Mastering Embedded Systems Online Diploma

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First term (Final project 2)

Student System Management

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1. Problem Statement

Write a program to build a simple Software for Student Information Management System which can perform the following operations:

1. Store the First name of the student.

2. Store the Last name of the student.

3. Store the unique Roll number for every student.

4. Store the GPA of every student.

5. Store the courses registered by the student.

2. Problem Approach

The idea is to form an individual APIs for every operation, All the functions are unified together to form software:

1. Add Student Details from File

2. Add Student Details Manually

3. Find the student by the given roll number

4. Find the student by the given first name

5. Find the students registered in a course

6. Count of students

7. Delete a student

8. Update Student

```
54
55  // APIs prototypes
56
57  FIFO_Buf_Status DataBase_Init(FIFO_Buf_t* buffer, Student_t* students, int length);
58  FIFO_Buf_Status Add_byFile(FIFO_Buf_t* buffer);
59  FIFO_Buf_Status Add_manually(FIFO_Buf_t* buffer);
60  FIFO_Buf_Status Find_byRoll(FIFO_Buf_t* buffer);
61  FIFO_Buf_Status Find_byFn(FIFO_Buf_t* buffer);
62  FIFO_Buf_Status Find_byCourse(FIFO_Buf_t* buffer);;
63  void Total_Count(FIFO_Buf_t* buffer);
64  FIFO_Buf_Status Delete_student(FIFO_Buf_t* buffer);
65  FIFO_Buf_Status Update_student(FIFO_Buf_t* buffer);
66  FIFO_Buf_Status Show_all(FIFO_Buf_t* buffer);
67
```

2.1 Approach - Add Student Details from File

Get data from file and add a student to the list of students. While adding the students into the list, check for the uniqueness of the roll number.

```
                ==============================
[INFO] Student with roll number 1 added successfully
[ERROR] This roll number 1 already exists
[INFO] Student with roll number 3 added successfully
[INFO] Student with roll number 4 added successfully
[INFO]  Students added successfully
---------------------------------
[INFO] The total number of students is 3
[INFO] You can add up to 50 students
[INFO] You can add up to 47 more students

                ==============================
```

2.2 Approach - Add Student Details Manually

Get data from user and add a student to the list of students. While adding the students into the list, check for the uniqueness of the roll number.

```
                ==============================
Enter the roll number: 7
Enter the first name of student: Amr
Enter the last name of student: Ahmed
Enter the GPA the student obtained: 3.8
Enter the course ID for every course
Course 1 ID: 15
Course 2 ID: 16
Course 3 ID: 17
Course 4 ID: 18
Course 5 ID: 19\
[INFO]  Students added successfully
---------------------------------
[INFO] The total number of students is 4
[INFO] You can add up to 50 students
[INFO] You can add up to 46 more students
```

2.3 Approach - Find the student by the given roll number

This function is to find the student record for the given roll number and print the details.

```
        ==============================
Enter the roll number of the student: 1
[INFO] The student details are:
Student first name: Amr
Student last name: Ali
Student roll number: 1                        ==============================
Student GPA: 3.20                             Enter the roll number of the student: 2
Student courses ID are: 1                     ----------------------------------
Student courses ID are: 2                     [ERROR] Roll number 2 not found in the database
Student courses ID are: 3
Student courses ID are: 4                     ==============================
Student courses ID are: 5
----------------------------------
```

2.4 Approach - Find the student by the given first name

This function is to find all the students with the given first name and print their details.

```
            ==============================
Enter the first name of the student: amr
[INFO] The student details are:
Student first name: Amr
Student last name: Ali
Student roll number: 1
Student GPA: 3.20
Student courses ID are: 1
Student courses ID are: 2
Student courses ID are: 3
Student courses ID are: 4
Student courses ID are: 5
----------------------------------
[INFO] The student details are:
Student first name: Amr
Student last name: Ahmed
Student roll number: 7
Student GPA: 3.80
Student courses ID are: 15
Student courses ID are: 16
Student courses ID are: 17
Student courses ID are: 18
Student courses ID are: 19
----------------------------------
```

2.5 Approach - Find the students registered in a course

This function is to find all the students who have registered for a given course.

```
=============================
Enter the Course ID for the student: 4
[INFO] The student details are:
Student first name: Amr
Student last name: Ali
Student roll number: 1
Student GPA: 3.20
Student courses ID are: 1
Student courses ID are: 2
Student courses ID are: 3
Student courses ID are: 4
Student courses ID are: 5
----------------------------------
[INFO] The student details are:
Student first name: Noha
Student last name: Ahmed
Student roll number: 4
Student GPA: 3.50
Student courses ID are: 74
Student courses ID are: 5
Student courses ID are: 2
Student courses ID are: 1
Student courses ID are: 4
----------------------------------
[INFO] Number of students in course 4 is: 2
```

2.6 Approach - Count of students

This function is to print the total number of students in the system

```
=============================
[INFO] The total number of students is 4
[INFO] You can add up to 50 students
[INFO] You can add up to 46 more students
```

2.7 Approach - Delete a student

This function is to delete the student record for the given roll number.

```
==============================
Enter the roll number which you want to delete:
1
[INFO] The roll number is deleted successfully

==============================
```

2.8 Approach - Update Student

This function is to update the student records. This function does not ask for new details for all fields but the user should be able to pick and choose what he wants to update.

```
==============================
Enter the roll number which you want to update:3
Choose what you want to change or update
1. first name
2. last name
3. roll number
4. GPA
5. Courses
1
Enter the new first name: maher
[INFO] Updated successfully

==============================
```

2.9 Approach – Show All Data

This function will show all the data base to the customer

```
[INFO] Showing all the database
Student first name: Amr
Student last name: Ali
Student roll number: 1
Student GPA: 3.20
Student courses ID are: 1
Student courses ID are: 2
Student courses ID are: 3
Student courses ID are: 4
Student courses ID are: 5
----------------------------------
Student first name: maher
Student last name: Amr
Student roll number: 3
Student GPA: 4.00
Student courses ID are: 24
Student courses ID are: 14
Student courses ID are: 54
Student courses ID are: 44
Student courses ID are: 34
----------------------------------
Student first name: Noha
Student last name: Ahmed
Student roll number: 4
Student GPA: 3.50
Student courses ID are: 74
Student courses ID are: 5
Student courses ID are: 2
Student courses ID are: 1
Student courses ID are: 4
----------------------------------
```