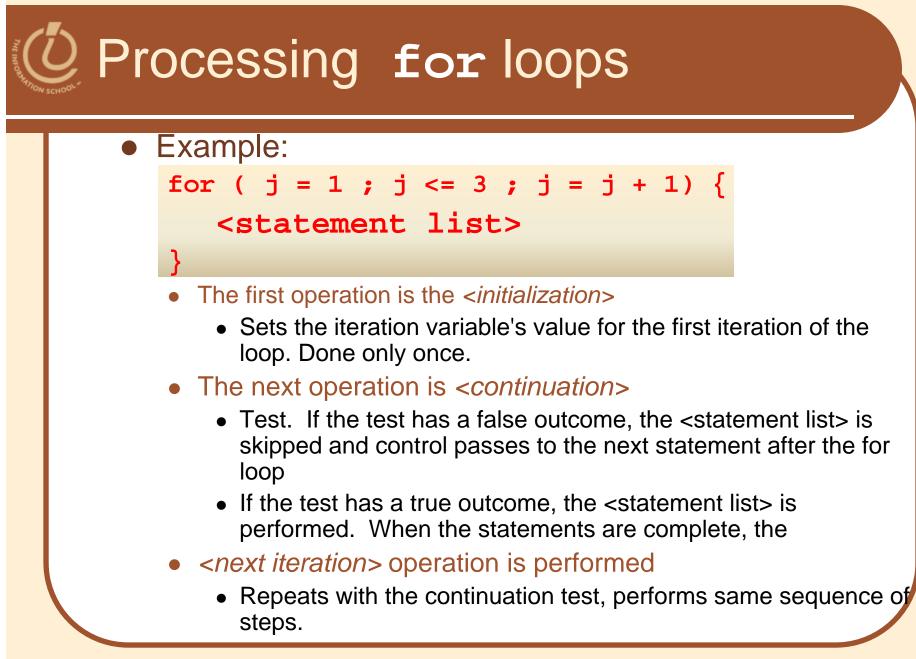


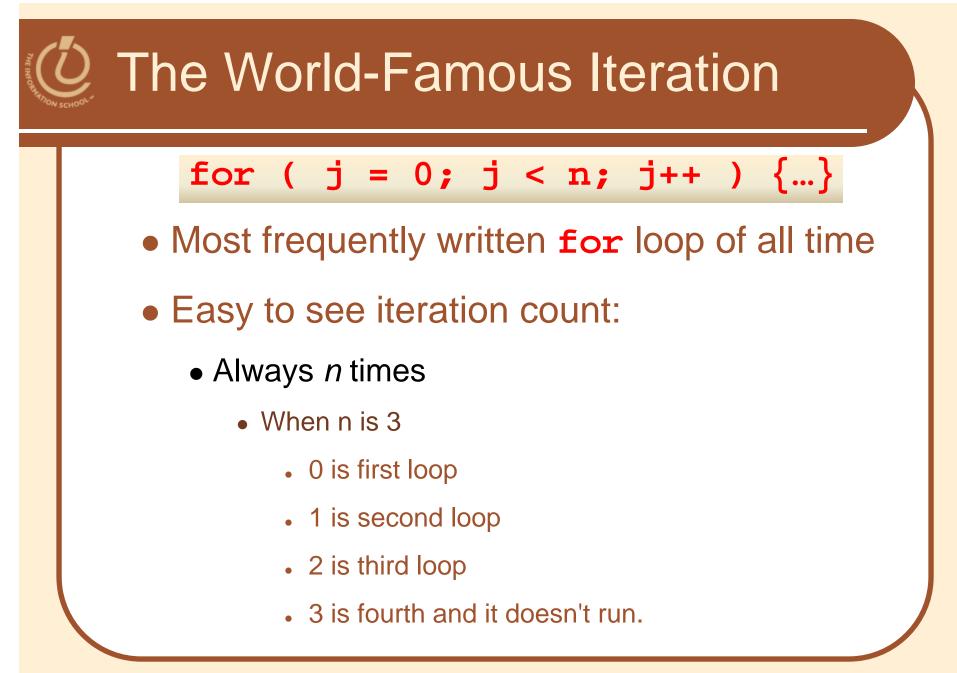








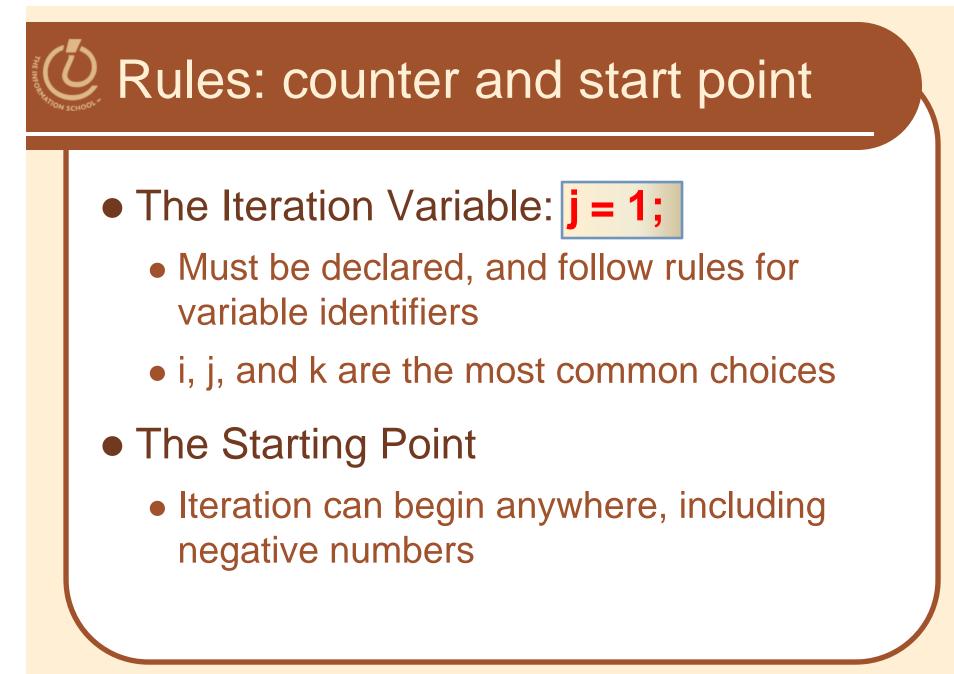


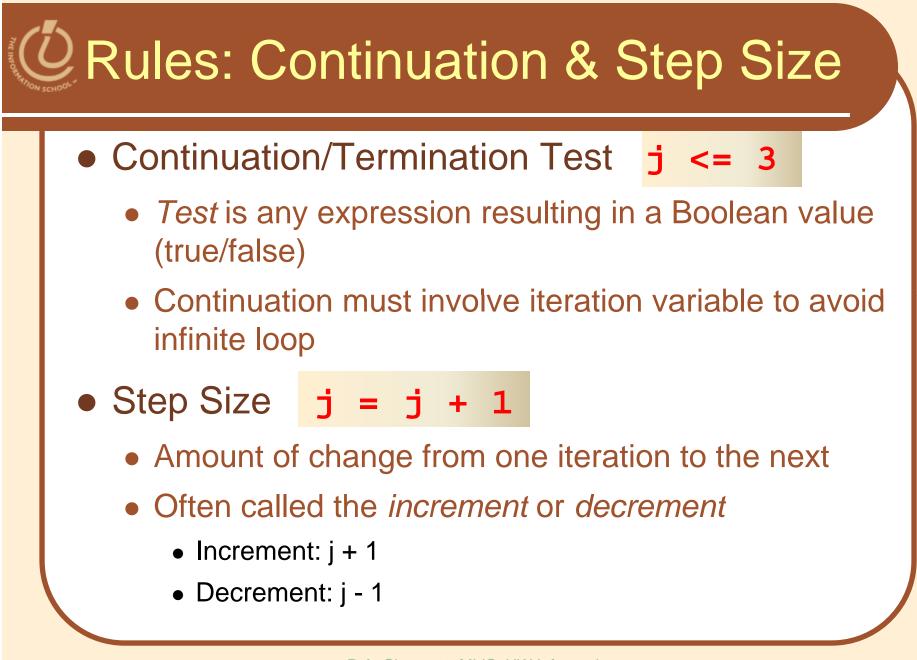


Running through a for loop

Table 21.1 The sequence of operations on j from the for loop with control specification (j=1; j<=3; j=j+1)

