University of Victoria
Department of Computer Science
CSC 110 Fundamentals of Programming
ASSIGNMENT 4

DUE: Monday, February 26, 2018 before 7:50 am – By submission on ConneX only

Output: MUST Match Sample Output – Exactly

Indentation: MUST be Exactly 4 spaces or 1 tab

Input: Only 2 Scanner (new) objects can be used:

- One is connected to Standard.in (the keyboard), and
- One is connected to the file `scores.dat`

How to hand in your work

Submit the file (called `FileGrades.java`) that completely answers part II (below) through the Assignment #4 link on the CSC 110 conneX site. Please make sure you follow all the required steps for submission (including the final confirmation of your submission: Never 'Save as Draft', but submit and re-submit whenever you create a better solution.) When you have received an email confirming your submission, then you know it is submitted, if not, wait a few moments, then re-check what you have done and re-submit.

In this assignment you are given the opportunity to experiment with conditional statements and loops and continue to develop your skills in deciding how to 'method-ize' a program. There are many choices to be made in the development of this code, different programmers will make different choices. Like two different works of art, there is more than one way to make a beautiful program. Taking an opportunity to explore alternative beautiful programs is an excellent learning experience. This assignment also represents an opportunity to examine test strategy. The various inputs can all be tested for correctness. Try to consider all the possible incorrect inputs.

Learning Outcomes

When you have completed this assignment, you should be able to:

- implement conditional statements (if and if/else)
- analyze the flow of choices to ensure correct program logic.
- use parameterized loops within methods.
- Receive input from a file
- Model multiple, linear dimensions of a problem using nested loops: the nesting may occur across method boundaries.

Part I*: Problems from the Textbook*

Complete the *Chapter 4 Self-Check Problems* and questions 19 through 26 and *Chapter 12 Self-Check Problems* and questions 1 through 13 and compare your answers to the author's answers.

Part II: *Calculating the Grades for the Entire Class!*

Modify the program of Assignment 3 to read its input from a file called *scores.dat*. Ensure it works for one student first, then make it work for all of the students in the file. The data for each student in the file will adhere to the following format, where each element is separated by either a space or a tab character:

id number a1 a2 a3 a4 a5 a6 a7 L1 L2 L3 L4 L5 L6 L7 L8 L9 L10 midterm1 midterm2 final
id number a1 a2 a3 a4 a5 a6 a7 L1 L2 L3 L4 L5 L6 L7 L8 L9 L10 midterm1 midterm2 final
id number a1 a2 a3 a4 a5 a6 a7 L1 L2 L3 L4 L5 L6 L7 L8 L9 L10 midterm1 midterm2 final
.
.
.
It is important to notice that this file only contains the integer portion of the student ID numbers (ie, the V00 part is not included.)

The output, written to the screen, should be the last four digits of the student number, the final percentage, and the final letter grade. Additionally, there should be a summary of the number of students who received each grade (that is, the number of A+'s, A,'s, B+'s, B's, B-'s, C+'s, C's, D's and F's).

Consider the sample file below, that contains only a single student's information,

```
804403  8.5  8.75  10  9.5  10  7   8.3  1 1 1 1 1   1 1 1 1 1   78   84  88
```

The program should produce output similar to the following:

```
C O U R S E   G R A D E   C A L C U L A T O R
    Purpose: Calculates the weighted grade for students in a course
    Inputs: The Assignment, Lab and Exam grades for students in a course

Passing Grade for Final ==>  47

FILE INPUT being received . . . .

4403: Grade: 86.50 A - Final: 36.96

Grade  Number Receiving Grade
A+       0
A        1
A-       0
B+       0
B        0
B-       0
C+       0
C        0
D        0
F        0
```

Additional sample input files will be made available in the resources link of the course web site.

Here are some specific directions for this assignment:

- The program prompts the user to input the passing grade for the final exam from the keyboard.
- The program obtains all student (assignment, lab and exam) grades from an input file called `scores.dat`.
- There is no need to check to see if the grades are in the correct range: You can assume that what done when the input file was created.
- Remember to check that you code meets the 'Coding Conventions'.

Marking

Your mark will be based on:

- [2 marks] Your code compiles and runs without errors
- [2 marks] Your program runs and produces exactly the same output as the sample output, for the same input, calculating students' grades and grade summaries correctly. IMPORTANT: You can only open 2 new Scanner objects: one to the keyboard input, one to the file input. More than 2 may produce output, but will not be considered correct. Observe that your program will be tested with an input file that contains different input (that still follows these specifications.)
- [4 marks] Your code follows the coding convention precisely, in particular:
    - indentation using exactly 1 tab stop or 4 spaces within each layer of braces,
    - appropriate choice of identifiers
    - documentation comments, including header comment, class comment, and method description comments.
    - clear, consistent and concise implementation comments.
- [2 marks] Your code uses parameterized methods and return values, where appropriate, to ensure there is little or no code redundancy.