PROJECT (40%)

A. INSTRUCTIONS

i. Group Registration (DONE)
- Each group representative is required to write the names of group members and their matriculation numbers. Link: Group Registration
- Each 14 groups will have 4 members except 2 groups which will have 3 members.

ii. Title/Topic
- Each group will receive a title/topic concerning practical problem and has to use creativity to solve it (**Please refer to Section C**).
- There will be marks given for creativity, which means each group is free to add as many elements as they want in their program.
- No change of title/topic is allowed.

iii. C++ program
- Each group has to write a C++ program to solve the assigned problem.
- It is allowed to refer to websites and books.
- The C++ program must be an original work of the group. No mark will be given to groups whose answers are taken from the internet or other resources, whether fully or partially.
- The C++ program **must contain elements from these topics**: selection, repetition, functions, arrays or data structures, and strings.

iv. Report
- Each group has to prepare and submit a report with the following elements:
  1. Front page (project title, group members' names & matriculation numbers);
  2. Introduction;
  3. A list of variables used in the C++ program and their descriptions;
  4. How the elements from the topics mentioned in (**iii)** are used in the program;
  5. Contribution of each group members;
  6. Adequate amount of test runs to show the program is working (and perhaps to show important abilities/elements of the program). Please print-screen and crop the output (the black screen or console) and put them in the report;
  7. List of references (websites, books, journal etc). Please have a look at Gaya UKM writing style to find a correct way to write list of references.
- When writing the report, please create sections or paragraphs. You can add subsections if needed. Numbers or bullets can also be used when there is a list of items.
- The report can be written in Bahasa Melayu or English (choose one only).
- The length of the report is approximately 4 to 5 pages (single or 1.5 spacing). Slightly more or less number of pages is fine as long as all important elements are included in the report.
- **The report is compulsory**, hence a failure to submit the report will result in no mark being granted to the group for the whole project.

Video presentation and presentation days
- Each group needs to prepare a 5-minute video describing their C++ program, which will be played during the presentation day. This will be followed by a **live** 5-minute QnA session.
- Presentation days will take place on 18th-22 July 2022.
- Thus, every group member has to attend the session allocated for his/her group.
- **Attendance is compulsory**, without which no mark will be granted to the group for this project.

vi. **Submission**
- Group representatives are responsible to submit all items, which are:
    1. The C++ file (in .cpp format)
    2. Data file, if there is any (in .txt format or other appropriate format).
    3. Report (in .pdf format)
    4. The URL of the video presentation. You could upload your video to Google Drive or Youtube with "unlisted" visibility, then generate its URL for submission.
- Submission must be made in UKMFolio **no later than Friday, 15th Julai 2022.**

B. MARKING CRITERIA (marking rubrics can be found in Section D**)**

No.	Marks	Marks
1	C++ Program (Code)	20 marks
2	Report	10 marks
3	Presentation	10 marks
	TOTAL	40 marks

C. PROJECT TITLES/TOPICS (one topic for two groups)

Groups	Title and description
1 & 9	**Train Reservation System**: Develop a program that shows the available seats of trains with various departure stations, destinations, dates and times. The program should allow users to book train tickets of various classes and quantities, and output the invoice or booking summary at the end of the program. It might be appropriate to ask users to create an account and to login before they can proceed with reservation. You could give special offers to students, senior citizens, members and people with disabilities. Please refer to the internet to get some ideas of how the program should work. Example: KTM's website, link: https://www.ktmb.com.my/
2 & 10	**Flight Reservation System**: Develop a program that shows the available seats of flights for different departure airports, destinations, dates and times. The program should allow users to book flight tickets of various classes and quantities, include luggage, select meals and output the invoice or booking summary at the end of the program. It might be appropriate to ask users to create an account and to login before they can proceed with reservation. Please refer to the internet to get some ideas of how the program should work. Example: MAS' website, link: https://www.malaysiaairlines.com/my/en.html
3 & 11	**Bus Reservation System**: Develop a program that shows the available seats of buses with different departure stations, destinations, dates and times. The program should allow users to book bus tickets of various classes and quantities and output the invoice or booking