| | Operation | Operation Result | Role |
|---|----------------|-----------------------------------|--|
| 1 | j = 1 | j's value is 1 | Initialize iteration variable |
| | j <= 3 | true, j is <i>less than</i> 3 | First < <i>continuation</i> > test, continue |
| 0 | j = j + 1 | j's value is 2 | First < next iteration> operation |
| 2 | j ∕ = 3 | true, j <i>is less than</i> 3 | Second < <i>continuation</i> > test, continue |
| | j = j + 1 | j's value is 3 | Second < next iteration > operation |
| | j <= 3 | true, j <i>is equal</i> to 3 | Third < <i>continuation</i> > test, continue |
| | j = j + 1 | j's value is 4 | Third < next iteration > operation |
| | j <= 3 | false, ј <i>is greater than</i> З | Fourth < <i>continuation</i> > test, terminate |
| | | | |

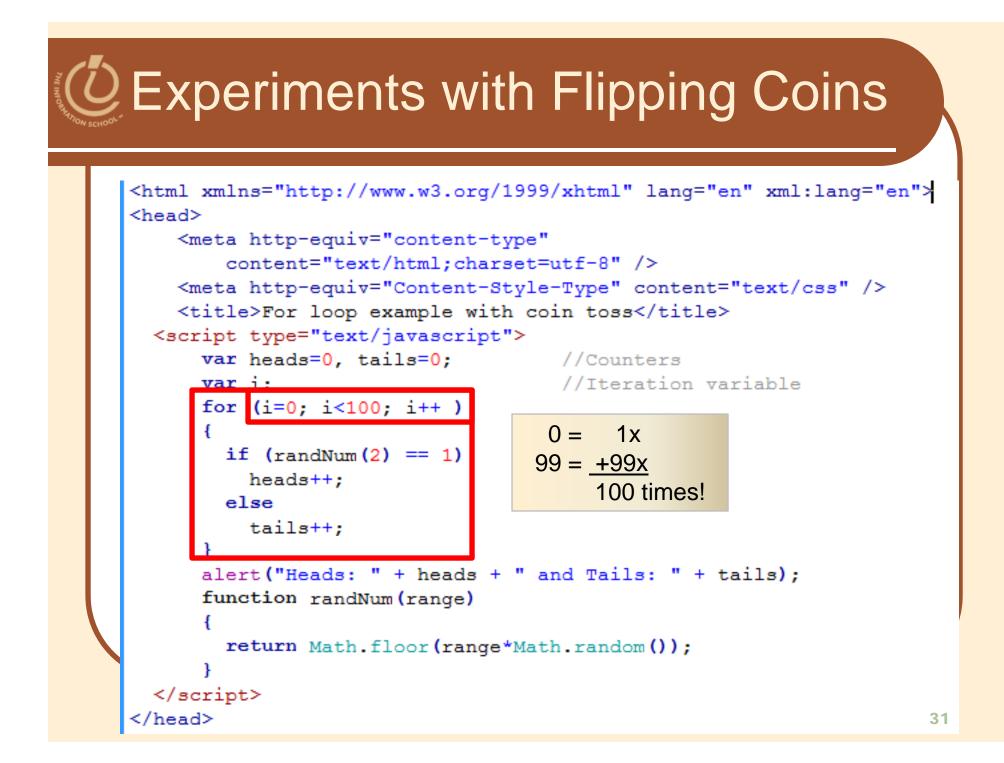




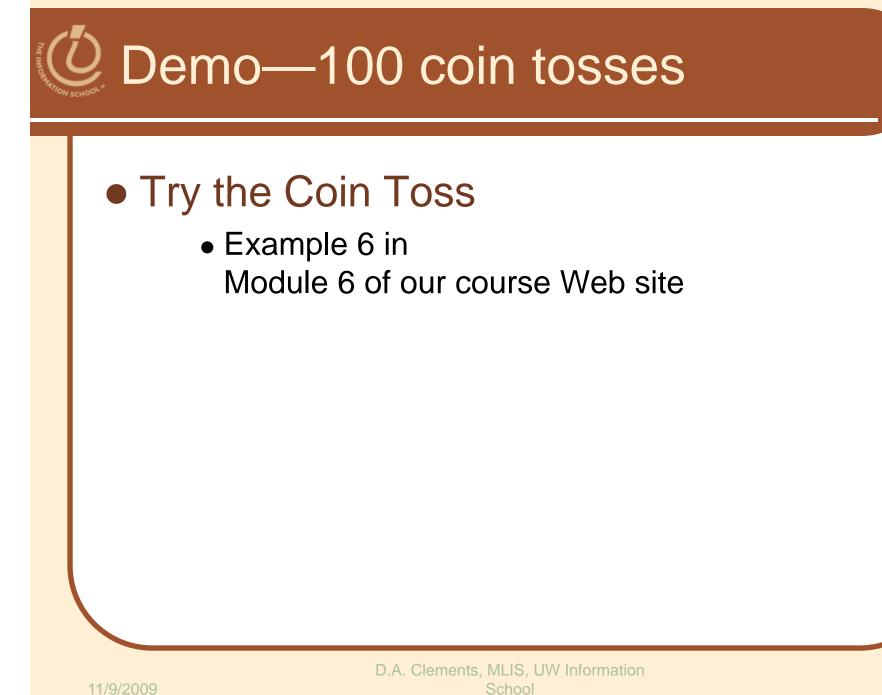
Experiments with Flipping Coins <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en"> <head> <meta http-equiv="content-type" content="text/html;charset=utf-8" /> <meta http-equiv="Content-Style-Type" content="text/css" /> <title>For loop example with coin toss</title> <script type="text/javascript"> var heads=0, tails=0; //Counters //Iteration variable var i; for (i=0; i<100; i++) if (randNum(2) == 1)heads++; else tails++; alert ("Heads: " + heads + " and Tails: " + tails); function randNum(range) return Math.floor(range*Math.random()); </script> head> 28

