

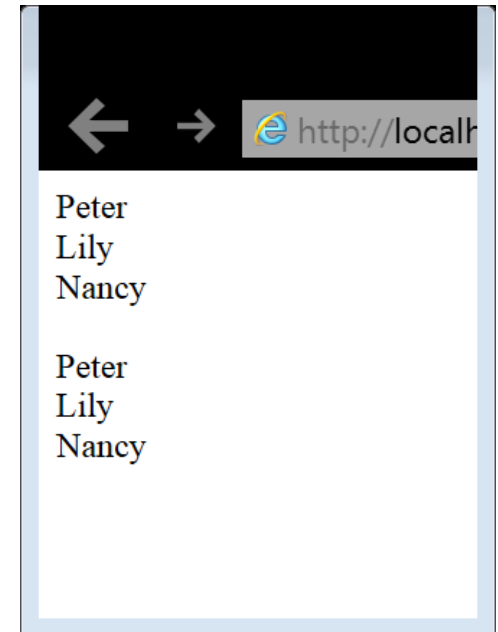
# Arrays and Flow Controls

# Arrays

- An array contains a set of data represented by a single variable name. You can think of an array as a collection of variables contained within a single variable.
- Arrays are represented in JavaScript by the Array object. The Array object contains a special constructor named **Array()** which is used for creating an array.  
var arrayName = new Array(number of elements);  
Example,  
var names = new Array(10);
- The numbering of elements within an array starts with an index number of zero.
- If you assign a value to an element that has not yet been created, the element is created automatically, along with any elements that might precede it.
- The Array class contains a single property, the **length** property, which returns the number of elements in an array.

# The array\_initialization.html

```
<!DOCTYPE html>
<html>
  <head>
    <title>Array Initialization</title>
  </head>
  <body>
    <script type="text/javascript">
      var names = new Array();
      names[0] = "Peter";
      names[1] = "Lily";
      names[2] = "Nancy";
      for (var i = 0; i < names.length; i++) {
        document.write(names[i] + "<br>");
      }
      document.write("<br>");
      var names2 = new Array("Peter", "Lily", "Nancy");
      for (var i = 0; i < names2.length; i++) {
        document.write(names2[i] + "<br>");
      }
    </script>
  </body>
</html>
```



# Decision Making

- The if statement is used to execute specific programming code if the evaluation of a conditional expression returns a value of true.

```
if (conditional expression)  
    statement;
```

- Example

```
var exampleVar = 5;  
if (exampleVar == 5)  
    window.alert("<p>The variable is equal to '5'.</p>");  
window.alert("<p>This dialog box is generated after the if  
statement.</p>");
```

# if else statements

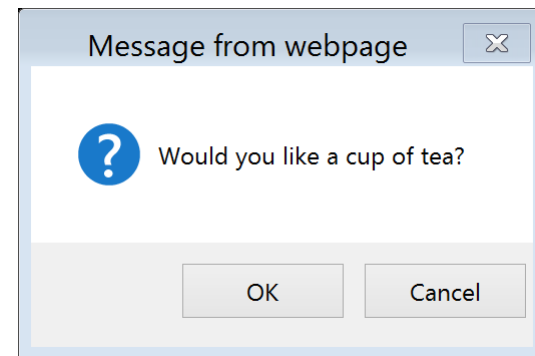
- An if statement that includes an else clause is called an if . . . else statement.

```
if (conditional expression)
    statement;
else
    statement;
```

- The `window.confirm()` method displays a confirm dialog box that contains an OK button and a Cancel button. The syntax for the `window.confirm()` method is
  - `window.confirm(message);`
- When a user clicks the OK button in the confirm dialog box, a value of `true` is returned. When a user clicks the Cancel button, a value of `false` is returned.

- Example

```
var txt;
var reply = window.confirm("Would you like a cup of tea?");
if (reply == true) {
    txt = "You pressed OK!";
} else {
    txt = "You pressed Cancel!";
}
```



