Cairo University **Computer Science Department**
Faculty of Computers & Information **Programming-1 Course**
Prof. Abeer El Korany **Fall 2017**
Dr. Amin Allam

Assignment-1

Problem 1: GPA Calculator

You are asked to develop a GPA calculator. The program input and output will be as follows:

1. Number of total students.
2. For each student:
    a. Student name.
    b. Number of subjects taken by the student.
        i. For each subject, the student mark (0 to 100) will be entered, and the program will output a grade for that subject (F to A+).
        ii. After finishing all subjects, the student GPA (0 to 4.0) will be displayed in addition to the General Grade (Very poor to Excellent).
        IV. Display the student's highest and lowest grades.
3. After calculating the grades for all students, the program should show some statistics which are:
    a. Average GPA for the students.
    b. Highest GPA and the corresponding student name who got it, and his/her highest and lowest grades.
    c. Lowest GPA and the corresponding student name who got it, and his/her highest and lowest grades.

Notes:

1. Calculate points for each subject based on grade as following then sum them and divide them by number of subjects:
    - A = 4.00 points
    - B = 3.30 points
    - C = 2.70 points
    - D = 2.20 points
    - F = 0.00 points
2. All float numbers should be displayed with 2 decimal places only.

Example run can look like the images below, note that the gray colored section represents console output and the black one represents user's input.

```
Enter number of students --> 3
Enter student #1 name --> Ahmed
Enter number of subjects --> 6
Enter marks for subject #1 --> 60
Grade for subject #1 --> D+
Enter marks for subject #2 --> 70
Grade for subject #2 --> C+
Enter marks for subject #3 --> 88
Grade for subject #3 --> A
Enter marks for subject #4 --> 90
Grade for subject #4 --> A+
Enter marks for subject #5 --> 95
Grade for subject #5 --> A+
Enter marks for subject #6 --> 75
Grade for subject #6 --> B
GPA for Ahmed is : 3.27
General grade for Ahmed is : Very Good
Enter student #2 name --> Mohamed
Enter number of subjects --> 2
Enter marks for subject #1 --> 69
Grade for subject #1 --> C
Enter marks for subject #2 --> 77
Grade for subject #2 --> B
```

Max grade is A+, Min grade is D+

Max grade is B, Min grade is C

```
GPA for Mohamed is : 2.70
General grade for Mohamed is : Good
Enter student #3 name --> Sara
Enter number of subjects --> 3
Enter marks for subject #1 --> 80
Grade for subject #1 --> B+
Enter marks for subject #2 --> 85
Grade for subject #2 --> A
Enter marks for subject #3 --> 76
Grade for subject #3 --> B
GPA for Sara is : 3.33
General grade for Sara is : Very Good

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Average GPA for students is : 3.10 Highest
GPA for student Sara is : 3.33 Lowest GPA
for student Mohamed is : 2.70
```

Max grade is A, Min grade is B

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Problem 2: Inventory Management System

You are asked to develop an inventory management system. The purpose of the system is to keep track of 2 products, the cost of each item per product, how many items were sold, how many are remaining, and the profit made. The system has two types of users: admin, and cashier. The admin can insert products' details, can view how many items of each product were sold, how many are remaining, and the profit. The cashier can only check out products.

Below is a detailed description of the program flow:

1. The program first asks the user to enter his/her credentials (i.e. UserID and password). Those credentials will be hard coded in the source code, and of type int. For example: I have: adminID = 123, adminPassword = 123, cashierID = 987, cashierPassword = 987
2. Then you need to check the entered credentials, do they match the credentials you have in the source code or not. If not, please display a "Log in Failed" message, then ask the user to enter his credentials again. (You are asked to implement this part using switch statement)
3. After the user has logged in, different list of actions will be displayed according to user's type.
   For Admin:
   a. Insert products' details (selecting this action would result in asking the user to enter products' ids, how many items of each product exist, and the cost of each item).
   b. Display number of the remaining items of each product (selecting this action would display each product, along side the remaining number of items of each).
   c. Display profit (selecting this action would print out the profit made).
   d. Log out (selecting this action would result in displaying a list, asking the user if he wants to login in again, or terminate the program).
   For Cashier:
   a. Check out items (selecting this action would result in asking the user about the number of items he wishes to check out for each product).
   b. Log out (selecting this action would result in displaying a list, asking the user if he wants to login in again, or terminate the program).

Example run can look like the table below, note that the left section represents console output and the right section represents user's input.

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Please enter your username:	123
Please enter your password:	123
Please select an action: 1-Insert products' details. 2-Display how many items of each product are remaining. 3-Display profit. 4-Log out.	1
Pleas enter product one name:	101
Please enter how many items of product 101 exist	5
Please enter the cost of each item of product 101	30
Pleas enter product two name:	202
Please enter how many items of product 202 exist	10
Please enter the cost of each item of product 202	15
Please select an action: 1-Insert products' details. 2-Display how many items of each product are remaining. 3-Display profit. 4-Log out.	3
Profit = 0	
Please select an action: 1-Insert products' details. 2-Display how many items of each product are remaining. 3-Display profit. 4-Log out.	4
Please select an action: 1-Login. 2-Terminate the program.	1
Please enter your username:	987
Please enter your password:	987
Please select an action: 1-Check out items. 4-Log out.	1
Please enter how many items of product 101 would you like to check out	2
Please enter how many items of 202 would you like to check out	5

Please select an action: 1-Check out items. 4-Log out.	1
Please enter how many items of Product1 would you like to check out	4

Sorry, we don't have enough items of product 101 to check out.	
Please enter how many items of product 202 would you like to check out	5
Please select an action: 1-Check out items. 4-Log out.	4
Please select an action: 1-Login. 2-Terminate the program.	1
Please enter your username:	admin
Please enter your password:	adminPass
Please select an action: 1-Insert products' details. 2-Display how many items of each product are remaining. 3-Display profit. 4-Log out.	2
Product 101: 3, Product 202: 0	
Please select an action: 1-Insert products' details. 2-Display how many items of each product are remaining. 3-Display profit. 4-Log out.	3
Profit = 210	
Please select an action: 1-Login. 2-Terminate the program.	2

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Delivery Notes:

- This is a group assignment of 2 members (at most) and the members should be from the same lab (i.e. G1&G2 can work together).
- Both students should work and fully understand everything in the code.
- Due date is on Saturday 26/10/2017 until 11:59 pm (i.e., until midnight).
- Assignment will be discussed in labs starting from 28/10/2017.
- No late submission is allowed.
- Submission will be through the Acadox: http://www.acadox.com/class/48405
- No submission through e-mails.
- For each task you will develop a .cpp file that should include a block comment
- containing students IDs and names these files should be named task1.cpp and task2.cpp then put these 2 files in a folder named Prog1_FirstAssignment_firstStudendID&SecondStudentID and compress them to a .zip file with the same folder name. The compressed file would be the file to be delivered.
- Failing to abide by the naming conventions of the file, would result in a ZERO for both team members.
- For students who do their assignments on shared machines (e.g., on the FCI labs' machines or the students' residence machines), please make sure t**o permanently delete your files from the shared machines after you finish your work,** so that no other student would take your files and submit it under their names.
- In case of Cheating if the assignment is from (N) marks then the one who have committed cheating will get (– N).
- You have to write clean code and follow a good coding style