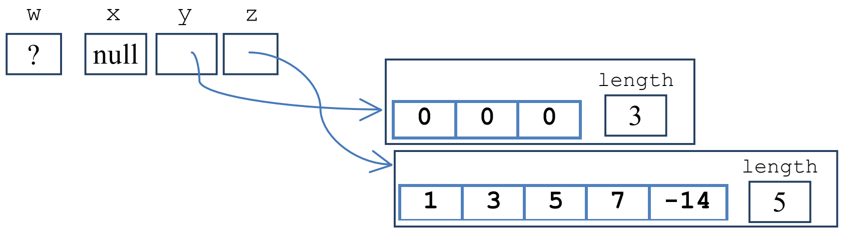
Practice Problems: Array Problems

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");
  }
}
```

```
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]; // notice:  += instead of =
    }
  }
}

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];
    }
  }
}

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=1; i<x.length; i++) {
      val = val + x[i];
    }
  }
}
```

2. Write a counter controlled loop to solve the following problems. Each one will involve an array (see the sample of Weather.java on slide 20).

1. (MinMax.java) Read in 500 ints from the keyboard, and store them in an array. Find the maximum and minimum values in the array, and display them on the screen.

   Source code?

2. (Swap.java) Read in 500 ints from the keyboard, and store them in an array. Find the *position* (or *index*) of the maximum and minimum values in the array, and *swap* them (move the biggest element to the position of the smallest, and move the smallest element to the position of the biggest).

   Source code?

3. (Even.java) Read 500 ints from the keyboard, and store them in an array. Display "true" on the screen if there is an even number of even numbers among these 500 numbers. Otherwise, display "false".

   Source code?