CST8116 Lab Exercise 07

Loops

Instructions Part 1: Pseudocode, Flowchart

- A school wants a software program that permits calculation of a semester grade point average for students. Each semester students take 5 courses. The program should ask for a numeric grade for each course adding them as a running total. The grade point average (average of numeric grades) should be printed on screen, then a prompt if the program should process another student or exit.

- To keep this exercise light in work, there is no requirement to validate the user input, assume it will be entered correctly as "Y" to continue, or "N" to end program, and that they will only enter values between 0.0 to 4.0 inclusive.
- You can create the full program in method main.
- You must demonstrate the use of nested loops, the two loops being
    - One of a while, or do-while loop
    - One for loop

- The grading system is summarized here:

Percent Grade	Letter Grade	Numeric Grade
80 – 100	A	4.0
70 – 79	B	3.0
60 – 69	C	2.0
50 – 59	D	1.0
0 – 49	F	0.0

- Create the pseudocode and flowchart for the problem and include these in your MS Word document, note that your full name must appear within any flowcharts you submit.

- Hand drawn flowcharts are acceptable as images within the MS Word document, computer generated flowcharts can also be included in your MS Word document as an image (or MS Word shapes themselves are acceptable).

Instructions Part 2: Testing / Hand Trace

- Provide a hand-trace of your pseudocode / flowchart looping for two sets of student numeric-grade entries.
- Ensure that if multiple students are entered by the user, each resulting grade point average is correct.
- This is an example, you will have more steps in your trace. Feel free to use this as a starting point, for your trace the user would enter Y to continue, do a second run of grade entries, then enter N.

shouldContinue	loopCounter	Output	Input	runningTotal
"Y"	1	Enter Grade 1	2.0	2.0
"Y"	2	Enter Grade 2	2.0	4.0
"Y"	3	Enter Grade 3	3.0	7.0
"Y"	4	Enter Grade 4	4.0	11.0
"Y"	5	Enter Grade 5	3.0	14.0
"Y"		Grade Point Average is 2.8 Continue Program (Y/N)?	"N"	14.0
"N"		Program shutdown Program by Stanley Pieda		

Instructions: Part 3 Plan, Create, Compile, Run a Java Program

- Using Eclipse, create a project named Exercise07 within your CST8116Workspace folder. (See Hybrid 1)
- Based on your pseudocode and flowchart, write the Java program to perform the tasks required.
- Follow Java programming conventions for identifiers, indentation, and provide programmer comments at the top of your file, and on each class header, and constructor and method.
- Take a screen shot of your program running, using the inputs for the planned hand-trace you created for entry of two student's numerical grades producing their grade point averages.
- Ensure your full name is visible as part of the program output in your screen shot.

Microsoft Word Document Format

See the template example (from exercise 01), suggested headings below:

Part 1: Pseudocode and Flowchart
Part 2: Hand Trace
Part 3: Java Screen Shot

Note: You are not required to copy and paste your Java code into the MS Word document, however you must upload the .java file(s) in addition to your MS Word document.

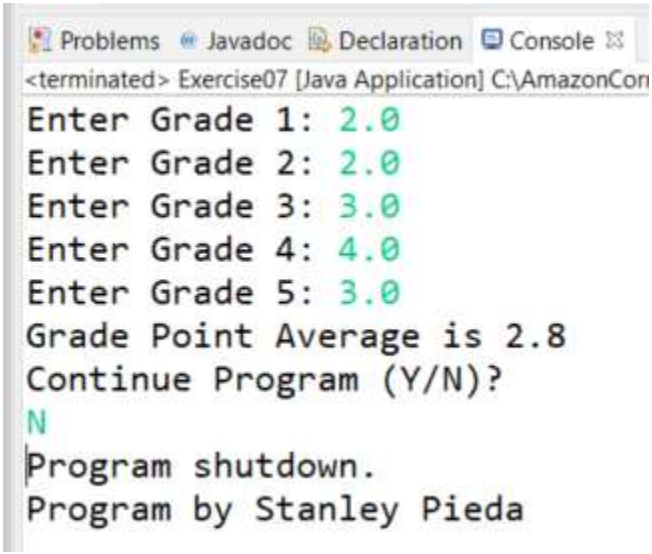
Submission Requirements

- Upload your MS Word document as well as your Java file to the Brightspace submission area by the due date. (See Brightspace for due date).
- Follow any additional submission requirements specified by your lab professor when submitting your homework.

