#LEARN_IN DEPTH

#Be_professional_in embedded_system

First Term (Final Project No.2)
Project Name : Students_Data_Base
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Under Supervision : Eng. Keroles Shenouda

Drive: https://drive.google.com/drive/folders/1aoPXE7PsonxWe_GjVykOnjz3Y6yxq3-v?usp=sharing

GitHub: https://github.com/Taha249/Master_Embedded_System_Diploma.git

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Contents

Project Description

Write a program in C language to build a simple Software for Students 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.

Approach

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

1- Add Studnet Details manually.

2- Add Student Details from text file.

3- Find the student by given the roll number.

4- Find the student by given the first name.

5- Find the students registered in a course.

6- Find the students Details by course ID.

7- Count of students.

8- Delete a student Details by a roll number.

9- Update student Details by a roll number.

10- Show all the information.

11- Exit

1- Add Studnet Details manually

```c
35  void addStudentManually() {
36      if (studentCount >= MAX_STUDENTS) {
37          DPRINTF("Maximum number of students reached.\n");
38          return;
39      }
40
41      struct Student newStudent;
42      DPRINTF("Enter the first name: ");
43      scanf("%s", newStudent.firstName);
44      DPRINTF("Enter the last name: ");
45      scanf("%s", newStudent.lastName);
46      DPRINTF("Enter the roll number: ");
47      scanf("%d", &newStudent.rollNumber);
48      DPRINTF("Enter the GPA: ");
49      scanf("%f", &newStudent.gpa);
50
51      int numCourses;
52      DPRINTF("Enter the number of courses registered: ");
53      scanf("%d", &numCourses);
54      DPRINTF("Enter the courses (separated by spaces): ");
55      for (int i = 0; i < numCourses; i++) {
56          scanf("%s", newStudent.courses[i]);
57      }
58      newStudent.courseCount = numCourses;
59
60      students[studentCount++] = newStudent;
61      DPRINTF("Student details added successfully.\n");
62  }
```

```
Console ×
Student_Data_Base Debug [C/C++ Application] [pid: 50]

--- Student Information Management System ---
1. Add Student Details manually
2. Add Student Details from a text file
3. Find Student by Roll Number
4. Find Student by First Name
5. Find Students registered in a Course
6. Find Students Details by Course ID
7. Count of Students
8. Delete Student Details by Roll Number
9. Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice: 1
Enter the first name: Taha
Enter the last name: Mohamed
Enter the roll number: 180060
Enter the GPA: 3.6
Enter the number of courses registered: 2
Enter the courses (separated by spaces): Mechatronics Control2
Student details added successfully.

--- Student Information Management System ---
1. Add Student Details manually
2. Add Student Details from a text file
3. Find Student by Roll Number
4. Find Student by First Name
5. Find Students registered in a Course
6. Find Students Details by Course ID
7. Count of Students
8. Delete Student Details by Roll Number
9. Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice:
```

2- Add Student Details from text file

```
64  void addStudentFromFile(const char* fileName) {
65      FILE* file = fopen(fileName, "r");
66      if (file == NULL) {
67          DPRINTF("Failed to open the file.\n");
68          return;
69      }
70
71      while (!feof(file) && studentCount < MAX_STUDENTS) {
72          struct Student newStudent;
73          fscanf(file, "%s %s %d %f", newStudent.firstName, newStudent.lastName, &newStudent.rollNumbe
74
75          int numCourses;
76          fscanf(file, "%d", &numCourses);
77          for (int i = 0; i < numCourses; i++) {
78              fscanf(file, "%s", newStudent.courses[i]);
79          }
80          newStudent.courseCount = numCourses;
81
82          students[studentCount++] = newStudent;
83      }
84
85      fclose(file);
86      DPRINTF("Student details added from file successfully.\n");
87  }
88
```

```
Console ×
Student_Data_Base Debug [C/C++ Application]  [pid: 50]
8.  Delete Student Details by Roll Number
9.  Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice: 1
Enter the first name: Taha
Enter the last name: Mohamed
Enter the roll number: 180060
Enter the GPA: 3.6
Enter the number of courses registered: 2
Enter the courses (separated by spaces): Mechatronics Control2
Student details added successfully.

--- Student Information Management System ---
1.  Add Student Details manually
2.  Add Student Details from a text file
3.  Find Student by Roll Number
4.  Find Student by First Name
5.  Find Students registered in a Course
6.  Find Students Details by Course ID
7.  Count of Students
8.  Delete Student Details by Roll Number
9.  Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice: 2
Enter the file name: fileName.txt
Student details added from file successfully.

--- Student Information Management System ---
1.  Add Student Details manually
2.  Add Student Details from a text file
3.  Find Student by Roll Number
4.  Find Student by First Name
5.  Find Students registered in a Course
6.  Find Students Details by Course ID
7.  Count of Students
8.  Delete Student Details by Roll Number
9.  Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice:
```