# The physicsquiz.html that demonstrates if-else statements

```
<!DOCTYPE html>
<html>
  <head>
    <title>Physics Quiz</title>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width">
    <script type="text/javascript">
      function scoreQuestion1(answer) {
        if (answer == "a")
          window.alert("Correct Answer");
        else
          window.alert("Incorrect Answer");
      }
      function scoreQuestion2(answer) {
        if (answer == "c")
          window.alert("Correct Answer");
        else
          window.alert("Incorrect Answer");
      }
      function scoreQuestion3(answer) {
        if (answer == "b")
          window.alert("Correct Answer");
        else
          window.alert("Incorrect Answer");
      }
      function scoreQuestion4(answer) {
        if (answer == "c")
          window.alert("Incorrect Answer");
        else
          window.alert("Incorrect Answer");
      }
      function scoreQuestion5(answer) {
        if (answer == "d")
          window.alert("Incorrect Answer");
        else
          window.alert("Incorrect Answer");
      }
    </script>
  </head>
  <body>
    <h1>Physics Quiz</h1>
    <form action="" name="quiz">
      <p><strong>1. How many natural elements are there?</strong></p><p>
        <input type="radio" name="question1" value="a"
          onclick="scoreQuestion1('a')" />92<br />
        <!-- correct answer -->
        <input type="radio" name="question1" value="b"
          onclick="scoreQuestion1('b')" />113<br />
        <input type="radio" name="question1" value="c"
          onclick="scoreQuestion1('c')" />103<br />
        <input type="radio" name="question1" value="d"
          onclick="scoreQuestion1('d')" />88</p>
      <p><strong>2. If one kg of air is compressed from 1 m3 to 0.5 m3,
        which of the following statements is true?</strong></p><p>
        <input type="radio" name="question2" value="a"
          onclick="scoreQuestion2('a')" />
        The density is halved.<br />
        <input type="radio" name="question2" value="b"
          onclick="scoreQuestion2('b')" />
        The mass is halved.<br />
        <input type="radio" name="question2" value="c"
          onclick="scoreQuestion2('c')" />
        The density is doubled.<br />
        <!-- correct answer -->
        <input type="radio" name="question2" value="d"
          onclick="scoreQuestion2('d')" />The mass is doubled.</p>
      <p><strong>4. What is the SI unit of density?</strong></p><p>
        <input type="radio" name="question4" value="a"
          onclick="scoreQuestion4('a')" />cm3/g<br />
        <input type="radio" name="question4" value="b"
          onclick="scoreQuestion4('b')" />m3/kg<br />
        <input type="radio" name="question4" value="c"
          onclick="scoreQuestion4('c')" />kg/m3<br />
        <!-- correct answer -->
        <input type="radio" name="question4" value="d"
          onclick="scoreQuestion4('d')" />g/cm3</p>
      <p><strong>5. Which of these has the highest density?</strong></p><p>
        <input type="radio" name="question5" value="a"
          onclick="scoreQuestion5('a')" />Lead<br />
        <input type="radio" name="question5" value="b"
          onclick="scoreQuestion5('b')" />Water<br />
        <input type="radio" name="question5" value="c"
          onclick="scoreQuestion5('c')" />Mercury<br />
        <input type="radio" name="question5" value="d"
          onclick="scoreQuestion5('d')" />Tungsten</p>
        <!-- correct answer -->
      </form>
    </body>
  </html>
```

← → http://localhost:8383/ Physics Quiz

## Physics Quiz

1. How many natural elements are there?

☐ 92  
☐ 113  
☐ 103  
☐ 88

2. If one kg of air is compressed from 1 m3 to 0.5 m3, which of the following statements is true?

☐ The density is halved.  
☐ The mass is halved.  
☐ The density is doubled.  
☐ The mass is doubled.

