

INTRODUCTION TO COMPUTER SCIENCE I

LAB 6: ARRAYS

Friday, March 6, 2020

1 Setup

Create a `lab6` project in IntelliJ, then create a new Java class called `Arrays.java`. Copy the code from the `Arrays.java` file on the course web page into your `Arrays.java`.

The program currently contains two methods. Each method takes an `int` array as its parameter and fills the array with `ints`. The `fillRandom` method (which we saw in class on Wednesday) does this by choosing a random number between 0 and 9 (inclusive) for each array element; the `fillKeyboard` method does this by repeatedly prompting the user to enter the next element. These methods are there to help you test the additional methods that you will write in this lab.

2 Practice Using Arrays

The purpose of this lab is to give you some practice using and manipulating arrays. Your job is to write seven new methods that operate on arrays in different ways. After writing each method, you will probably want to add some code to the main method that tests to make sure your methods are working properly. Please make sure that your method names, input parameters, and return types match the instructions *exactly*. If they don't, our test code won't work properly and you won't receive credit for the method.

1. Write a method called `print` that, given an `int` array, prints the contents of that array. The elements should all print on the same line, with spaces in between them, and with a line break after the last element prints. For example:

```
3 6 9 8 2 6 3 5
```

We did this one in class on Wednesday, but I encourage you to practice by trying to reconstruct it before you look back at your notes.

2. Write a method called `addAllElements` that, given an `int` array, adds up the values of all elements stored in the array and returns the total.

3. Write a method called `fillFibonacci` that, given an `int` array called `myArray`, fills that array with the first `myArray.length` Fibonacci numbers (recall that the Fibonacci sequence is 1, 1, 2, 3, 5, 8, ...: the i th Fibonacci number is obtained by adding the $i - 1$ st and $i - 2$ nd Fibonacci numbers).

4. Write a method called `average` that, given a `int` array, computes the average of all elements stored in the array and returns the result. (Hint: use your `addAllElements` method!)

5. Write a method called `countElements` that, given a `int` array, counts the number of times each number from 0 to 9 appears in the array and prints the results. For example, if the input array is:

```
3 6 9 8 2 6 3 5
```

then the method should print:

```
0 0 1 2 0 1 1 0 1 1
```

That is, 0 appears 0 times in our input array, 1 appears 0 times, 2 appears once, 3 appears twice, and so on. If the input array contains an element that isn't between 0 and 9, don't count it anywhere in your result.

6. Write a method called `reverse` that, given a `int` array, returns a **different** array that contains the elements in the input array in reverse order. For example, if the input array is:

```
3 6 9 13 2 6 3 5
```

then the method should return an array containing:

```
5 3 6 2 13 9 6 3
```

Your method should *not* print the reversed array.

7. Write a method called `reverseInPlace` that, given a `int` array, reverses the order of the elements *in that array*. For example, if the input array is:

```
5 9 2 11 6 3
```

then after running the method the *same* array should contain:

```
3 6 11 2 9 5
```

Again, your method should not print the reversed array.

3 Submit your work

Submit `Arrays.java` file to the "Lab 6: Arrays" assignment on Moodle.

This assignment is due on Friday, March 13, 11:59 pm.
(Note the later-than-usual submission date due to next week's midterm.)