

Arrays

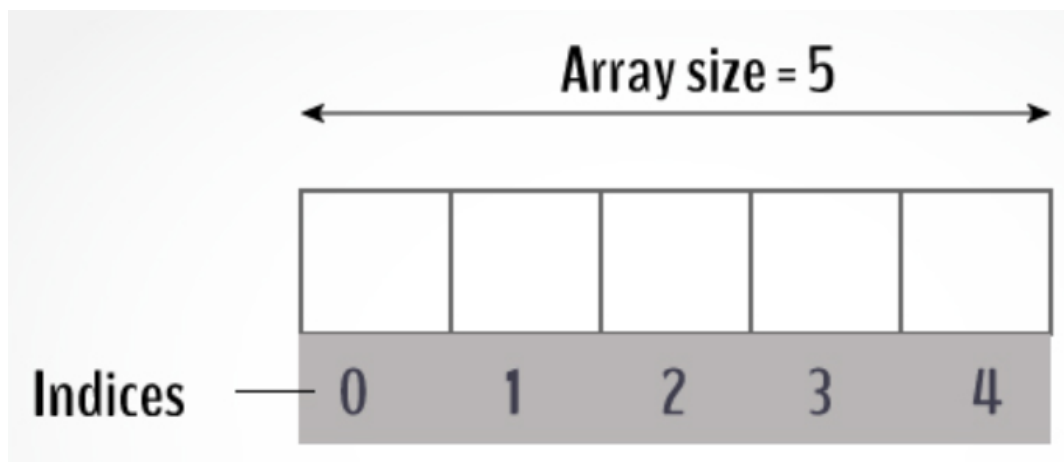
Ch. 5

Arrays

- An array is a contiguous set of memory locations, all storing the same type of data.

Arrays

- An array is a container that stores values.
- Arrays cannot change size once created.
- Arrays only hold a certain data-type – which we define.
- Specifying the index, we can access elements in the array.



Initializing Arrays

```
// Here, x is the name of our array that stores 10 ints.
```

```
int [] x = new int[10];
```

```
// An array storing 5 doubles
```

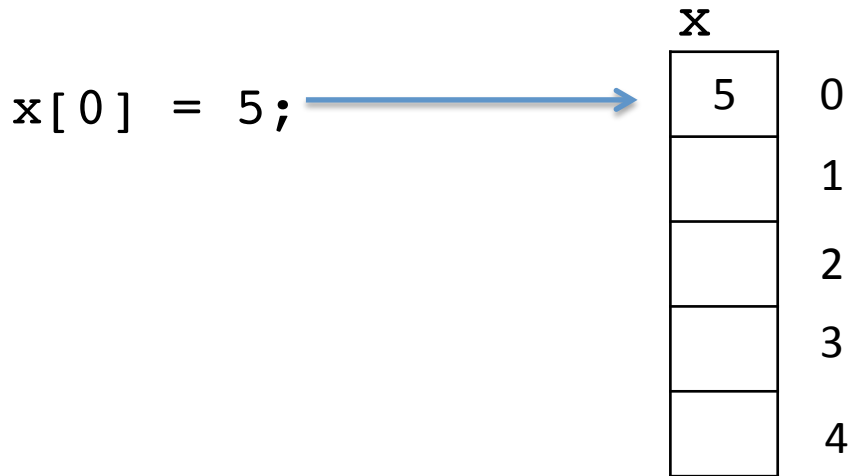
```
double [] y = new double[5];
```

Initializing Arrays

```
// Here, x is the name of our array that stores 10 ints.  
int [] x = new int[10];  
  
// accessing elements in arrays requires using an integer  
// as an index for the element being accessed  
  
// the statement below uses 0 as an index in the array x.  
// the index must be between 0 and array length - 1  
x[0] = 5;
```

Initializing Arrays

```
// Here, x is the name of our array that stores 10 ints.  
int [] x = new int[10];
```

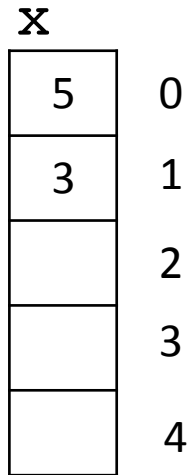


Initializing Arrays

```
// Here, x is the name of our array that stores 10 ints.  
int [] x = new int[10];
```

```
x[0] = 5;
```

```
x[1] = 3;
```



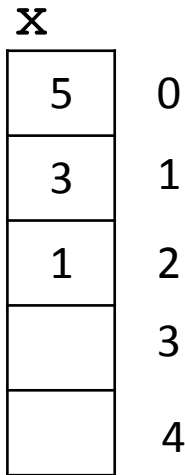
Initializing Arrays

```
// Here, x is the name of our array that stores 10 ints.  
int [] x = new int[10];
```

```
x[0] = 5;
```

```
x[1] = 3;
```

```
x[2] = 1;
```



Initializing Arrays

```
// A more direct way of initializing arrays  
int [] array = {5, 3, 1, 0, -4};
```

Initializing Arrays

```
// A more direct way of initializing arrays
int [] array = {5, 3, 1, 0, -4};

// accessing an array's length can be useful
int i = 0;
while(i < array.length){
    System.out.println(array[i]);
    i++;
}
```

Initializing Arrays

```
// A common error: Out of bounds exception. Trying to
// access elements in array that don't exist.
int [] ar = new int[5];

// The statement below will throw an
// ArrayIndexOutOfBoundsException causing the program to
// crash.
System.out.println(ar[5]);
```

Processing Arrays

```
// Simple example: reading doubles from the user
import java.util.Scanner;
public class ArrayTest{
    public static void main(String[] args){
        Scanner keyboard = new Scanner(System.in);
        double[] array = new double[5];
        for(int i = 0; i < array.length; i++){
            array[i] = keyboard.nextDouble();
        }
        System.out.println("Printing doubles.");
        for(int i = 0; i < array.length; i++){
            System.out.println(i + ": " + array[i]);
        }
    }
}
```

Processing Arrays

```
// Printing the array in reverse?
import java.util.Scanner;
public class ArrayTest{
    public static void main(String[] args){
        Scanner keyboard = new Scanner(System.in);
        double[] array = new double[5];
        for(int i = 0; i < array.length; i++){
            array[i] = keyboard.nextDouble();
        }
        System.out.println("Printing doubles.");
        for(int i = array.length - 1; i >= 0; i--){
            System.out.println(i + ": " + array[i]);
        }
    }
}
```

Processing Arrays

```
// Finding the highest value
import java.util.Scanner;
public class ArrayTest{
    public static void main(String[] args){
        int[] populations = {30000, 100000, 25000, 150000};
        // determining the highest value in an array
        int index = 0;
        int highest = populations[index];
        while(index < populations.length){
            if(populations[index] > highest)
                highest = populations[index];
            index++;
        }
    }
}
```