SCHOOL OF COMPUTER SCIENCES
UNIVERSITI SAINS MALAYSIA
ACADEMIC SESSION: SEM 2, 2021/2022

CPT 113 – Programming Methodology & Data Structures
Assignment 1

You are required to build an object-oriented programme revolving around `class Student`. You may build a program to process the `Student`'s desasiswa or `Student`'s fee for example. The important part is, your program must have multiple classes and one of them is `class Student`. You are free to determine the scope of the program. However, you must fulfill the following requirements.

You need to design C++ object-oriented programme which demonstrates the use of the following representation and specifications:

1. UML diagram
2. Classes with relevant attributes and proper processing
3. Inheritance
4. Composition (object must be of type private)
5. `friend` functions
6. Operator overloading
7. Read input from a text file
8. You must **only use ONE object** in **`main()`**
9. `Student` must be the object of the derived class. The object must be in array of object
10. You must maintain the data encapsulation of the classes and respecting the concept of information hiding.
11. Your marks is also depending on the complexity of the program.

Based on your program design, you need to specify the purpose of the program and the assumption you use when building the program.

You also need to **prepare 15 minutes video** recording explaining what the problem the program is solving, describing the program structure and running the program with meaningful test case.

You program must have the following features:

i. Input validation
ii. Interactive – menu to aid user, easy to follow
iii. Good interface design and flow
iv. Meaningful comments in the source codes

Your documentation need to have:

i. The details of the report in the cover:

Course: CPT113
Assignment: 1
Group Number: <Your group number **Please refer to the Google Spreadsheet in eLearning**>
Member List : <Members full name (Matric Number)>
Lecturer's Name: Dr Nur Hana Samsudin

ii. Table of Content
iii. Description of the question requirements (also recorded in a video)
    a. What problem your program can solve using object oriented
    b. Analysis of the problem
    c. Identify the specification of the requirements
    d. Represent your class structure of the program using UML diagram. Include the inheritance, composition, friend function components in the diagram as well.
    e. Make sure you include inputs, outputs, process and your own constraints and assumptions
iv. The code (represented in multiple file inclusion). You may compressed it if you wish.
v. Sample of cases tested on your program (use print screen with clear print)

Restriction for this Assignment 1:

- You **must not** use global variable.
- You **must not** use vector, list, queue, or any possible data structure provided by the built-in C++ library.
- You **must not** use <vector>, <list>, <linkedlist>, <queue>, <stack> and any other preprocessor never used during classes and tutorials. **You may use all the directives** in your programme's pre-processor which you have been exposed to during your class and lab sessions.
- You **must use** multiple files inclusion.

How to Submit:

i. You need to compress/zipped all documents into one file. Make sure you have:
    a. The code in .dev, .h and .cpp files
    b. Your report in .pdf file
    c. List of the team member in .txt file
    d. A simple text file (notepad) with the link to your video recording. Video need to be uploaded into cloud (you may use YouTube, Google Drive, Vimeo or any manner of publishing but you need to send the url or you are losing all the marks for video). If you are using Google Drive or One Drive or Dropbox, please make sure it is accessible to those with links otherwise you will also miss the marks for the video if you did not grant access when requested.
ii. Upload your file in the submission link provided in the e-Learning.
iii. Name the folder containing the files in the form of **<Group Number>** only.
iv. There is not specific writing font to use. If you need a relative or comparable size, you may use **Times New Roman** or **Calibri** with **size 11 or 12** for the main content. You may use other font size for sub-title / sub-heading. Please do it in Ms Word or Open Office or Google Doc or any comparable document type and convert to pdf. **Do not write your report in Ms Powerpoint.**

Assignment 1 Duration:

i. This question is released at 00:00 on 29th April 2022 and is due to be submitted at 00:00 midnight on 16th May 2022.
ii. Failure to submit within the timeframe will render you not getting any marks.
iii. No submission outside e-Learning platform will be accepted.

Additional Notes

i. Do not change the filenames at the last minute. Create .dev file and maintain the program linkages with all classes. Failure to lock the link will cause your program not able to run on my machine.

ii. **The team allowing their program or report to be copied** by another team will also get '**F**' **together with the group they shared their program or report** with.

iii. Please refer to rubric to know more about penalties deduction.

iv. Your lecturer will really not answer your questions if you ghosted your Telegram ID.