Assignment 1
Flowcharting

Overview

- This assignment is to be conducted in pairs.
- You are free to choose any partner within this section to work with.
- In this assignment, you will be developing the algorithm for the given problem below using the flowcharting technique.
- Prepare your work in a digital format using any drawing software (for example: Draw.io). After completing the drawing, convert it into a PDF file.

Problem

Academic Performance Calculator for University Students

A university is seeking to develop an Academic Performance Calculator to assist students in monitoring and managing their academic progress. The calculator will enable students to enter their matriculation number and scores earned for each course taken for a semester, and it will calculate their CGPA (Cumulative Grade Point Average) based on the grades and credit hours earned. The university offers a variety of courses across different departments, each with its own credit hours. The calculator application is specifically developed for registered students at the university. Consequently, students are required to authenticate themselves for the application to identify them. The application can retrieve the student's name using their matriculation number. As for the name of each course taken, the application can obtain it from the course's code. Furthermore, the course's credit hour is obtained from the last digit of the course code (for example, the code of SECJ1013 indicates a 3-credit hour course). Then, as for the grade , it is determined from the total score earned by the student for the course. The university is adopting a standard grading system across the courses, as shown in table below:

Score	Grade	Point Value
90 - 100	A+	4.00
80 - 89	A	4.00
75 - 79	A-	3.67
70 - 74	B+	3.33
65 - 69	B	3.00
60 - 64	B-	2.67
55 - 59	C+	2.33
50 - 54	C	2.00
45 - 49	C-	1.67
40 - 44	D+	1.33
35 - 39	D	1.00
30 - 34	D-	0.67
0 - 29	E	0.00

The application will calculate the CGPA based on the total point values earned and total credit hours earned by the student. For example,

CGPA = sum (point value x credit hour) / credit hour

The application will generate reports as shown in the example below

This is the CGPA report of current semester for the student

Name: Ahmad Dawud Abdullah
Matriculation Number: A24CS12345

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Subject Code    Subject Name          Credit    Score     Grade     Point     Sub Total

SECI2143        Statistic             3         85        A         4         12
SECJ1023        Prog Tech II          3         80        A         4         12
SECR2033        COA                   3         82        A         4         12
SECV1113        Math for CG           3         89        A         4         12
UHIS1022        Current Issues        2         95        A+        4         8

TOTAL POINT   : 56
TOTAL CREDIT  : 14
GPA           : 4
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Tasks and Assessments

Using a modular flowcharting technique, design the algorithm based on the provided case study. Your design should encompass several modules or functions, including the main function. Each module should be represented by its own flowchart, clearly illustrating the data flow from one module to another. Ensure that parameter passing is applied appropriately throughout the algorithm.

This assignment carries **6%** weightage for the final grade of this course. As you work on this assignment, keep in mind the following assessment criteria (The breakdown marks below is given as per 100 pts):

1. Modularity: Perform the top down or modular approach to design the algorithm. Clearly identify all the modules for the given problem. Clearly identify the goal, inputs, tasks involved and the output for each module.

   (40 pts)

2. Flowchart Clarity: Ensure that the flowcharts depicting each module are clear and easy to understand, with well-organized layouts, clear labeling, and straightforward structure. This will help others comprehend the flowcharts' content and logic easily.

   (20 pts)

3. Data Flow and Parameter Passing: How effectively the data flow from one module to another is represented in the flowcharts. Analyze the clarity and accuracy of data input, output, and transformation depiction within the flowcharts. Parameter passing is correctly implemented throughout the algorithm. This includes the appropriateness and accuracy of parameter usage in facilitating data communication between modules.

   (20 pts)

4. Algorithm Design and Correctness: The overall design of the algorithm, including its efficacy in addressing the problem outlined in the case study. Additionally, the algorithm is able to produce the expected results.

(20 pts)

Submission

- Deadline: As per specified on eLearning
- Names of both members must be clearly written in the report.
- Only one member needs to submit

Plagiarism Warning

You may discuss with others and refer to any resources. However, any kind of plagiarism will lead to your submission being dismissed. No appeal will be entertained at all. You are also prohibited from using any machine learning tool such as chat gpt to do the exercise for you.

Late Submission and Penalties

- Submissions must be made exclusively through the eLearning platform. Any submissions via alternative methods such as Telegram, email, Google Drive, etc., will not be accepted
- Late submissions will incur a penalty of 10% for every hour overdue. The calculation will be rounded up to the nearest hour. For instance, if you submit 1 minute late, it will be considered as 1 hour overdue.