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| **TMF1414-Introduction to Programming**  **Pair Assignment (10%) – (2 students in a group)**  **Due Date: 03rd November 2019, before 4pm** |

**Learning Outcomes:**

To demonstrate the ability of students to:

* Distinguish the basic problem-solving techniques in developing algorithms and programs for given problems. [C4]
* Construct complete programs based on a given specification. [P4]
* Construct the process of top-down, stepwise refinement to benefit all related software construction task. [P4]

**Objectives:**

To demonstrate the ability of students to:

* analyse given problem and identify correct requirements.
* produce readable program – indentation, comments, variables
* produce a correct programming code based on programming design
* design solution and use appropriate control structures to handle program logics based on different conditions and generate correct outputs. For instance, selection and repetition, multiple selections and others control statements.

**Problem Statement(s):**

You are working at a telephone company that sells pre-paid reload card. You were instructed by your manager to write a program to estimate the total call charge for every customer. Every phone call is charged as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| Call Type | Fixed Charge | First 3 minutes | Subsequent Minutes |
| Local  (Same operator) | Flat rate @ RM0.20 / 25 sec block | - | - |
| Local  (Other Operator) | Flat rate @ RM0.35 / 30 sec block | - | - |
| International (Landline) | RM0.50 | RM2.50 | RM0.75 / min block |
| International (Mobile) | RM1.00 | RM3.00 | RM0.85 / min block |

Local call is charged at flat rate in block. A block is a duration between 0 – 25 sec for same operator and 0 – 15 sec for other operator. This means that a call of 1 sec is also considered as one block. The subsequent minutes for international call is in per minute block where a duration less than 1 minute is considered as a block.

**Requirements:**

* The program should initially prompt the user for the number of call made.
* Then input the type and duration for each phone call.
* Your program should output the total charge for each call, total of duration for local call with total charge as well as duration for international call with total charge. Finally, the total charge for the customer is displayed on the screen.
* Your program should check for invalid data such as non-positive or number of calls or less than 1, number of second greater than 60 and so on wherever you think necessary. It should prompt the user for corrected input whenever it detects invalid input.
* Applying appropriate control structures to handle program logic in your program.
  + Include at least one (1) different type of selection or multiple selection structure
  + Include at least two (2) different type of repetition structures
* Bear in mind that your program may become more complex and it is important for you to use proper indentation and style, meaningful identifiers and appropriate comments.

Here is an example of how a run might appear:

Enter number of call(s): 3

Enter the type of call-1 (1-Local(Same); 2-Local(Other); 3-Inter(Land); 4-Inter(Mob)): 2

Enter the duration of call-1 (in minute and second, separated by a space): 1 43

Call-1 charge is RM1.40

Enter the type of call-2 (1-Local(Same); 2-Local(Other); 3-Inter(Land); 4-Inter(Mob)): 4

Enter the duration of call-2 (in minute and second, separated by a space): 6 18

Call-2 charge is RM7.40

Enter the type of call-3 (1-Local(Same); 2-Local(Other); 3-Inter(Land); 4-Inter(Mob)): 1

Enter the duration of call-3 (in minute and second, separated by a space): 2 47

Call-3 charge is RM1.40

Total local call duration is 4min 30sec

Total local charge is RM2.80

Total international call duration is 6min 18sec

Total international charge is RM7.40

Total charge is RM10.20

**Deliverables:**

1. A set of bug‐free program (source code) – sc\_STUDENTIDs.cpp – eg: sc\_10021\_10033.cpp
2. Refer to the assignment rubric on how to document your report (eg: rpt\_10021\_10033.docx). Your report should not exceed 5 pages (excluding the cover and the table of content). Font type is Century Schoolbook and font size is 11 with single spacing. Your report should contain;
   1. Table of content
   2. Introduction
   3. Flow charts
   4. Pseudocode
   5. Print screens (sample run of your program)

**Remarks:**

* This assignment must be done in **pair (2 students)**;
* Plagiarism will be penalized; no mark will be given;
* The assignment must be submitted through **eleap.unimas.my** (C source code, and softcopy of the report) as one zip file and name it with your matric number, for example “10021\_10033.zip”. You must upload it to **eleap.unimas.my** by 03rd **November 2019**, **before 4.00pm**; and
* Late submission will only receive up to 50% out of the total mark.