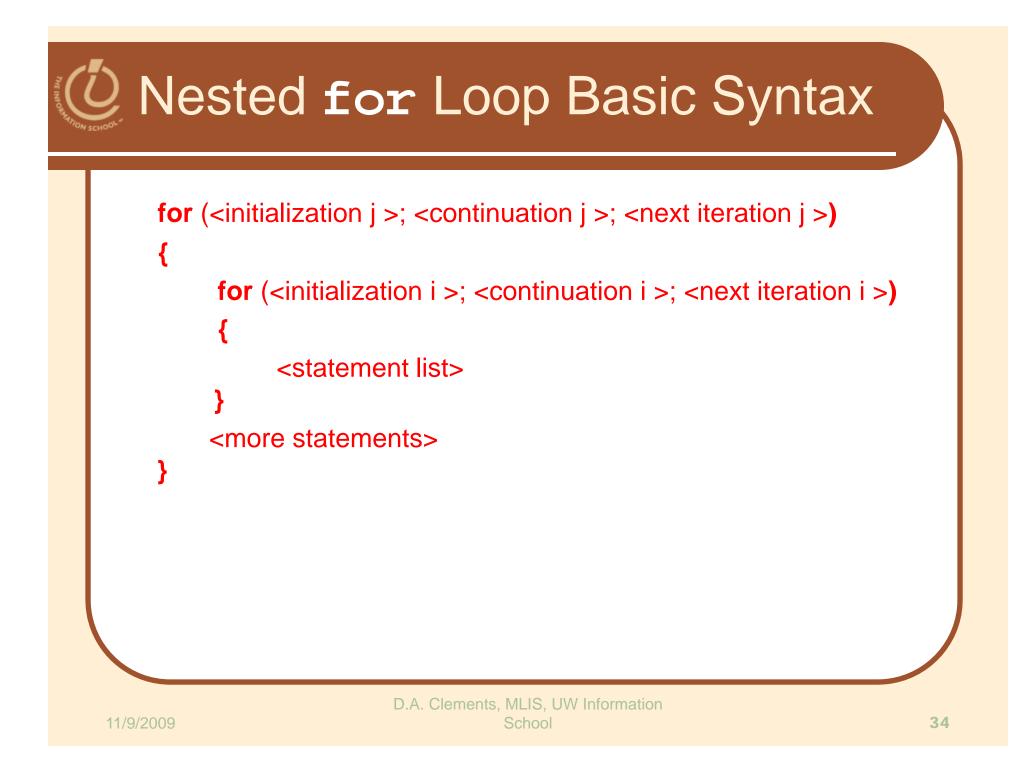
```
OExperiments with Flipping Coins
    <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
    <head>
       <meta http-equiv="content-type"
           content="text/html;charset=utf-8" />
       <meta http-equiv="Content-Style-Type" content="text/css" />
       <title>For loop example with coin toss</title>
     <script type="text/javascript">
         var heads=0, tails=0;
                               //Counters
                                      //Iteration variable
         var i;
         for (i=0; i<100; i++ )
           if (randNum(2) == 1)
             heads++;
           else
             tails++;
         alert("Heads: " + heads + " and Tails: " + tails);
         function randNum (range)
           return Math.floor(range*Math.random());
      </script>
     /head>
                                                                   29
```





```
Experiments with Flipping Coins
  <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
  <head>
      <meta http-equiv="content-type"
          content="text/html;charset=utf-8" />
      <meta http-equiv="Content-Style-Type" content="text/css" />
      <title>For loop example with coin toss</title>
    <script type="text/javascript">
        var heads=0, tails=0;
                                  //Counters
                                     //Iteration variable
        var i.
        for (i=0; i<100; i++ )</pre>
          if (randNum(2) == 1)
            heads++;
          else
            tails++.
        alert ("Heads: " + heads + " and Tails: " + tails);
        function randNum(range)
          return Math.floor(range*Math.random());
    </script>
    'head>
                                                                   32
```