Grading (6 Points)

Criteria	Missing / Poor (0)	Below Expectations (0.5)	Meets Expectations (1)
Algorithm: pseudocode	Missing or poorly done.	Pseudocode is included in MS Word document, however there are logic mistakes and or missing either (while/do-while) or for loop structures.	Pseudocode is included in MS Word document, provides a working algorithm that meets the requirements.
Algorithm: flowchart	Missing or poorly done or student name missing from flowchart.	Flowchart is included in MS Word document, however there are logic mistakes and or missing nested loops.	Flowchart is included in MS Word document, has correct format, and provides a working algorithm that meets the requirements.
Hand Trace	Missing or poorly done	Hand Trace does not show entry of two sets of student grades.	Test plan does test the minimal requested items, and also adds tests so that each possible letter grade is tested.
Screen shots running program	Missing, or missing students name as part of the program output.	Screen shots show program execution with sample input that matches the hand trace. May not show both a single student-grade-set entry, and a two student-grade-set entry runs of the program.	Screen shots show program execution with sample input that matches the hand trace. Shows both a single student-grade-set entry, and a two student-grade-set entry runs of the program.
Java file(s): Comments	No programmer comments, and or no student name.	Not all parts are commented: Comment header block at top of each source code file, class and constructor(s), and method(s) each have brief comment.	All parts are commented: Comment header block at top of each source code file, class and constructor(s), and method(s) each have brief comment.
Java file(s): Logic	Missing, or poorly done.	Small syntax or logic mistakes in the program. Java coding conventions not fully followed. Program accepts inputs, provides outputs, outputs may not be fully correct.	Program syntax and logic are correct. Java coding conventions fully followed. Program accepts inputs, provides correct outputs.

Appendix: Sample Program Run(s)



Basic run of the program, following the hand trace table. Shows that after entry of 5 student grades the program shuts down.

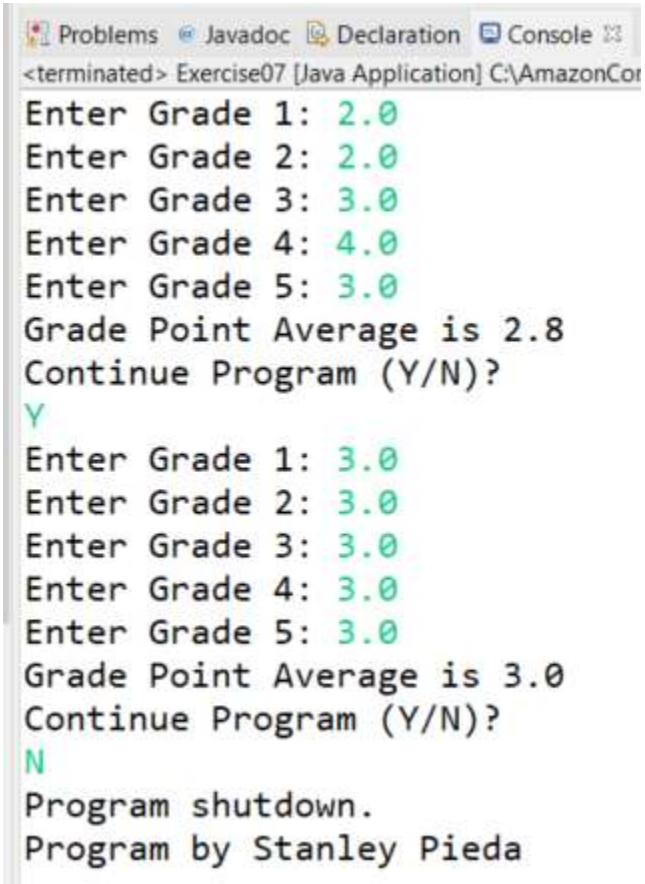


Image demonstrates entry of two sets of student grades, with output grade point average for each student following the grades input for them, the program continues for the second student grade and produces the correct grade point average, then shuts down as expected.