TMF1414 Introduction to Programming
Project (20%)
Due Date: 16th January 2023, before 5:00 pm

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]
- Justify the solution clearly and confidently. [A3, TS]

Objectives:

To demonstrate the ability of students to:

- design and develop a **console program** that receives inputs from user and display correct outputs;
- apply **modular programming** to solve given problem effectively using functions; and
- use appropriate **derived data types** to manage data for the project. For instance, array, structure and files.

Problem Statement(s):

Construct a console program to simulate BUS reservation system. The system is used to make reservation for a Bus journey from Kuching Airport to 3 main destinations namely Kuching, Serian and Kota Samarahan. Once a reservation is confirmed, the customer can make payment via online banking. In order to make a reservation, the customer needs to enter the following information:

a) Seat reservation class: such as business or economy.

b) Number of seats they wish to reserve. Everybody must have a seat reserved for the bus journey including babies.

c) There are two types of seat for both business and economy class, that are either hot seat or normal seat. The hot seat is a bit bigger and more comfortable, and it is also located near the window. The rate for kids 12 years old and below is 50% off of the adult rate.

d) Customer may choose to include food and drink in the reservation. The food and drink for business class are more expensive than those in economy type.

Requirements:

Your system should be able:

a) to display the seat details as shown in *figure-1* for customer information;

b) to allow up to a maximum of 3 types of seat classes for each customer/transaction. the number of seats is unlimited.

c) to display the details of the reservation made by each customer and the calculated total price in a single receipt;

d) to operate continuously for the customer to make reservations until the user chooses to exit from the system;

e) to display all the transaction details at any time when it is needed; and

f) to save all the transactions to a file (.txt or .dat) as illustrated in *figure-2* before the system is exited.

You should show program modularity in your solution using functions, and also demonstrate ability in passing argument(s) to and returning value from called function in your program. Besides, your project **MUST** apply the following mechanisms to store and organize the data for your project:

a) Array / Pointer
b) Basic Data Structure
c) File Operations

Seat Class	Seat Type						Food & Drink	
	Hot Seat			Normal Seat				
	Kuching	Serian	Kota Samarahan	Kuching	Serian	Kota Samarahan	Food (RM)	Drink (RM)
a) Business - Adult	20.00	30.00	25.00	15.00	25.00	20.00	5.00	2.00
b) Business - Kid	50% of the Adult Rate	50% of the Adult Rate	50% of the Adult Rate	50% of the Adult Rate	50% of the Adult Rate	50% of the Adult Rate	3.50	1.20
c) Economy - Adult	15.00	25.00	20.00	12.00	20.00	17.00	4.00	1.50
d) Economy - Kid	50% of the Adult Rate	50% of the Adult Rate	50% of the Adult Rate	50% of the Adult Rate	50% of the Adult Rate	50% of the Adult Rate	3.00	1.00

Figure 1: **The Price Details for Different Types of Seat Reservation**

Receipt No	Seat Class	Seat Type						Food & Drink		Amount (RM)
		Hot Seat			Normal Seat					
		Kuching	Serian	Kota Samarahan	Kuching	Serian	Kota Samarahan	Food (unit)	Drink (unit)	
001	Business – Adult	2	-	-	-	-	-	2	1	66.70
	Business - Kid	1						1	1	
002	Economy - Adult	-	3	1	-	-	2	-	4	135.00
									Total	**201.70**

Figure 2: **Example of transaction details of all reservations made**

Deliverables:

i. A set of bug-free C program (source codes - *.c / *.h and files - *.txt/*.dat).
ii. Project cover page
iii. Presentation material (PowerPoint)
iv. Proof of discussion (WhatsApp or meeting record/pics).

Remarks:

- This project must be done in groups of **FOUR (4) to FIVE (5)** members;
- Plagiarizing will be penalized; no mark will be given;
- The project must be submitted through **eleap.unimas.my** (C source codes) as one zip file and name it with your **L**ecture**G**roupNumber_RegisteredProjectGroupNo, for example "LG02_ProjGroup08.zip". You must upload it to **eleap.unimas.my** **by Monday, 16th January 2023, before 5.00 pm;**
- Any late submission will only receive 50% of the marks given for your program; and
- All projects **MUST** be presented and all group members should present during the presentation session.