THE INFORMATION SCHOOL

Experiment 2—with Five Trials

A Nested Loop

- To run several trials, consider the entire loop we just looked at as one Trial
- Create another for loop containing this Trial unit, adding a couple of needed statements
- We have a loop within a loop (*nested loop*) which causes the Trial loop (0-99) to run five times

```
Experiment 2—the original trial
    <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
    <head>
        <meta http-equiv="content-type"
            content="text/html;charset=utf-8" />
        <meta http-equiv="Content-Style-Type" content="text/css" />
        <title>For loop example with coin toss</title>
      <script type="text/javascript">
          var heads = 0, tails = 0;
11
12
          var i, j, text='';
                                         //Iteration vars
          for (j = 0; j < 5; j++)
                                         //Outer loop start
13
14
          {
              for (i=0; i<100; i++)</pre>
                                         //Trial line 1
15
16
17
              if (randNum(2) == 1)
                                         //Trial line 2
18
               heads++;
                                         //Trial line 3
19
              else
                                         //Trial line 4
20
                                         //Trial line 5
              tails++;
21
                                         //Trial line 6
22
              text = text + 'Trial ' + j + ': '; //Add line to message that will print at end
23
24
              for (i = 0; i < (Math.abs(heads-50)); i++)</pre>
25
26
                                        //Add to message
                text = text + '*';
27
28
              text = text + ' n';
                                         //Add line break (html <br /> cannot be used for alerts)
29
              heads = 0; tails = 0;
                                         //Additional
                                          //Outer loop end
31
          alert(text);
32
          function randNum(range)
33
34
              return Math.floor(range*Math.random());
      </script>
                                                                                          36
37
    </head>
```

```
Experiment 2—outer loop
    <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
    <head>
        <meta http-equiv="content-type"
            content="text/html;charset=utf-8" />
        <meta http-equiv="Content-Style-Type" content="text/css" />
        <title>For loop example with coin toss</title>
      <script type="text/javascript">
          var heads = 0, tails = 0;
11
12
          var i, j, text='';
                                      //Iteration vars
13
          for (j = 0; j < 5; j++)
                                         //Outer loop start
14
              for (i=0; i<100; i++)</pre>
                                         //Trial line 1
15
16
17
              if (randNum(2) == 1)
                                        //Trial line 2
18
               heads++;
                                        //Trial line 3
19
              else
                                        //Trial line 4
20
                                         //Trial line 5
              tails++;
21
                                         //Trial line 6
22
              text = text + 'Trial ' + j + ': '; //Add line to message that will print at end
23
24
              for (i = 0; i < (Math.abs(heads-50)); i++)</pre>
25
26
                                       //Add to message
                text = text + '*';
27
              text = text + '\n';
28
                                        //Add line break (html <br /> cannot be used for alerts)
29
              heads = 0; tails = 0;
                                        //Additional
                                         //Outer loop end
31
          alert(text);
32
          function randNum(range)
33
          {
34
             return Math.floor(range*Math.random());
      </script>
                                                                                         37
37
    </head>
```

```
Experiment 2—declare i and j
    <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
    <head>
        <meta http-equiv="content-type"
            content="text/html;charset=utf-8" />
        <meta http-equiv="Content-Style-Type" content="text/css" />
        <title>For loop example with coin toss</title>
      <script type="text/javascript">
          var heads = 0, tails = 0;
11
12
          var i, j, text='';
                                         //Iteration vars
13
          for (j = 0; j < 5; j++)
                                         //Outer loop start
14
              for (i=0; i<100; i++)</pre>
                                         //Trial line 1
15
16
17
              if (randNum(2) == 1)
                                        //Trial line 2
18
               heads++;
                                        //Trial line 3
19
              else
                                        //Trial line 4
20
                                         //Trial line 5
              tails++;
21
                                         //Trial line 6
22
              text = text + 'Trial ' + j + ': '; //Add line to message that will print at end
23
24
              for (i = 0; i < (Math.abs(heads-50)); i++)</pre>
25
26
                                      //Add to message
                text = text + '*';
27
28
              text = text + '\n';
                                        //Add line break (html <br /> cannot be used for alerts)
29
              heads = 0; tails = 0;
                                        //Additional
                                         //Outer loop end
31
          alert(text);
32
          function randNum(range)
33
          {
34
             return Math.floor(range*Math.random());
      </script>
                                                                                         38
37
    </head>
```

```
Experiment 2—set heads, tails to ze
    <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
    <head>
        <meta http-equiv="content-type"
           content="text/html;charset=utf-8" />
        <meta http-equiv="Content-Style-Type" content="text/css" />
        <title>For loop example with coin toss</title>
      <script type="text/javascript">
         var heads = 0, tails = 0;
11
12
         var i, j, text='';
                                        //Iteration vars
         for (j = 0; j < 5; j++)
                                        //Outer loop start
13
14
          {
             for (i=0; i<100; i++)</pre>
15
                                        //Trial line 1
16
              {
17
             if (randNum(2) == 1)
                                        //Trial line 2
18
              heads++;
                                        //Trial line 3
19
             else
                                        //Trial line 4
20
                                        //Trial line 5
             tails++;
21
                                        //Trial line 6
             3
22
23
             text = text + 'Trial ' + j + ': '; //Add line to message that will print at end
24
             for (i = 0; i < (Math.abs(heads-50)); i++)</pre>
25
26
               text = text + '*';
                                       //Add to message
27
28
                                        //Add line break (html <br /> cannot be used for alerts)
             text = text + ' n';
29
             heads = 0; tails = 0;
                                       //Additional
                                        //Outer loop end
31
          alert(text);
32
         function randNum(range)
33
          {
34
             return Math.floor(range*Math.random());
      </script>
                                                                                        39
37
    </head>
```

