

### INFO1112 Assignment#3

**This assignment is due on March 22, 2022 at 10am.** Late submission is accepted with late penalty.

Write a program that keeps track of students' scores using a **vector**. Your program will read a set of students' scores (note: a score may contain decimal point, e.g., 83.34) until a termination code is entered. After, it provides a summary of all scores. (Please read scenarios on the following page to see how the program works)

#### Termination Code:

- The termination code, which is a **negative** number, uses **the last two digits of your student ID**. For example,
  - if your ID is 1099999**01**, the secret number becomes **-1**.
  - if your ID is 1099999**87**, the secret number becomes **-87**.
  - if your ID is 1099999**99**, the secret number becomes **-99**.

#### Assumption:

- The user will not enter more than 5 scores (But, he could enter less than 5 scores).
- The user always enters numbers (i.e., no need to check for non-numeric inputs). A valid score is a number with or without decimal points falling between 0 and 100 inclusively (i.e., 0 and 100 are also valid inputs)

#### Requirements:

- No global variables are allowed (**-100% if any global variable is used**).
- Use function prototyping technique so that the main function is always the first function in your program.
- Use **vector** to keep track students' scores (**-75% if vectors are not used. However, you may use array operations when manipulating the content of the vector**)
- Use loop(s) in your program
- Use One procedure (a procedure is a function of void return type) and One function to implement your solution. The procedure / function should be designed in such a way that it can be re-used by other programs:
  - Write a **procedure** named "**determine\_grade**". In the summary, for each score stored in the vector, the program will call this procedure and display its equivalent letter grade
    - Grade A 80 – 100 (inclusive)
    - Grade P 60 - 79 (inclusive)
    - Grade F 0 – 59 (inclusive)
  - Write a **function** named "**calc\_average**" that takes the vector and **returns** the average of the scores.
  - In the summary, all numbers must be **formatted with 2 decimal points when they are displayed** (e.g., 66.66, 78.50, 34.00). Proper formatting and alignments of output are required (see scenarios on next page).

#### Submission:

- Submit ONLY the source **main\_YourStudentID.cpp**. (i.e., the word "main", followed by "\_" and your student ID. (e.g., the file name is "main\_109999983.cpp" where 109999983 is the student ID) to the **Assignment#3\_Description\_Submission** link on the course website.

#### Assessment

The following penalties will be applied in assessment. Penalty will be applied to overall quality of work.

*(Note: assessment on quality is subject to the decision of the instructor)*

Project is not built successfully	-100% (Note: a programming project will have 0 mark if it is not built successfully. For a complex project, you may decide to skip some requirements to get partial marks instead of 0)
Requirements not fulfilled	Up to -100%; it depends on the % of requirements completed
Incorrect file name(s)	-5% per name (there should be no space in a name)

improper code format, output format, no code comments	Up to -30%
low quality coding (e.g., redundant or unused code statement, hard-coded constant if a variable should be used, etc.)	Up to -100%

### Study the following scenarios to understand the program requirements

In the following scenario, the user has entered -1, 0, 100, 101, and -83. (Note: -1 and 101 are invalid inputs; -83 is termination code. These three numbers should not be taken into account when calculating the average.)

Since -1 is an invalid input, the user prompt (#1) will be repeated. Same rule is applied to #3.

```

C:\Users\andy\Desktop\A3\Debug\A3.exe
Please enter a maximum of 5 scores. A valid score is between 0 and 100 inclusively.
Enter score#1 (or enter -83 to end): -1
Invalid input. Enter a number between 0 and 100 inclusively.
Enter score#1 (or enter -83 to end): 0
Enter score#2 (or enter -83 to end): 100
Enter score#3 (or enter -83 to end): 101
Invalid input. Enter a number between 0 and 100 inclusively.
Enter score#3 (or enter -83 to end): -83

Summary of the scores:
Score#1:      0.00 Grade F
Score#2:     100.00 Grade A

The average of the scores = 50.00
Press any key to continue . . .

```

Use your assigned "termination code".

The output should be displayed in a table-like format with proper alignments (e.g. number column should be right justified).

Numbers in summary and average are displayed with 2 decimal points.

In the following scenario, the user has entered -1, 90.4, 74.6, 111, 34.60 and -83. (Note: -1 and 111 are invalid inputs; -83 is termination code. These three numbers should not be taken into account when calculating the average.)

Since 111 is an invalid input, the user prompt (#3) will be repeated. Same rule is applied to #1.

```

C:\Users\andy\Desktop\A3\Debug\A3.exe
Please enter a maximum of 5 scores. A valid score is between 0 and 100 inclusively.
Enter score#1 (or enter -83 to end): -1
Invalid input. Enter a number between 0 and 100 inclusively.
Enter score#1 (or enter -83 to end): 90.4
Enter score#2 (or enter -83 to end): 74.6
Enter score#3 (or enter -83 to end): 111
Invalid input. Enter a number between 0 and 100 inclusively.
Enter score#3 (or enter -83 to end): 34.60
Enter score#4 (or enter -83 to end): -83

Summary of the scores:
Score#1:      90.40 Grade A
Score#2:      74.60 Grade P
Score#3:      34.60 Grade F

The average of the scores = 66.53
Press any key to continue . . .

```

Use your assigned "termination code".

The output should be displayed in a table-like format with proper alignments (e.g. number column should be right justified).

Numbers in summary and average are displayed with 2 decimal points.