3- Find the student by given the roll number

```
89  void findStudentByRollNumber(int rollNumber) {
90      for (int i = 0; i < studentCount; i++) {
91          if (students[i].rollNumber == rollNumber) {
92              DPRINTF("Student Found:\n");
93              DPRINTF("First Name: %s\n", students[i].firstName);
94              DPRINTF("Last Name: %s\n", students[i].lastName);
95              DPRINTF("Roll Number: %d\n", students[i].rollNumber);
96              DPRINTF("GPA: %.2f\n", students[i].gpa);
97              DPRINTF("Courses Registered: ");
98              for (int j = 0; j < students[i].courseCount; j++) {
99                  DPRINTF("%s ", students[i].courses[j]);
00              }
01              DPRINTF("\n");
02              return;
03          }
04      }
05      DPRINTF("Student with roll number %d not found.\n", rollNumber);
06  }
```

```
Console ×
Student_Data_Base Debug [C/C++ Application] [pid: 50]
GPA: 3.90
Courses Registered: Structure Drawing Material Applied
First Name: Amr
Last Name: Khaled
Roll Number: 190654
GPA: 4.00
Courses Registered: Robotics Mechanics2 Math3 Robotics Movement

--- Student Information Management System ---
1. Add Student Details manually
2. Add Student Details from a text file
3. Find Student by Roll Number
4. Find Student by First Name
5. Find Students registered in a Course
6. Find Students Details by Course ID
7. Count of Students
8. Delete Student Details by Roll Number
9. Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice: 3
Enter the Roll Number: 180060
Student Found:
First Name: Taha
Last Name: Mohamed
Roll Number: 180060
GPA: 3.60
Courses Registered: Mechatronics Control2

--- Student Information Management System ---
1. Add Student Details manually
2. Add Student Details from a text file
3. Find Student by Roll Number
4. Find Student by First Name
5. Find Students registered in a Course
6. Find Students Details by Course ID
7. Count of Students
8. Delete Student Details by Roll Number
9. Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice:
```

