Solution to Practice Problems: Array Basics

1. Understanding code

Draw a representation of what the computer's memory and screen (if relevant) looks like at the end of each of these programs:

public class Array-Declarations {
    public static void main(String[] args) {
        int[] w;
        int[] x = null;
        int[] y = new int[3];
        int[] z = {1, 3, 5, 7, -14};
    }
}

On an exam or quiz, it's fine to leave out the box for the length, since it's usually obvious what the length is. In the examples below, I will leave out the box for the length. But just so you know, this is the full representation of what memory looks like.

public class Array-Assignment {
    public static void main(String[] args) {
        int[] x = new int[3];
        int[] y = {3, 5, 9, 2};
        x[2] = y[3];
        x[0]++;
        y[1] += y[2] * y[0];
        int[] z = x;
        x = y;
    }
}

public class Array-Length {
    public static void main(String[] args) {
        int[] x = new int[4];
        int[] y = {};
        int[] z = {0};
        System.out.println("x has " + x.length + " elements");
        System.out.println("y has " + y.length + " elements");
    }
}
public class Array-With-Loop1 {
    public static void main(String [] args) {
        int [] x = {-4, 9, 8, 2, -5, 7, 1};
        for(int i=1; i<x.length; i++) {
            x[i] = x[i-1];
        }
    }
}

public class Array-With-Loop2 {
    public static void main(String [] args) {
        int [] x = {-4, 9, 8, 2, -5, 7, 1};
        for(int i=1; i<x.length; i++) {
            x[i] += x[i-1]; // notice: += instead of =
        }
    }
}

public class Array-With-Loop3 {
    public static void main(String [] args) {
        int [] x = {-4, 9, 8, 2, -5, 7, 1};
        int val = 0;
        for(int i=0; i<x.length; i++) {
            val = val + x[i];
        }
    }
}
2. Writing Java Programs with Arrays
   a. Write a program that reads in 10 ints from the keyboard, and stores them all in an array.

   ```java
   import java.util.Scanner;
   public class Store10Ints {
       public static void main(String[] args) {
           Scanner keyboard = new Scanner(System.in);
           int[] store = new int[10];
           for(int i=0; i<store.length; i++) {
               store[i] = keyboard.nextInt();
           }
       }
   }
   ```

   b. Write a program that reads in 10 temperature values (as doubles) for 10 days of weather, computes the average temperature, and displays the number of days that were hotter than the average.

   ```java
   import java.util.Scanner;
   public class DaysAboveAverage {
       public final int NUM_DAYS = 10;
       public static void main(String[] args) {
           Scanner keyboard = new Scanner(System.in);
           double[] store = new double[NUM_DAYS];

           // sum algorithm
           double sum = 0;
           for(int i=0; i<NUM_DAYS; i++) {
               store[i] = keyboard.nextDouble();
               sum += store[i];
           }
           double avg = sum / NUM_DAYS;

           // accumulate algorithm
           int count = 0;
           for(int i=0; i<NUM_DAYS; i++) {
               if(store[i]>avg) {
                   count++;
               }
           }
           System.out.println("avg temp = " + avg + " and " + count + " days above avg");
       }
   }
   ```