CSc 110 Assignment 7:

Arrays of Objects

How to hand it in:

Submit file **GradeCalculator.java** through the Assignment 7 link on the CSC110 conneX site.

Don't forget to follow the Style Guidelines posted – this is part of the requirements of every assignment.

REMINDER: It is OK to talk about your assignment with your classmates, and you are encouraged to design solutions together, but each student must implement their own solution. We will be using plagiarism detection software on your assignment submissions.

Learning Outcomes:

When you have completed this assignment, you should understand:

- How to use a class to instantiate objects.
- How to use instance methods.
- How to sort and search for data in an array.
- How to create and use an array of objects.
- How to write output to a file.

Assignment Description:

The teaching team needs some help calculating grades for CSC 110 at the end of term. This assignment requires you to implement a Grade Calculator that will take a raw set of student marks from the term and generate a final grade report.

The input file is just like that in Assignment 5. It contains an unknown number of lines, where each line is a single student's set of marks.
Each line is comprised of the student's marks for the term (separated by white space) formatted as follows:
Labs A1 A2 A3 A4 A5 A6 A7 Midterm1 Midterm2 FinalExam

The corresponding max grade of each component of the course is:
5 10 10 10 10 10 10 10 20 35 110

The corresponding weight of each component of the course as a percentage is:
5 4 4 4 4 4 4 4 15 15 37

We have provided you with the Csc110Student class (see Csc110Student.java). DO NOT change the code in this file.

However, in your GradeCalculator class you must:

1. Take the name of the input and output file as command line arguments, where the input file is argument 1 and the output file is argument 2. If the user does not enter the correct command line arguments your program should exit.
2. Identify how many student entries are in the input file so you can create the correct size of array. (REMINDER: you did this in Assignment 5)
3. Create an array of Csc110Student objects, creating each object with the data that you read from the input file described above. Be sure to carefully read the constructor and instance methods provided in the Csc110Student class in order to understand how to create and set the fields of each object you create.

   Your method for doing this must have the following signature:

```
/*
 *    PURPOSE: creates an array of Csc110Student objects using data
 *    from the input file. All fields of each object will have a value.
 *    INPUT:      Scanner s, access to the input data file and
 *          int n, the number of entries in the input
 *    OUTPUT: returns an array holding the Csc110Student objects
 */
 public static Csc110Student[] getStudents(Scanner s, int n) {
```

4. You must now generate a report using your array of Csc110Student objects. This report should include:
   a. The class averages for Midterms, Labs, Assignments and Final Exams (Do **NOT** include scores of 0 for any given component when you calculate the averages).
   b. The record of the student with the **highest finalGrade**.
   c. The record of the student with the **lowest finalGrade** (not including those who received 0 as a final grade).
   d. The record of the student with the **median finalGrade** (not including those who received 0 as a final grade).
   e. The record of the student with the **maximum finalExam score**
   f. The record of the student with the **minimum finalExam score** (not including those who received 0 on the final exam – assume they did not write the exam).
   g. An output of ALL student records in order of their **finalGrade** from lowest to highest.

   In the generation of this report you **must** call a sort method where sort **must** have the following signature:

```
/*
 *    PURPOSE: sorts an array of Csc110Student objects
 *          based on their finalGrade in ascending order
 *    INPUT: Csc110Student[] students, the array of
 *          Csc110Student objects to sort
 *    OUTPUT: none
 */
 public static void sort(Csc110Student[] students)
```

A sample input and output file are attached to this assignment for the following run:

```
java GradeCalculator grades.txt Report.txt
```