CSC171 — Homework 8

Arrays

The goal of this assignment is to give you experience with programming with arrays.

If you're a scientist, your experiments produce sequences of data values—you'll want to use an array to store them in your programs. Or perhaps you're running (or consulting for) a business and the data are your daily sales numbers. Use an array. Or perhaps you're a musician recording your songs digitally. A digital audio file is essentially a sequence of numbers corresponding to the instantaneous volume level of the music. In other words, an array.

Questions

1. Write a program that reads an integer from the user, then creates an array of integers of that length. It then fills the array with integers read from the user.

2. In your program's main class, define a static method `printArray` that takes an array of integers as its only argument and prints the elements of the array. You should print all the elements of the array on one line, separated by spaces, with no extra space after the last element. Extend your program from Question 1 to use this method to print the array after reading it.

3. Extend your program to print the index of the middle element of the array and the value stored in the array at that index (with an informative message). Explain in a comment how you decide what the middle is.

4. Extend your program to compute the minimum value in the array and print it out (with an informative message).

5. Extend your program to read an integer from the user and add it to every element of the array. Print the array after changing it (with an informative message).

6. Extend your program to declare another integer array variable and make its value be a *copy* of the first array. That is, its value should be a reference to a new array of the same length that contains the same element values (this is called a *shallow* copy). Print the first and last elements of the copy (with an informative message).

7. Arrays of the same length are added by adding the corresponding elements (*i.e.*, the first element of the sum is the sum of the first elements of each array, same for the second element, and so on). In math:

$$[a_0, a_1, \ldots, a_n] + [b_0, b_1, \ldots, b_n] = [a_0 + b_0, a_1 + b_1, \ldots, a_n + b_n]$$

   Extend your program to add the copy of the array to the original. This should change the original array but not the copy. Print both arrays afterwards to show that this is so (with an informative message).

Grading Scheme

Equal weight for each part.

Doesn't compile or is trivial	$<$ 50%
Compiles and is non-trivial	$\geq$ 50%
Complete and correct with good style and comments	100%
Incomplete, incorrect, bad style, no comments	$<$ 100%

Submission Requirements

Your submission **MUST** include a file named "`README.txt`" with your name, your NetID, the assignment number, and your lab section. This file should explain anything we need to know about how to build and run your project. In particular, be sure to explain how to run what parts of your submission for each question in the assignment.

Submit your solution as a single ZIP archive to BlackBoard before the deadline.

Late homeworks will not be graded and will receive a grade of 0.

All assignments and activities associated with this course must be performed in accordance with the University of Rochester's Academic Honesty Policy.