Array Activities

1. Write a program to do the following:

* Create a new array of ten integers.
* Using a for loop, set the values of the array to be multiples of 10.
* Loop through the array again and print out the values to the console.   
  The output should look like this:  
  10 20 30 40 50 60 70 80 90 100
* Loop through the array again and multiply each of the values in the array by 2.
* Loop through the array again and print out the values to the console.   
  The output should look like this:  
  20 40 60 80 100 120 140 160 180 200

2. Write a program to do the following:

* Create two arrays of equal size and initialize their values.
* Print them both out to the console on separate lines.
* Compute the dot product of the two arrays by multiplying the values at matching indices together and adding all of those results together.
* Print the dot product result to the console.

3. Write a program to do the following:

* Create two arrays of equal size and initialize their values.
* Print them both out to the console on separate lines.
* Swap the contents of the two arrays, then print them out again.

4. Write a program to do the following:

* Create an array and initialize its values.
* Print it out to the console.
* Reverse the values in the array and print it out again.

5. Write a program to do the following:

* Create an array and initialize its values.
* Ask the user for a number to search for in the array.
* Perform a linear search through the array for the value: if it is found, print out the index, otherwise print a statement telling the user it was not found.

# Challenges:

1. Bubble sort
   1. While the array is not sorted, for each index in the array, if the value at the index is greater than the value at the next index, swap the values.
2. Binary search on a sorted array
   1. set L to 0 and R to length – 1
   2. while index L is less than index R
      1. set m to the middle of L and R
      2. if value at index m == search value
         1. return index m
      3. if value at index m < search value
         1. set L to m + 1
      4. if value at index m > search value
         1. set R to m – 1
   3. (if we get here, the value was not found)
3. Selection sort
   1. For indexes 0 to length – 2, find the smallest value in the unsorted portion of the array, swap the smallest value with the current index.