4- Find the student by given the first name

```
108  void findStudentByFirstName(const char* firstName) {
109      for (int i = 0; i < studentCount; i++) {
110          if (strcmp(students[i].firstName, firstName) == 0) {
111              DPRINTF("Student Found:\n");
112              DPRINTF("First Name: %s\n", students[i].firstName);
113              DPRINTF("Last Name: %s\n", students[i].lastName);
114              DPRINTF("Roll Number: %d\n", students[i].rollNumber);
115              DPRINTF("GPA: %.2f\n", students[i].gpa);
116              DPRINTF("Courses Registered: ");
117              for (int j = 0; j < students[i].courseCount; j++) {
118                  DPRINTF("%s ", students[i].courses[j]);
119              }
120              DPRINTF("\n");
121              return;
122          }
123      }
124      DPRINTF("Student with first name %s not found.\n", firstName);
125  }
126
```

```
Console ×
Student_Data_Base Debug [C/C++ Application] [pid: 50]
Enter the Roll Number: 180060
Student Found:
First Name: Taha
Last Name: Mohamed
Roll Number: 180060
GPA: 3.60
Courses Registered: Mechatronics Control2

--- Student Information Management System ---
1. Add Student Details manually
2. Add Student Details from a text file
3. Find Student by Roll Number
4. Find Student by First Name
5. Find Students registered in a Course
6. Find Students Details by Course ID
7. Count of Students
8. Delete Student Details by Roll Number
9. Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice: 4
Enter the First Name: Amr
Student Found:
First Name: Amr
Last Name: Khaled
Roll Number: 190654
GPA: 4.00
Courses Registered: Robotics Mechanics2 Math3 Robotics Movement

--- Student Information Management System ---
1. Add Student Details manually
2. Add Student Details from a text file
3. Find Student by Roll Number
4. Find Student by First Name
5. Find Students registered in a Course
6. Find Students Details by Course ID
7. Count of Students
8. Delete Student Details by Roll Number
9. Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice:
```
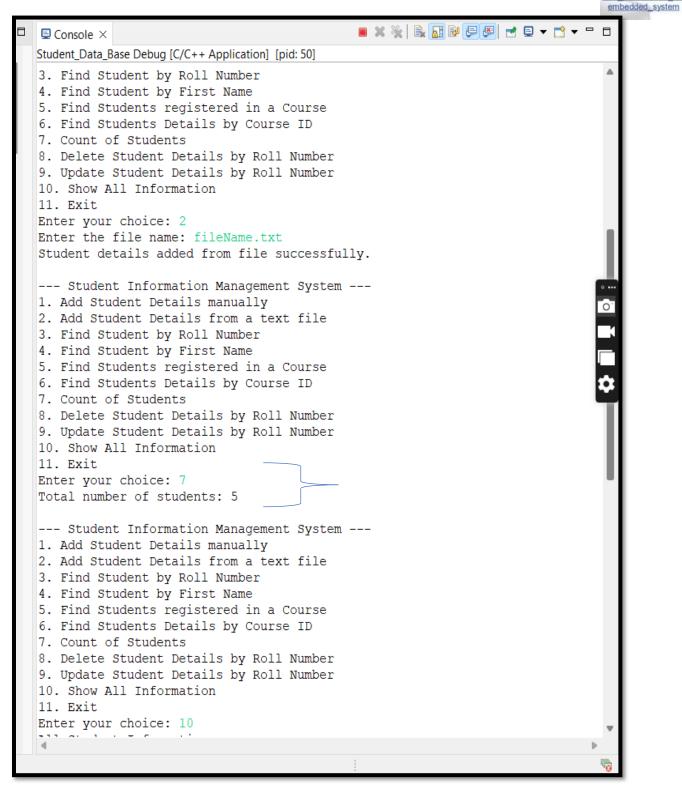
5- Find the students registered in a course

```c
127 void findStudentsByCourse(const char* course) {
128     DPRINTF("Students registered in course %s:\n", course);
129     for (int i = 0; i < studentCount; i++) {
130         for (int j = 0; j < students[i].courseCount; j++) {
131             if (strcmp(students[i].courses[j], course) == 0) {
132                 DPRINTF("First Name: %s\n", students[i].firstName);
133                 DPRINTF("Last Name: %s\n", students[i].lastName);
134                 DPRINTF("Roll Number: %d\n", students[i].rollNumber);
135                 DPRINTF("GPA: %.2f\n", students[i].gpa);
136                 DPRINTF("\n");
137                 break;
138             }
139         }
140     }
141 }
142
```

```
Console ×
Student_Data_Base Debug [C/C++ Application] [pid: 50]
Enter the Course: Math
Students registered in course Math:
First Name: Belal
Last Name: Mohamed
Roll Number: 180456
GPA: 3.70


--- Student Information Management System ---
1. Add Student Details manually
2. Add Student Details from a text file
3. Find Student by Roll Number
4. Find Student by First Name
5. Find Students registered in a Course
6. Find Students Details by Course ID
7. Count of Students
8. Delete Student Details by Roll Number
9. Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice: 5
Enter the Course: Robotics
Students registered in course Robotics:
First Name: Amr
Last Name: Khaled
Roll Number: 190654
GPA: 4.00


--- Student Information Management System ---
1. Add Student Details manually
2. Add Student Details from a text file
3. Find Student by Roll Number
4. Find Student by First Name
5. Find Students registered in a Course
6. Find Students Details by Course ID
7. Count of Students
8. Delete Student Details by Roll Number
9. Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice:
```

