CS52(SMC Spring 2019) – Lab1 – Nested loop Control Structure
(See due date and other requirements on Canvas)

This assignment will train you in using repetition control structure with nested loops (loop inside a loop). In such programs, the outer loop is designed first and when that works correctly, an inner loop is added. Your program will accept data entry from keyboard and then write output to screen. Your program will be tested in four different scenarios.

The input data will have student names and their scores in various tests. Assume that each test was out of 100 total points. Each student's record ends with a negative value. Such negative value for test score is called a sentinel value. Below is an example of record for student Toots Sweet:

Toots Sweet 87 76 90 -1

Meaning of above line is that Toots Sweet took three tests and her scores (out of 100 in each test) were 87, 76, and 90. The -1 value is the sentinel value that tells program to stop reading when negative value has arrived. This allows the design of sentinel controlled looping structure. Obviously, some students (such as Phil o'sophy) took no test and for such students we do not calculate a grade. Rather we simply print that that person did not take any tests.

The data input for a student such as Phil o'sophy looks like below:
Phil o'sophy -88

Notice the typical characteristics of first and last name. They are both two tokens with no whitespace in between. However, obviously, the first and last names are separated by white space.

You can use C++ data type string (all lower case) for input of first and last name respectively. Use of string data type would require including #include <string>. The code fragment in the box below and output shows how you can take input for first and last name and then output the full name to console.

Line #	source code
1	#include <iostream>
2	#include <string>
3	using namespace std;
4	
5	int main( ){
6	string first;
7	string last;
8	cout<<"Enter first name and then press enter key: ";
9	cin>>first;
10	cout<<"Enter last name and then press enter key: ";
11	cin>>last;
12	cout<<"Hello "<<first<< " "<<last<<"\n";
13	return 0;
14	}
	If user entered John as first name and Doe as last name then output will be below

15	Hello John Doe

The program MUST use a nested loop. Outer loop is an EOF control loop, whereas inner loop is a sentinel-controlled loop. Use of arrays, user defined functions, struct etc. is not allowed in this program. No C programming code is allowed either. Basically, outer loop starts the data entry for one record, then inner (sentinel) loop sums up student scores, counts that how many tests were taken, computes the semester average (assuming that each test is out of 100), and uses the table below to assign letter grade

The grading of student average of tests they took is to be done based on following criterion:

90 <=average A

80< average <=90 B

68 < average <= 80 C

55 < average <=68 D

0 <= average <= 55 F

On windows the EOF character with keyboard data entry is Control key + Z and on Mac it's Control + D. The code fragment below shows how this outer loop could work.

```
#include <iostream>
#include <string>
using namespace std;

int main()
{
   string first;
   cout<<"Enter first name only: ";
   cin>>first;

   while(cin)
   {
      cout<<"Hello "<<first<<"\n";
      cout<<"Enter first name only: ";
      cin>>first;  // Upon end of data entry, user will enter Control +Z or D to terminate data entry
   }

   return 0;
}
```

User data entry after last record is inputted is terminated by typing:
Control + Z for Windows

Control + D for Mac

Typical output may look like below Inputted data are shown in italics and program output in bold non-italic fonts.

This program will process test scores to provide individuals with letter grades according to the following scale :

90	**<**	**average**		**A**
80	**<**	**average**	**<= 90**	**B**
68	**<**	**average**	**<= 80**	**C**
55	**<**	**average**	**<= 68**	**D**
0	**<=**	**average**	**<= 55**	**F**

Please Enter your first name: *Toots*
Please Enter your last name: *Sweet*
Please enter your test scores, end of score entry must be indicated by a negative integer.
For example, if you took three tests and you scored 90, 91, 89 respectively, then you will enter
90 91 89 -5:
87 76 90 -5

Your name is : Toots Sweet
Your scores are : 87 76 90
Toots sweet, your average is 84.3 and your letter grade is B.

Please Enter your first name: *Willy*
Please Enter your last name: *Nilly*
Please enter your test scores, end of score entry must be indicated by a negative integer.
For example, if you took three tests and you scored 90, 91, 89 respectively, then you will enter
90 91 89 -5:
93 94 0 83 -5
Your name is : Willy Nilly
Your scores are : 93 94 0 83
Willy Nilly, your average is 67.5 and your letter grade is D.

Please Enter your first name: *Phil*
Please Enter your last name: *O'sophy*
Please enter your test scores, end of score entry must be indicated by a negative integer.
For example, if you took three tests and you scored 90, 91, 89 respectively, then you will enter
90 91 89 -5:
-5
Your name is : Phil O'Sophy
Phil O' Sophy you did not take any tests.

Please Enter your first name: *Jill*
Please Enter your last name: *Quirk*
Please enter your test scores, end of score entry must be indicated by a negative integer.
For example, if you took three tests and you scored 90, 91, 89 respectively, then you will enter
90 91 89 -5:
84 73 83 -5
Your name is : Jill Quirk
Your scores are : 84 73 83
Jill Quirk, your average is 80.0 and your letter grade is C.

Please Enter your first name: *Jim*
Please Enter your last name: *Wim*

Please enter your test scores, end of score entry must be indicated by a negative integer.
For example, if you took three tests and you scored 90, 91, 89 respectively, then you will enter 90 91 89 -5:
91 95 99 100 -5
Your name is : Jim Wim
Your scores are : 91 95 99 100
Jill Quirk, your average is 96.3 and your letter grade is A.

Submission on Canvas

Only source code files must be uploaded. The extension of source code file in this lab will be:
.cpp
.hpp
Canvas WILL NOT accept any other file type!