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 : 21:10 – 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 Ministry of Health (MOH) to determine the status of a zone by calculating the number of active cases for COVID 19. The program should perform the following tasks:

Task 1: Write a function named **`dispStatus`**. **(10 marks)**

a) This is a non-returning function.
b) It takes the number of active cases as an input parameter.
c) The function should display the status of a zone based on the conditions in Table 1.

Table 1

Number of active cases	Status of zone
Above 40	Red
21 until 40	Orange
1 until 20	Yellow
No case	Green

Task 2: Write a function named **`getInput`**. **(7 marks)**

a) This is a non-returning function.
b) It takes the number of total cases, new cases, total death, and total recovered as input parameters.
c) The function should ask the user to enter the number of total cases, new cases, total death, and total recovered.
d) It sends all the values entered by the user in (c) back to the calling module through the use of reference parameters.

Task 3: Write a function named **`dispOutput`**. **(4 marks)**

a) This is a non-returning function.
b) It takes the number of active cases as an input parameter.
c) The function should display the number of active cases and zone status by calling the **`dispStatus`** function.

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

a) It takes the number of states and total active cases as input parameters.
b) The function should calculate the average number of active cases per state.
c) It should return the average value calculated in (b).

Task 5: Write a **`main`** function to perform the following tasks: **(29 marks)**

a) You need to use an appropriate **LOOP** to perform the process in this function. The loop will be repeated when the user press ENTER.
b) You are **NOT ALLOWED** to use **arrays** except an array of characters.
c) The function should ask the user to enter a state name.

d) The function may need to call the functions that are defined in Task 2, Task 3, and Task 4.

e) The function should calculate the number of active cases for Covid 19 using the following formula:

Number of active cases = Total cases + New cases – Total Death – Total Recovered

f) The function should determine the state with the highest number of active cases and calculate the number of states, and the total number of active cases for all states. ***Note:*** You are **NOT ALLOWED** to use any **predefined function(s)** to determine the highest number of active cases.

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 >>>>>>>>>>>>>
State name     : Negeri Sembilan
Total cases    : 7103
New cases      : 57
Total death    : 11
Total recovered: 6274

<<<<<<<<<<<< SUMMARY >>>>>>>>>>>
Active cases   : 875
Status         : Red zone

Press <ENTER> to continue...

<<<<<<<<<<<<< DATA >>>>>>>>>>>>>
State name     : Johor
Total cases    : 3421
New cases      : 167
Total death    : 32
Total recovered: 1985

<<<<<<<<<<<< SUMMARY >>>>>>>>>>>
Active cases   : 1571
Status         : Red zone

Press <ENTER> to continue...

<<<<<<<<<<<<< DATA >>>>>>>>>>>>>
State name     : Perak
```

```
Total cases    : 2888
New cases      : 17
Total death    : 16
Total recovered: 2503

<<<<<<<<<<<< SUMMARY >>>>>>>>>>>
Active cases   : 386
Status         : Red zone

Press <ENTER> to continue...

<<<<<<<<<<<<< DATA >>>>>>>>>>>>>
State name     : Perlis
Total cases    : 44
New cases      : 1
Total death    : 2
Total recovered: 41

<<<<<<<<<<<< SUMMARY >>>>>>>>>>>
Active cases   : 2
Status         : Yellow zone

Press <ENTER> to continue...

<<<<<<<<<<<<< DATA >>>>>>>>>>>>>
State name     : Pulau Pinang
Total cases    : 2978
New cases      : 23
Total death    : 9
Total recovered: 2743

<<<<<<<<<<<< SUMMARY >>>>>>>>>>>
Active cases   : 249
Status         : Red zone

Press <ENTER> to continue...N

<<<<<<<<< ACTIVE CASES >>>>>>>>>>
Total  : 3083
Highest: 1571 (Johor)
Average for 5 states: 616
```