6- Count of students

```
Console ×
Student_Data_Base Debug [C/C++ Application]  [pid: 50]
3. Find Student by Roll Number
4. Find Student by First Name
5. Find Students registered in a Course
6. Find Students Details by Course ID
7. Count of Students
8. Delete Student Details by Roll Number
9. Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice: 2
Enter the file name: fileName.txt
Student details added from file successfully.

--- Student Information Management System ---
1. Add Student Details manually
2. Add Student Details from a text file
3. Find Student by Roll Number
4. Find Student by First Name
5. Find Students registered in a Course
6. Find Students Details by Course ID
7. Count of Students
8. Delete Student Details by Roll Number
9. Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice: 7
Total number of students: 5

--- Student Information Management System ---
1. Add Student Details manually
2. Add Student Details from a text file
3. Find Student by Roll Number
4. Find Student by First Name
5. Find Students registered in a Course
6. Find Students Details by Course ID
7. Count of Students
8. Delete Student Details by Roll Number
9. Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice: 10
```

7- Delete a student Details by a roll number.

```
164⊖ void deleteStudentByRollNumber(int rollNumber) {
165     for (int i = 0; i < studentCount; i++) {
166         if (students[i].rollNumber == rollNumber) {
167             for (int j = i; j < studentCount - 1; j++) {
168                 students[j] = students[j + 1];
169             }
170             studentCount--;
171             DPRINTF("Student with roll number %d deleted successfully.\n", rollNumber);
172             return;
173         }
174     }
175     DPRINTF("Student with roll number %d not found.\n", rollNumber);
176 }
```

```
Console ×
Student_Data_Base Debug [C/C++ Application]  [pid: 50]
2.  Add Student Details from a text file
3.  Find Student by Roll Number
4.  Find Student by First Name
5.  Find Students registered in a Course
6.  Find Students Details by Course ID
7.  Count of Students
8.  Delete Student Details by Roll Number
9.  Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice: 7
Total number of students: 5

--- Student Information Management System ---
1.  Add Student Details manually
2.  Add Student Details from a text file
3.  Find Student by Roll Number
4.  Find Student by First Name
5.  Find Students registered in a Course
6.  Find Students Details by Course ID
7.  Count of Students
8.  Delete Student Details by Roll Number
9.  Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice: 8
Enter the Roll Number: 190654
Student with roll number 190654 deleted successfully.

--- Student Information Management System ---
1.  Add Student Details manually
2.  Add Student Details from a text file
3.  Find Student by Roll Number
4.  Find Student by First Name
5.  Find Students registered in a Course
6.  Find Students Details by Course ID
7.  Count of Students
8.  Delete Student Details by Roll Number
9.  Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice:
```

8- Update student Details by a roll number

```c
void updateStudentByRollNumber(int rollNumber) {
    for (int i = 0; i < studentCount; i++) {
        if (students[i].rollNumber == rollNumber) {
            DPRINTF("Enter the new first name: ");
            scanf("%s", students[i].firstName);
            DPRINTF("Enter the new last name: ");
            scanf("%s", students[i].lastName);
            DPRINTF("Enter the new GPA: ");
            scanf("%f", &students[i].gpa);

            int numCourses;
            DPRINTF("Enter the number of new courses registered: ");
            scanf("%d", &numCourses);
            DPRINTF("Enter the new courses (separated by spaces): ");
            for (int j = 0; j < numCourses; j++) {
                scanf("%s", students[i].courses[j]);
            }
            students[i].courseCount = numCourses;

            DPRINTF("Student details updated successfully.\n");
            return;
        }
    }
    DPRINTF("Student with roll number %d not found.\n", rollNumber);
}
```

```
Console ×

Student_Data_Base Debug [C/C++ Application] [pid: 50]
7. Count of Students
8. Delete Student Details by Roll Number
9. Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice: 7
Total number of students: 4

--- Student Information Management System ---
1. Add Student Details manually
2. Add Student Details from a text file
3. Find Student by Roll Number
4. Find Student by First Name
5. Find Students registered in a Course
6. Find Students Details by Course ID
7. Count of Students
8. Delete Student Details by Roll Number
9. Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice: 9
Enter the Roll Number: 180060
Enter the new first name: Taha
Enter the new last name: Hamed
Enter the new GPA: 3.7
Enter the number of new courses registered: 3
Enter the new courses (separated by spaces): Robotics Control Design
Student details updated successfully.

--- Student Information Management System ---
1. Add Student Details manually
2. Add Student Details from a text file
3. Find Student by Roll Number
4. Find Student by First Name
5. Find Students registered in a Course
6. Find Students Details by Course ID
7. Count of Students
8. Delete Student Details by Roll Number
9. Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice:
```

