CONFIDENTIAL

SCHOOL OF COMPUTING
Faculty of Engineering

UNIVERSITI TEKNOLOGI MALAYSIA

TEST 2 (PROGRAMMING)

SEMESTER I 2020/2021

SUBJECT CODE : SECJ/SCSJ1013
SUBJECT NAME : PROGRAMMING TECHNIQUE I
YEAR/COURSE : 1 (SECJ/ SECV/ SECB/ SECR/ SECP)
TIME : 21:00 – 23:00 MYT (1 hour 50 minutes)
DATE : 4th JANUARY 2021 (Monday)

INSTRUCTIONS TO THE STUDENTS:

- Please read the ***General Guidelines for the Programming Technique I Test 2*** that is shared in Telegram's Group and/ or provided in UTM e-learning
- Read the problem and instructions carefully.
- You are given **ONE HOUR FIFTY MINUTES** to complete the test inclusive of the submission of your program (**1 hour 20 minutes to answer** the question, **15 minutes to submit** the partial answer, and **15 minutes to submit** the final answer).
- Your program must follow the input and output as required in the text and shown in the examples. You must test the programs with (but not limited to) all the input given in the examples.

IMPORTANT NOTES:

- All the **COMMENT STATEMENTS** in the submitted program **WILL NOT BE EVALUATED**.

SUBMISSION PROCEDURE:

- Only the source code is required for the submission and the source code's file shall be named as follows: ***Name_ matricsNo_section.cpp*** (i.e. *AinaAli_A20EC018_01.cpp*).
- You do not need to compress the file.
- Submit the source code file via the **UTM's e-learning system**.

Question [65 Marks]

Write a complete C++ program that helps the cashier to calculate the price of the rent movies. The program should perform the following tasks:

Task 1: Write a function named **`calcAverage`**. **(4.5 marks)**

a) It takes the total number of each rented movie type as input parameters.
b) The function should calculate the average number of movies rented per movie type.
c) It should return the average value calculated in (b).

Task 2: Write a function named **`calcPrice`**. **(9.5 marks)**

a) It takes the total rate as an input parameter.
b) The function should calculate the final price based on the discount based on the conditions in Table 1.

Table 1

Rate Range	Discount(%)
Below RM 35.00	10
Between RM 35.00 to RM 60.00	15
Above RM 60.00	25

c) It should return the final price calculated in (b).

Task 3: Write a function named **`getInput`**. **(5.5 marks)**

a) This is a non-returning function.
b) It takes the number of movies to rent for each movie type (movie type 1, movie type 2, and movie type 3) as input parameters.
c) The function should ask the user to enter the number of movies to rent for each movie type.
d) It sends all the values entered by the user in (c) back to the calling module through the use of reference parameters.

Task 4: Write a function named **`dispRentalSummary`**. **(13 marks)**

a) This is a non-returning function.
b) It takes the overall total of total rate and the total number of each rented movie type as input parameters.
c) The function should display the overall total of total rate and the average number of movies rented per movie type by calling the **`calcAverage`** function as been shown in the Rental Summary section as in sample execution given below.
d) The function also needs to determine which type of movie that have the highest total number of rental and how much the total number of the highest rented movie type.

Note: You are **NOT ALLOWED** to use any **predefined function(s)** to determine the highest number of rented movie types.

Task 5: Write a **`main`** function to perform the following tasks: **(21.5 marks)**

a) You need to use an appropriate **LOOP** to perform the process in this function. The loop will be terminated when the user press 'N'.
b) You are **NOT ALLOWED** to use **arrays** except an array of characters.
c) The function should ask the user to enter a renter name.
d) The function should calculate the total rate using the following formula:

$$\textit{Total Rate} = (\textit{Movie Type 1} \times 2) + (\textit{Movie Type 2} \times 5) + (\textit{Movie Type 3} \times 3.5)$$

e) The function will sum up the overall total of total rate and calculate the total number of each rented movie type.
f) The function may need to call the functions that are defined in Task 2, Task 3, and Task 4.
g) The program should produce the output as in the sample execution given below. ***Note:*** The values in **bold** are input by the user.

Task 6: List all function prototypes. **(4 marks)**

Task 7: You must ensure your program fulfill the following criteria: **(7 marks)**

a) The program is able to run.
b) The program uses an appropriate structure for the program (e.g. all required header files are included, the program is properly written, proper indentation, etc.)

SAMPLE PROGRAM EXECUTION

```
<<<<<<<<<<<<< DATA >>>>>>>>>>>>>
Renter Name : Nick Fury
Movie Type 1: 1
Movie Type 2: 2
Movie Type 3: 1

<<<<<<<<<<<< SUMMARY >>>>>>>>>>>
Total Rate (RM): 15.5
Final Price(RM): 13.95

Press [N] to stop...y

<<<<<<<<<<<<< DATA >>>>>>>>>>>>>
Renter Name : Tony Stark
Movie Type 1: 4
Movie Type 2: 4
Movie Type 3: 0

<<<<<<<<<<<< SUMMARY >>>>>>>>>>>
```

```
Total Rate (RM): 28
Final Price(RM): 25.2

Press [N] to stop...m

<<<<<<<<<<<<< DATA >>>>>>>>>>>>>
Renter Name : Natasha Romanoff
Movie Type 1: 3
Movie Type 2: 4
Movie Type 3: 5

<<<<<<<<<<<< SUMMARY >>>>>>>>>>>
Total Rate (RM): 43.5
Final Price(RM): 36.975

Press [N] to stop...Y

<<<<<<<<<<<<< DATA >>>>>>>>>>>>>
Renter Name : T'Challa
Movie Type 1: 5
Movie Type 2: 2
Movie Type 3: 4

<<<<<<<<<<<< SUMMARY >>>>>>>>>>>
Total Rate (RM): 34
Final Price(RM): 30.6

Press [N] to stop...k

<<<<<<<<<<<<< DATA >>>>>>>>>>>>>
Renter Name : Steve Rogers
Movie Type 1: 3
Movie Type 2: 0
Movie Type 3: 1

<<<<<<<<<<<< SUMMARY >>>>>>>>>>>
Total Rate (RM): 9.5
Final Price(RM): 8.55

Press [N] to stop...m

<<<<<<<<<<<<< DATA >>>>>>>>>>>>>
Renter Name : Thor Odinson
Movie Type 1: 3
Movie Type 2: 2
Movie Type 3: 4

<<<<<<<<<<<< SUMMARY >>>>>>>>>>>
```

```
Total Rate (RM): 30
Final Price(RM): 27

Press [N] to stop...n

<<<<<<<<< RENTAL SUMMARY >>>>>>>>>
Overall Total Rate (RM)              : 160.5
Average for 3 types of rented movies: 16
Highest type of movie rented         : Movie Type 1 (19)
```