Question 1   **[35 Marks]**

> **instructions:**
>
> - A starter code is provided for this question in **program1.cpp**
> - For question (a) and (b), write your answers in the answer booklet provided.
> - As for questions (c) and (d), modify the same program, **program1.cpp.**

Given a C++ program named **program1.cpp** that contains two classes named `Course`, and `Student`. This program is intended to store information about course enrollment by students. Then the user can search for a student by their matric number and print the information. Analyze the program and answer the following questions:

c. Complete the class `Student` in the same **program1.cpp** by implementing of the following methods:

    i. `enrollToCourse()`.

    This method will enroll the student to a course passed as a parameter. The course will be added the `courses` list.

                                                   (2 marks)

    ii. `getEnrolledCount()`.

    Returns the number of courses enrolled by the student

                                                   (2 marks)

    iii. `getTotalCredit()`.

    Returns the number of credits taken by the student

                                                   (4 marks)

    iv. `printCourses()`.

    Prints all the courses enrolled by the student

                                                   (2 marks)

d. Complete the main function based on the following tasks:

    i. Create the list of available courses using `vector`. You can create the list with hard-coded data. Use the sample data from the file **question1_data.txt**.

                                                   (4 marks)

ii. Create the list of students using `map` using student matric number as the key. Enroll the students to some courses. You can create the list with hard-coded data. Use the sample data from the file **question1_data.txt**.

(6 marks)

iii. Write the code that asks the user to enter a matric number of a student. Then search for the student based on the matric number and finally print out the summary information about the student and the list of courses he/she enrolls to. Figure 1 shows examples of expected result of the program. Text in bold indicates user input.

(5 marks)

```
Enter the matric number=> A16EC4041

Information of found student
==========================
Name:Mario Max
Matric:A16EC4041
Number of courses enrolled:4
Total credit carried:11
List of courses enrolled
------------------------
Course: Programming Technique I   Credit=3
Course: Digital Logic   Credit=3
Course: Graduate Success Attributes   Credit=2
Course: Programming Technique I   Credit=3
```

Run 1

```
Enter the matric number=> A19EC4002

Information of found student
==========================
Name:Anna Mull
Matric:A19EC4002
Number of courses enrolled:5
Total credit carried:15
List of courses enrolled
------------------------
Course: Programming Technique II   Credit=3
Course: Operating Systems   Credit=3
Course: Digital Logic   Credit=3
Course: Web Programming   Credit=3
Course: Software Engineering   Credit=3
```

Run 2

```
Enter the matric number=> A18EC4044

Information of found student
===========================
Name:Jimmy Changa
Matric:A18EC4044
Number of courses enrolled:5
Total credit carried:16
List of courses enrolled
-----------------------
Course: Web Programming   Credit=3
Course: Object-Oriented Programming   Credit=4
Course: Application Development   Credit=4
Course: Final Year Project I   Credit=2
Course: Programming Technique II   Credit=3
```

Run 3

```
Enter the matric number=> A16EC4045

Information of found student
===========================
Name:Wilma Mumduya
Matric:A16EC4045
Number of courses enrolled:0
Total credit carried:0
List of courses enrolled
```

Run 4

```
Enter the matric number=> A23EC0001

The students is not found
```

Run 5

Figure 1: Expected outputs from Program 1,