9- Show all the information

```
203
204⊖void showAllInformation() {
205        DPRINTF("All Student Information:\n");
206        for (int i = 0; i < studentCount; i++) {
207            DPRINTF("First Name: %s\n", students[i].firstName);
208            DPRINTF("Last Name: %s\n", students[i].lastName);
209            DPRINTF("Roll Number: %d\n", students[i].rollNumber);
210            DPRINTF("GPA: %.2f\n", students[i].gpa);
211            DPRINTF("Courses Registered: ");
212            for (int j = 0; j < students[i].courseCount; j++) {
213                DPRINTF("%s ", students[i].courses[j]);
214            }
215            DPRINTF("\n");
216        }
217 }
218
```

```
Console ×

Student_Data_Base Debug [C/C++ Application] [pid: 50]
4. Find Student by First Name
5. Find Students registered in a Course
6. Find Students Details by Course ID
7. Count of Students
8. Delete Student Details by Roll Number
9. Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice: 10
All Student Information:
First Name: Taha
Last Name: Mohamed
Roll Number: 180060
GPA: 3.60
Courses Registered: Mechatronics Control2
First Name: Belal
Last Name: Mohamed
Roll Number: 180456
GPA: 3.70
Courses Registered: Math Physics
First Name: Gamal
Last Name: Ahmed
Roll Number: 170567
GPA: 2.90
Courses Registered: Control Robotics2 Mechanics
First Name: Islam
Last Name: Mohamed
Roll Number: 181033
GPA: 3.90
Courses Registered: Structure Drawing Material Applied
First Name: Amr
Last Name: Khaled
Roll Number: 190654
GPA: 4.00
Courses Registered: Robotics Mechanics2 Math3 Robotics Movement

--- Student Information Management System ---
1. Add Student Details manually
2. Add Student Details from a text file
3. Find Student by Roll Number
4. Find Student by First Name
5. Find Students registered in a Course
```

Exit the program

```
Console X
<terminated> (exit value: 0) Student_Data_Base Debug [C/C++ Application] C:\Users\Taha\eclipse-workspace\Student_

9. Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice: 7
Total number of students: 4

--- Student Information Management System ---
1. Add Student Details manually
2. Add Student Details from a text file
3. Find Student by Roll Number
4. Find Student by First Name
5. Find Students registered in a Course
6. Find Students Details by Course ID
7. Count of Students
8. Delete Student Details by Roll Number
9. Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice: 9
Enter the Roll Number: 180060
Enter the new first name: Taha
Enter the new last name: Hamed
Enter the new GPA: 3.7
Enter the number of new courses registered: 3
Enter the new courses (separated by spaces): Robotics Control Design
Student details updated successfully.

--- Student Information Management System ---
1. Add Student Details manually
2. Add Student Details from a text file
3. Find Student by Roll Number
4. Find Student by First Name
5. Find Students registered in a Course
6. Find Students Details by Course ID
7. Count of Students
8. Delete Student Details by Roll Number
9. Update Student Details by Roll Number
10. Show All Information
11. Exit
Enter your choice: 11
Exiting the program. Goodbye!
```