	summary at the end of the program. It might be appropriate to ask users to create an account and to login before they can proceed with reservation. You could give special offers to students, senior citizens, members and people with disabilities. Please refer to the internet to get some ideas of how the program should work. Example: SANI's website, link: http://book.saniexpress.com.my/
4 & 12	**Car Rental System:** Develop a program that shows the available cars at different pick-up and return locations, dates and times. The program should allow users to book a car from various selections for certain number of days and output the invoice or booking summary at the end of the program. You could add special service such as insurance/protection, free cancelation, baby/toddler safety seats, navigational system and many others. The rent could be made different for different age groups and many factors. Please refer to the internet to get some ideas of how the program should work. Example: Europcar's website, link: https://www.europcar.com/en-us
5 & 13	**Movie/Cinema Booking System**: Develop a program that shows the available seats for movies at various locations of cinemas, dates and times. The program should allow users to book tickets of various categories and quantities along with some add-ons such as ability to buy foods and beverages, and display current top movies aired. The program should output the invoice or booking summary at the end of the program. It might be appropriate to ask users to create an account and to login before they can proceed with their reservation. You could give special offers to students, senior citizens and people with disabilities. Please refer to the internet to get some ideas of how the program should work. Example: GSC's website, link: https://www.gsc.com.my/main/home
6 & 14	**Online Banking System**: Develop an online banking system that starts with asking users to enter user id and password (assuming both details are known, and saved in a text file). The program could show menus for users to select actions that they want to do: change password, money transfer, pay bills, buy top up, check transaction histories, and so on. The program should output the receipt of transaction at the end of the program. Please make sure that the account balance after a few transactions made is correct. You could add elements of security to your online banking system. Please refer to any online bank system of your preference to build the program.
7 & 15	**Electronic store system:** Develop a program that allows users to retrieve the items currently available at electronic stores of different locations. The program should also allow users to search for nearest stores based on postcodes and hence choose to self-collect or buy items online. The program should output the transaction receipt at the end of the program. It might be appropriate to ask users to create an account and to login before they can proceed with certain actions. Please refer to the internet to get some ideas of how the program should work. Example: Apple Online Store's website, link: https://www.apple.com/my/shop
8 & 16	**Food Ordering system:** Develop a program that shows the available foods to users. The users should be allowed to search for nearest restaurant, buy foods from various selections, buy add-ons, select payment methods, choose for delivery or self-pick-up, cancel and add more items, use coupons, make pre-order and so on. The program should output the transaction receipt at the end of the program. Please refer to the internet to get some ideas of how the program should work. Example: Pizza Hut's website or even the Foodpanda's, links: https://www.foodpanda.my/ and https://www.pizzahut.com.my/

D. MARKING RUBRIC

i.   C++ PROGRAM (20%)

Criteria	Very Weak (0 / 1)	Weak (2)	Fair (3)	Good (4)	Very Good (5)
Program elements • Selection • Repetition • Functions • Arrays / Structures • Strings	None or 1 element is used correctly	2 elements are used correctly	3 elements are used correctly	4 elements are used correctly	All 5 elements are used correctly
Programming style & readability • Comments on important lines • Consistent indentation • Organized & readable (code grouping) • Consistent and indicative/meaningful naming scheme • Simple (not too long). Examples: repetitions are avoided by using functions, variables of the same type are declared together.	Program is very poorly organized and very difficult to read. None or 1 element is present and used correctly.	Program is poorly organized and difficult to read. 2 elements are present and used correctly.	The program is fairly easy to read. 3 elements are present and used correctly.	The program is easy to read. 4 elements are present and used correctly.	The program is exceptionally well organized and very easy to follow. All 5 elements are present and used correctly.