4. What is the SI unit of density?

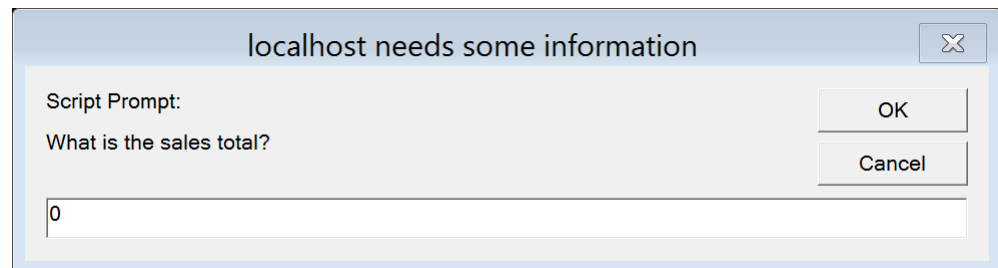
☐ cm3/g  
☐ m3/kg  
☐ kg/m3  
☐ g/cm3

5. Which of these has the highest density?

☐ Lead  
☐ Water  
☐ Mercury  
☐ Tungsten

# Nested if else statements

- When one decision-making statement is contained within another decision-making statement, they are referred to as nested decision-making structures.
- The preceding code uses the `window.prompt()` method, which displays a prompt dialog box with a message, a text box, an OK button, and a Cancel button. Any text that is entered into a prompt dialog box by a user can be assigned to a variable. The syntax for the `window.prompt()` method is  
    `variable = window.prompt(message, default text);`
- Example.  
    `var salesTotal = window.prompt("What is the sales total?", 0);`  
    `if (salesTotal > 50)`  
        `if (salesTotal < 100)`  
            `document.write("The sales total is between 50 and 100.`  
    `");`



```
function scoreQuestions(number, answer) {  
    if (number == 1) {  
        if (answer == "a")  
            window.alert("Correct Answer");  
        else  
            window.alert("Incorrect Answer");  
    }  
    else if (number == 2) {  
        if (answer == "c")  
            window.alert("Correct Answer");  
        else  
            window.alert("Incorrect Answer");  
    }  
    else if (number == 3) {  
        if (answer == "b")  
            window.alert("Correct Answer");  
        else  
            window.alert("Incorrect Answer");  
    }  
    else if (number == 4) {  
        if (answer == "c")  
            window.alert("Correct Answer");  
        else  
            window.alert("Incorrect Answer");  
    }  
    else if (number == 5) {  
        if (answer == "d")  
            window.alert("Correct Answer");  
        else  
            window.alert("Incorrect Answer");  
    }  
}
```

The physicsquiz\_1.html  
that demonstrates  
nested if-else  
statements



# switch statements

- The switch statement controls program flow by executing a specific set of statements, depending on the value of an expression. The switch statement compares the value of an expression to a value contained within a special statement called a case label.
- A case label in a switch statement represents a specific value and contains one or more statements that execute if the value of the case label matches the value of the switch statement's expression

```
switch (expression) {  
    case label:  
        statement(s);  
    case label:  
        statement(s);    ...  
    default:  
        statement(s);  
}
```

- You can use a variety of data types as case labels within the same switch statement.

```
case exampleVar: // variable name  
    statement(s)  
case "text string": // string literal  
    statement(s)  
case 75: // integer literal  
    statement(s)  
case -273.4: // floating-point literal  
    statement(s)
```

# The physicsquiz\_1\_1.html that demonstrates switch statements

```
function scoreQuestions(number, answer) {  
  switch (number) {  
    case 1:  
      if (answer == 'a')  
        window.alert("Correct Answer");  
      else  
        window.alert("Incorrect Answer");  
      break;  
    case 2:  
      if (answer == 'c')  
        window.alert("Correct Answer");  
      else  
        window.alert("Incorrect Answer");  
      break;  
    case 3:  
      if (answer == 'b')  
        window.alert("Correct Answer");  
      else  
        window.alert("Incorrect Answer");  
      break;  
    case 4:  
      if (answer == 'c')  
        window.alert("Correct Answer");  
      else  
        window.alert("Incorrect Answer");  
      break;  
    case 5:  
      if (answer == 'd')  
        window.alert("Correct Answer");  
      else  
        window.alert("Incorrect Answer");  
      break;  
  }  
}
```

# while statements

- The while statement, which repeats a statement or series of statements as long as a given conditional expression evaluates to true. The syntax for the while statement is as follows:

```
while (conditional expression) {  
    statement(s);  
}
```

- Example

```
var count = 1;  
while (count <= 5) {  
    document.write(count + "<br />");  
    count++;  
}  
document.write("<p>You have printed 5 numbers.</p>");
```

# The physicsquiz\_1\_1\_1.html that demonstrates nested if-else statements

```
var answers = new Array(5);
var answers = new Array(5);
var correctAnswers = new Array(5);
correctAnswers[0] = "a";
correctAnswers[1] = "c";
correctAnswers[2] = "b";
correctAnswers[3] = "c";
correctAnswers[4] = "d";

function recordAnswer(question, answer) {
    answers[question-1] = answer;
}

function scoreQuiz() {
    var totalCorrect = 0;
    var count = 0;
    while (count < correctAnswers.length) {
        if (answers[count] == correctAnswers[count])
            ++totalCorrect;
        ++count;
    }

    document.quiz.score.value = "You scored "
        + totalCorrect
        + " out of 5 answers correctly!";
}
```

← → http://localhost:8383/ Physics Quiz

## Physics Quiz

1. How many natural elements are there?

☒ 92  
☐ 113  
☐ 103  
☐ 88

2. If one kg of air is compressed from 1 m<sup>3</sup> to 0.5 m<sup>3</sup>, which of the following statements is true?

☒ The density is halved.  
☐ The mass is halved.  
☐ The density is doubled.  
☐ The mass is doubled.

