1. Write the value of each variable after each statement executes. If the variable has no value assigned to it, mark its value as ‘---’. Be sure to indicate whether the variables are strings or numbers by using quotation marks.

<table>
<thead>
<tr>
<th>num</th>
<th>msg1</th>
<th>msg2</th>
</tr>
</thead>
<tbody>
<tr>
<td>num = 1024;</td>
<td>1024</td>
<td>--</td>
</tr>
<tr>
<td>msg1 = 'x = 0';</td>
<td>1024</td>
<td>'x = 0'</td>
</tr>
<tr>
<td>msg2 = 'num = ' + num;</td>
<td>1024</td>
<td>'x = 0'</td>
</tr>
<tr>
<td>num = num / 2;</td>
<td>512</td>
<td>'x = 0'</td>
</tr>
<tr>
<td>msg1 = msg2;</td>
<td>512</td>
<td>'num = 1024'</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>num1</th>
<th>num2</th>
<th>num3</th>
</tr>
</thead>
<tbody>
<tr>
<td>num1 = 24;</td>
<td>24</td>
<td>--</td>
</tr>
<tr>
<td>num2 = '24';</td>
<td>24</td>
<td>'24'</td>
</tr>
<tr>
<td>num3 = num1 + num2;</td>
<td>24</td>
<td>'24'</td>
</tr>
<tr>
<td>num2 = parseFloat(num3);</td>
<td>24</td>
<td>2424</td>
</tr>
<tr>
<td>num1 = num1 + num2;</td>
<td>2448</td>
<td>2424</td>
</tr>
<tr>
<td>num1 = num3 + num1 + num2;</td>
<td>'242424482424'</td>
<td>2424</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>x</th>
</tr>
</thead>
<tbody>
<tr>
<td>x = 'The sum is ' + 12 + 20;</td>
</tr>
<tr>
<td>x = 12 + 20 + ' is the sum';</td>
</tr>
<tr>
<td>x = 12 + (20 + ' is the sum');</td>
</tr>
</tbody>
</table>
Suppose you are asked to arrange a group of people in sequence from youngest to oldest. You must organize a line that begins with the youngest and continues in ascending order according to age. Describe an algorithm for completing this task. Hint: Write an ordered list of steps.

There are many possible solutions. One is listed below.

1. Ask the first person their age.
2. Ask the second person their age.
3. Continue through the list of people until you reach the end.
4. Return to the person who was the youngest.
5. Move that person to the front of the line.
6. Repeat the previous 5 steps with the remaining people until they are all ordered.

Some other possible ways are discussed in your textbook. This is an $O(n^2)$ algorithm.
Suppose you are given a list of numbers like the one below.

\[11 \ 112 \ 96 \ 65 \ 89 \ 34 \ 101 \ 22 \ 14\]

Describe an algorithm (ordered list of steps) for finding all numbers greater than a given number (for example, 28 or 54). How many steps does your algorithm require? Write the correct Big-Oh notation for your algorithm. *Hint: Write an ordered list of steps.*

This is one possible answer. There are others.

1. **Examine the first number.**
2. **Compare that number to the "target" number.**
3. **If it's larger, add 1 to your running total.**
4. **Move to the next number.**
5. **Repeat previous 4 steps until there are no more numbers in the list.**
6. **Report the count of numbers greater than your target number.**

*This is an O(n) algorithm. We must go through the list only once to arrive at our answer. Compare this to the previous problem where we had to go through the list multiple times in order to arrange the people in order.*
Consider the HTML page below. Write a function named MultNums which gets two numbers from the textboxes and displays their product below them.

```html
<html>
<head>
  <title> Multiplying Numbers</title>
  <script type="text/javascript">
    num1s = document.getElementById('box1').value;
    num2s = document.getElementById('box2').value;
    num1 = parseFloat(num1s);
    num2 = parseFloat(num2s);
    prod = num1 * num2;
    document.getElementById('product').innerHTML = prod;
  </script>
</head>
<body>
  <!-- Two boxes for user entered numbers -->
  <p>
    Multiply this number: <input type="text" id="box1" size=4 value=0>
    by this number: <input type="text" id="box2" size=4 value=0>
  </p>
  <!-- Button to perform calculation -->
  <input type="button" value="Multiply!" onclick="MultNums();">  
  <!-- Place to display answers -->
  <div id="product"> </div>
</body>
</html>
```

There are many ways to do this problem. Here is another (shorter but not necessarily better) solution.

```javascript
num1 = parseFloat(document.getElementById('box1').value);
num2 = parseFloat(document.getElementById('box2').value);
document.getElementById('product').innerHTML = (num1 * num2);
```