Program debugging & output **1) Option menu** • "Start page" with various options for users • Day, time or location options • Create account & login option (member or guest) • "Exit" option • Other add-ons: classes of seats, selections of food etc	None or 1 element is present and function correctly.	2 elements are present and function correctly.	3 elements are present and function correctly.	4 elements are present and function correctly.	All 5 elements are present and function correctly.
2) Others • Free from error • Contains proper prompts for user input • Gives correct/desired output • Invoice / booking summary using fstream • Output formatting	4 or more non-compliant elements	3 non-compliant elements	2 non-compliant elements	1 non-compliant element	0 non-compliant element
Imitation & creativity • Ability to imitate real and working applications using C++ language creatively	Different from real and working application (from the home menu to the end of program)	A little bit similar to real and working application (from the home menu to the end of program)	Quite similar to real and working application (from the home menu to the end of program)	Similar to real and working application (from the home menu to the end of program)	Highly similar to real and working application (from the home menu to the end of program)

TOTAL = 25 marks

ii.   REPORT (10%)

Criteria	Very Weak (0 / 1)	Weak (2)	Fair (3)	Good (4)	Very Good (5)
Introduction and problem statement	Little or not relevant with little or no elaboration	Quite relevant but very briefly elaborated	Relevant but briefly elaborated	Relevant and elaborated	Very relevant and elaborated
List of variables	A few or no important variables are listed and elaborated	Many important variables are not listed and elaborated	Some important variables are not listed and elaborated	Almost all important variables are listed and elaborated	All important variables are listed and elaborated
5 elements of C++ topics	None or 1 element used in the program is elaborated	2 elements used in the program are elaborated	3 elements used in the program are elaborated	4 elements used in the program are elaborated	All 5 elements used in the program are elaborated
Test runs of the program to show the actual capability of the program	One or no test run is conducted, or a few test runs but for the same cases are conducted	A couple of test runs for different cases are conducted	Quite sufficient number of test runs for different cases are conducted	Close to sufficient number of test runs for different cases are conducted	Sufficient number of test runs for different cases are conducted
Clarity / readability	The report is very poorly organized and very difficult to read.	The report is poorly organized and difficult to read.	The report is fairly organized and fairly easy to read	The report is well organized and easy to read	The report is exceptionally well organized and very easy to read

TOTAL = 25 marks

iii.   PRESENTATION (10%)

Criteria	Very Weak (0 / 1)	Weak (2)	Fair (3)	Good (4)	Very Good (5)
Introduction, stories and examples	No stories/examples or a couple of stories/examples with no or little elaboration	Have stories/examples but very briefly elaborated	Fairly relevant and briefly elaborated stories/examples	Relevant and elaborated stories/examples	Very relevant and elaborated stories/examples
Clarity, Energy and enthusiasm	Speak unclearly which is very hard to understand, with no or little energy and enthusiasm	Speak unclearly, with less energy and enthusiasm	Speak fairly clearly, energetically and enthusiastically	Speak clearly, energetically and enthusiastically	Speak very clearly, energetically and enthusiastically
Rehearsed and within time limit	Not prepared and/or too long or too short than the time given	Slightly prepared and/or presented with more than 2 minutes longer than the time limit	Quite prepared and/or presented with 2 minutes longer than the time limit	Well prepared and/or presented with a minute longer than the time limit	Well prepared and presented within the 5 minute time limit
Appearance of slides / Presentation materials	Not attractive and contains very little information	Ordinary and contains little information	Fairly attractive and contains many information	Attractive and contains complete information	Very attractive and contains complete information
Q&A	Inappropriate/incorrect answers	Acceptable answers but need a lot of improvements	Acceptable answers	Good answers but can be improved	Accurate answers

TOTAL = 25 marks

Note: The C++ program's rubric was adapted from https://mohduzir.uitm.edu.my/