3. What is the acceleration due to gravity?

☐ 980 m/s<sup>2</sup>  
☒ 9.8 m/s<sup>2</sup>  
☐ 98 m/s<sup>2</sup>  
☐ 0.98 m/s<sup>2</sup>

4. What is the SI unit of density?

☒ cm<sup>3</sup>/g  
☐ m<sup>3</sup>/kg  
☐ kg/m<sup>3</sup>  
☐ g/cm<sup>3</sup>

5. Which of these has the highest density?

☐ Lead  
☐ Water  
☐ Mercury  
☒ Tungsten

Score You scored 3 out of 5 answers correctly!

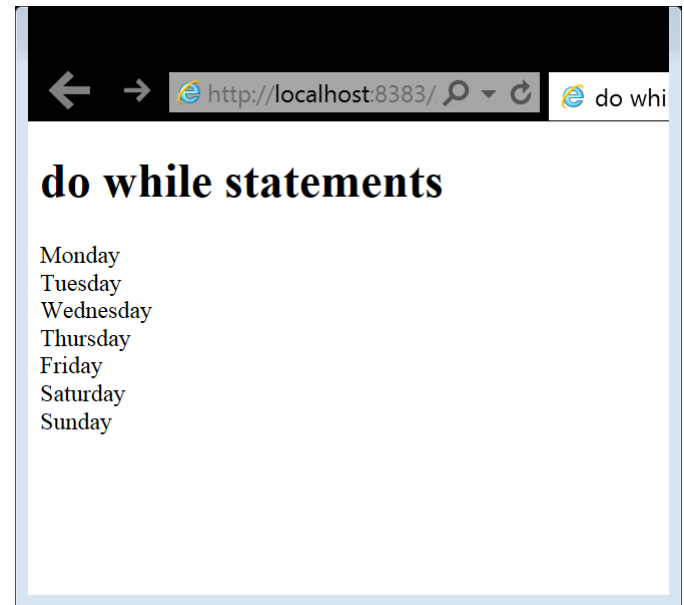
# do while statements

- The `do . . . while` statement executes a statement or statements once, then repeats the execution as long as a given conditional expression evaluates to true. The syntax for the `do . . . while` statement is as follows:

```
do {  
    statement(s);  
} while (conditional expression);
```

- Example

```
var daysOfWeek = new Array();  
daysOfWeek[0] = "Monday";  
daysOfWeek[1] = "Tuesday";  
daysOfWeek[2] = "Wednesday";  
daysOfWeek[3] = "Thursday";  
daysOfWeek[4] = "Friday";  
daysOfWeek[5] = "Saturday";  
daysOfWeek[6] = "Sunday";  
var count = 0;  
do {  
    document.write(daysOfWeek[count] + "");  
    count++;  
} while (count < daysOfWeek.length);
```



# for statements

- The for statement is used to repeat a statement or series of statements as long as a given conditional expression evaluates to true.
- The syntax of the for statement is as follows:  
for (counter declaration and initialization; condition; post statement) {  
    statement(s);  
}
- Example.  

```
var daysOfWeek = new Array();  
daysOfWeek[0] = "Monday";  
daysOfWeek[1] = "Tuesday";  
daysOfWeek[2] = "Wednesday";  
daysOfWeek[3] = "Thursday";  
daysOfWeek[4] = "Friday";  
daysOfWeek[5] = "Saturday";  
daysOfWeek[6] = "Sunday";  
for (var count = 0; count < daysOfWeek.length; count++) {  
    document.write(daysOfWeek[count] + "<br />");  
}
```

# Other keywords to control loops

- The **continue** statement, which restarts a loop with a new iteration.

- Example

```
for (var count = 1; count <= 5; ++count) {  
    if (count == 3)  
        continue;  
    document.write("<p>" + count + "</p>");  
}
```

- The break statement immediately ends the for loop

- Example

```
for (var count = 1; count <= 5; ++count) {  
    if (count == 3)  
        break;  
    document.write("<p>" + count + "</p>");  
}
```

# Exercises

- Many companies normally charge a shipping and handling fee for purchases. Create a Web page that allows a user to enter a purchase price into a text box; include a JavaScript function that calculates shipping and handling. Add functionality to the script that adds a minimum shipping and handling fee of \$1.50 for any purchase that is less than or equal to \$25.00. For any orders over \$25.00, add 10% to the total purchase price for shipping and handling, but do not include the \$1.50 minimum shipping and handling fee. The formula for calculating a percentage is  $\text{price} * \text{percent} / 100$ . For example, the formula for calculating 10% of a \$50.00 purchase price is  $50 * 10 / 100$ , which results in a shipping and handling fee of \$5.00. After you determine the total cost of the order (purchase plus shipping and handling), display it in an alert dialog box. Save the document as CalcShipping. html.