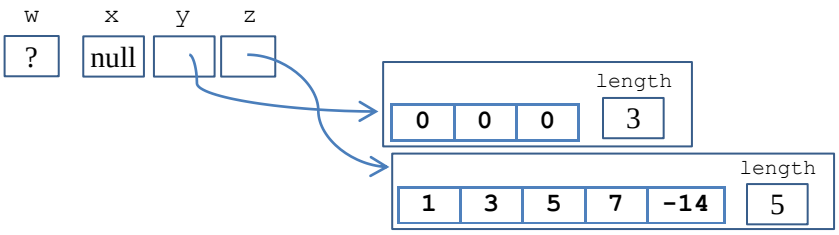
Solution to Practice Problems: Array Basics

1. Understanding code

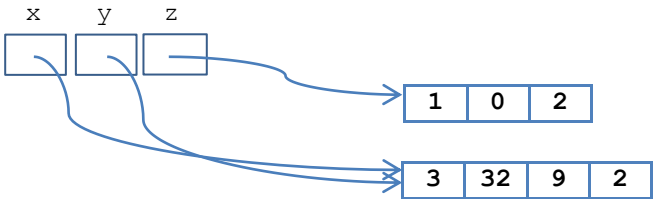
Draw a representation of what the computer's memory and screen (if relevant) looks like at the end of each of these programs:

```
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};
  }
}
```



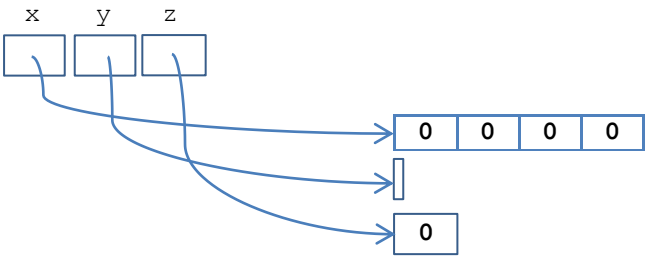
On an exam or quiz, it's fine to leave out the box for the length, since it's usually obvious what the length is. In the examples below, I will leave out the box for the length. But just so you know, this is the full representation of what memory looks like.

```
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");
```

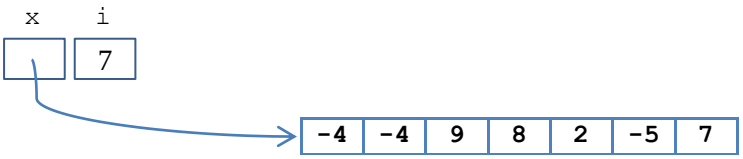
```
    System.out.println("z has " + z.length + " elements");
  }
}
```



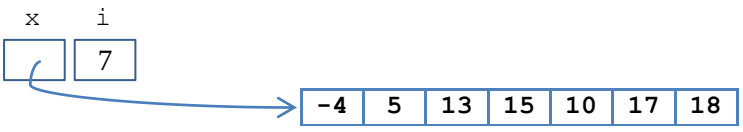
screen

x has 4 elements
y has 0 elements
z has 1 elements

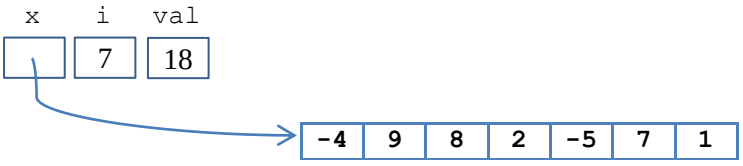
```
public class Array-With-Loop1 {
  public static void main(String [] args) {
    int [] x = {-4, 9, 8, 2, -5, 7, 1};
    for(int i=1; i<x.length; i++) {
      x[i] = x[i-1];
    }
  }
}
```




```
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.

```
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.

```
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");
  }
}
```