Experiment 2—how far from 50%? <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en"> <head> <meta http-equiv="content-type" content="text/html;charset=utf-8" /> <meta http-equiv="Content-Style-Type" content="text/css" /> <title>For loop example with coin toss</title> <script type="text/javascript"> var heads = 0, tails = 0; 11 //Iteration vars 12 var i, j, text=''; for (j = 0; j < 5; j++)//Outer loop start 13 14 { for (i=0; i<100; i++) //Trial line 1</pre> 15 16 **{** 17 if (randNum(2) == 1)//Trial line 2 18 heads++; //Trial line 3 19 else //Trial line 4 20 //Trial line 5 tails++; 21 //Trial line 6 22 text = text + 'Trial ' + j + ': '; //Add line to message that will print at end 23 24 for (i = 0; i < (Math.abs(heads-50)); i++)</pre> 25 26 text = text + '*'; //Add to message 27 28 //Add line break (html
 cannot be used for alerts) text = text + '\n'; 29 heads = 0; tails = 0; //Additional //Outer loop end 3 31 alert(text); 32 function randNum(range) 33 { 34 return Math.floor(range*Math.random()); </script> 40 37 </head>



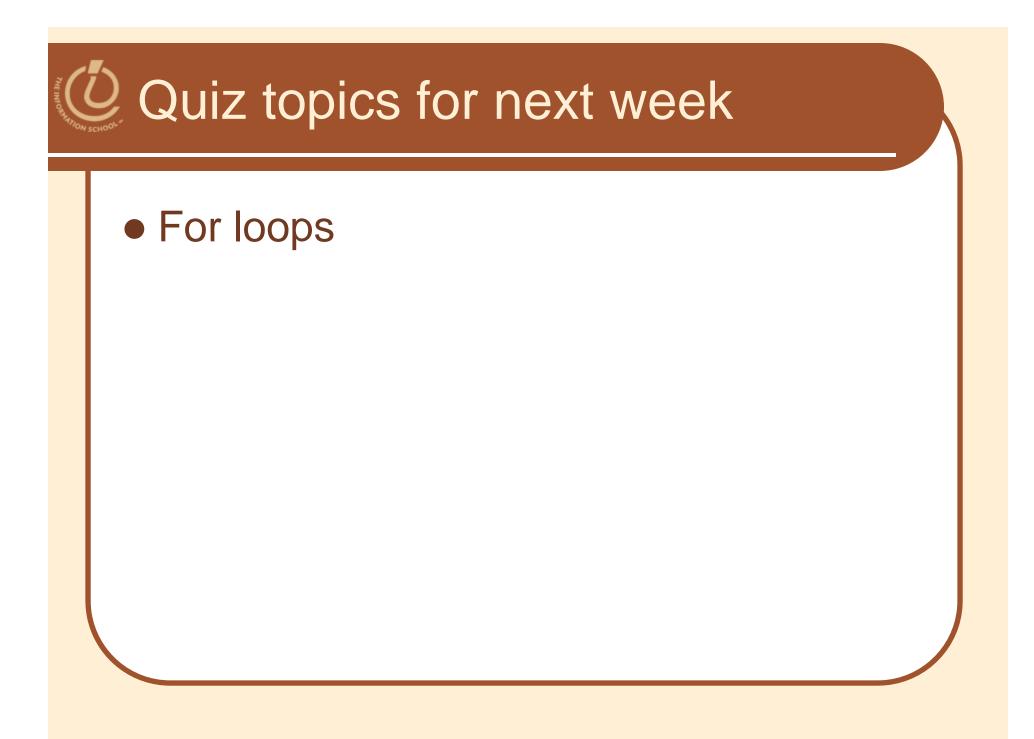
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• Learn the syntax of loops

- Use loops to count down or count up
- Recognize the World-Famous Iteration
- Learn how to start, increment, and end a loop
- Describe the structure of nested loops





 A computer lets you make more mistakes faster than any invention in human history—with the possible exceptions of handguns and tequila.
 ~Mitche Ratcliffe