SCHOOL OF COMPUTING
Faculty of Engineering

UNIVERSITI TEKNOLOGI MALAYSIA

TEST 2 (PRACTICAL)

SEMESTER I 2019/2020

SUBJECT CODE : SECJ/SCSJ1023
SUBJECT NAME : PROGRAMMING TECHNIQUE I
YEAR/COURSE : 1 (SECJ/ SECV/ SECB/ SECR/ SECP)
TIME : 2.30 – 4.30 pm (2 hours)
DATE : 12th November 2019 (Tuesday)
VENUE : N28 MPK1-MPK8, MPK10, MCASE

INSTRUCTIONS TO THE STUDENTS:

- Read the instructions carefully.
- References to any resources by any means **EXCEPT** Programming Technique I Lab Module are strictly prohibited.
- You are given **TWO HOURS** to complete the test, including the submission of your program.
- 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.

SUBMISSION PROCEDURE:

- Only the source code file is required for the submission (i.e. **`Test2.cpp`**).
- Submission must be done via the **UTM’s e-learning system**.

Question [80 Marks]

Write a complete C++ program that helps the company to calculate the employee meals' allowance. The program should perform the following tasks:

Task 1: Write a function named `getAmount`. **(5.5 marks)**

a) It is a function with no input parameters.

b) The function should ask the user to enter the amount spent by the employee for his/ her meal.

Input validation: The program should **not accept zero and negative** number for the input.

c) It should return the value entered by the user in (b).

Task 2: Write a function named `times` to enter the punch in and punch out time by using 24-hour clock system. **(13.5 marks)**

a) This is a non-returning function. It takes punch in (PI) and punch out (PO) time as input parameters. It sends PI and PO back to the calling module through the use of reference parameters.

b) The function should ask the user to enter the punch in and punch out time by using 24-hour clock system. The format for user input is HH.MM.

c) The function should call `validTime` function to validate the time entered by the user.

Input validation: The program should ONLY **accept PO greater than PI** for the input.

Task 3: Write a function named `validTime` to validate either the punch in and punch out time is the valid time or not. **(10 marks)**

a) It takes time as input parameter.

b) By using 24-hour clock system, punch in and punch out time must be in between 00.00 and 23.59. Therefore, you need to check either the time passed to this function is a valid or not.

Note: For the validation purposes, you may use `cmath` predefined function or type casting if necessary.

c) The function should return the boolean value.

Task 4: Write a function named `mealsAllowance` to calculate the meals allowance. **(31 marks)**

a) This is a non-returning function. It takes total expenses by the employee (E), total given allowance (GA) and total allowable allowance (AA) as input parameters. It sends E, GA and AA back to the calling module through the use of reference parameters.

b) The attendance time will be used to entitle the meals allowance. The function should call **`times`** function to enter the punch in and punch out time by using 24-hour clock system. Employees punch in when they start working, and punch out when they stop working.

c) There are three types of allowance will be given, which are:

(i) Breakfast allowance if the time of punch in is before 7.00 am.

(ii) Lunch allowance if the time of punch out is after 12.00 pm.

(iii) Dinner allowance is allowed if the time of punch out is after 6.00 pm.

The company allocates the allowance up to RM 5 for breakfast, RM 7 for lunch, and RM 7 for dinner.

Note: Please use constant variables if necessary.

d) To calculate total expenses by the employee (E) and total allowable allowance (AA), the function should call **`getAmount`** function to enter the amount spent for his/her breakfast, lunch and/or dinner meals, if any.

e) For example:

> *Employee A punch in at 06.50 and punch out at 20.00. Let's say, employee A spent RM 7 for breakfast, RM 5 for lunch and RM 6 for dinner.*

Total expenses by the employee = 7 + 5 + 6 = RM 18.
Total given allowance by the company = 5 + 7 + 7 = RM 19.
Total allowable allowance of the employee = **5** + *5* + *6* = RM 16.

Notes: If the amount spent by the employee for meals is greater than maximum allowance given, the total allowable allowance must be equal to maximum value for the allowance given (in **bold**). Otherwise, it must be equal to the amount spent by the employee (in *italics*).

Task 5: Write a **`main`** function to perform the following tasks: **(12 marks)**

a) The function should ask the user to enter the number of working days.

b) The function may need to call the functions that are defined in Task 1 to Task 4.

c) The function should display the total expenses by the employee (E), total given allowance (GA) and total allowable allowance (AA).

d) Finally, the function should calculate and display the extra amount to be paid by the employee (EA) and/ or the total amount saved by the employer (AS).

Notes: EA = E – AA and AS = GA – AA.

The program should produce the output as in sample executions given below. ***Note:*** The values in **bold** are input by the user.

Task 6: You must ensure your program fulfill the following criteria: **(8 marks)**

a) The program is able to run.

b) The program use 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 1

```
Please enter the number of working days : 1

Day 1:
Please enter the punch in time (HH.MM) : 06.50
Please enter the punch out time (HH.MM): 13.00

:: Breakfast ::
Please enter the amount spent : 8

:: Lunch ::
Please enter the amount spent : 8

Total expenses            : RM16
Total given allowance     : RM12
Total allowable allowance : RM12

Extra amount paid by employee   : RM4
```

SAMPLE PROGRAM EXECUTION 2

```
Please enter the number of working days : 1

Day 1:
Please enter the punch in time (HH.MM) : 06.61
Punch in time must be between 00.00 and 23.59.

Please enter the punch in time (HH.MM) : 06.51
Please enter the punch out time (HH.MM): 05.30
Invalid inputs!!

Please enter the punch in time (HH.MM) : 06.51
Please enter the punch out time (HH.MM): 20.30

:: Breakfast ::
Please enter the amount spent : 0
Amount must be greater than 0.
Please enter the amount spent : 7

:: Lunch ::
Please enter the amount spent : 5
```

```
:: Dinner ::
Please enter the amount spent : 6

Total expenses            : RM18
Total given allowance     : RM19
Total allowable allowance : RM16

Extra amount paid by employee   : RM2
Total save by employer          : RM3
```

SAMPLE PROGRAM EXECUTION 3

```
Please enter the number of working days : 2

Day 1:
Please enter the punch in time (HH.MM) : 10.00
Please enter the punch out time (HH.MM): 18.30

:: Lunch ::
Please enter the amount spent : 9

:: Dinner ::
Please enter the amount spent : 5

Day 2:
Please enter the punch in time (HH.MM) : 06.50
Please enter the punch out time (HH.MM): 17.00

:: Breakfast ::
Please enter the amount spent : 5

:: Lunch ::
Please enter the amount spent : 6

Total expenses            : RM25
Total given allowance     : RM26
Total allowable allowance : RM23

Extra amount paid by employee   : RM2
Total save by employer          : RM3
```