First Term (Final Project No.2)

Project Name: *Students Management System*
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Project Description

Program in C language to build a simple Software for Students Information Management System which can perform the following operations:
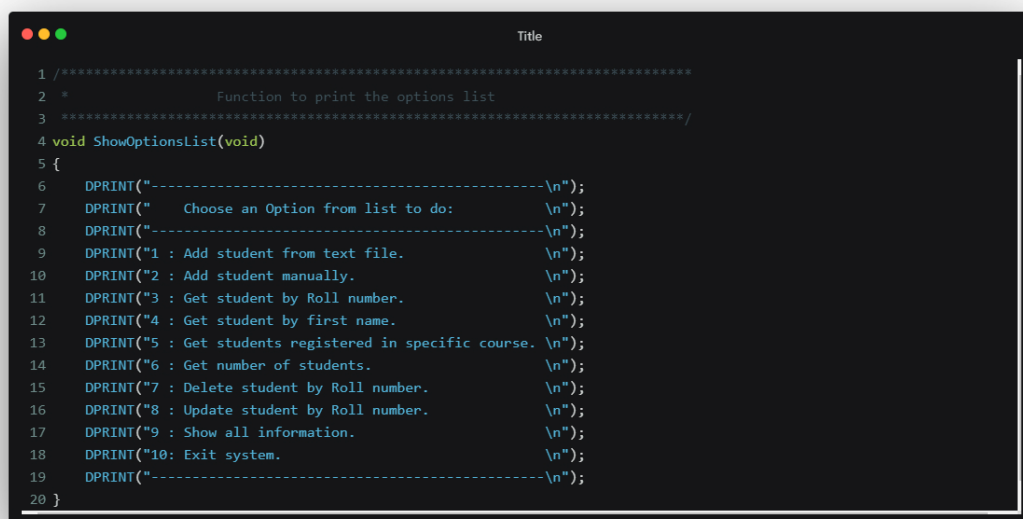1- Store the First name of the student.
2- Store the Last name of the student.
3- Store the unique Roll number for every student.
4- Store the GPA of every student.
5- Store the courses registered by the student.

Approach

The idea is to form an individual functions for every operation.
 All the functions are unified together to form software.
1- Add Student Details from text file.
2- Add Student Details manually.
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- Count of students.
7- Delete a student Details by a roll number.
8- Update student Details by a roll number.
9- Show all the information.
10- Exit

```
1  /************************************************************************
2   *                  Function to print the options list
3   ************************************************************************/
4  void ShowOptionsList(void)
5  {
6      DPRINT("-------------------------------------------------\n");
7      DPRINT("    Choose an Option from list to do:            \n");
8      DPRINT("-------------------------------------------------\n");
9      DPRINT("1 : Add student from text file.            \n");
10     DPRINT("2 : Add student manually.                  \n");
11     DPRINT("3 : Get student by Roll number.            \n");
12     DPRINT("4 : Get student by first name.             \n");
13     DPRINT("5 : Get students registered in specific course. \n");
14     DPRINT("6 : Get number of students.                \n");
15     DPRINT("7 : Delete student by Roll number.         \n");
16     DPRINT("8 : Update student by Roll number.         \n");
17     DPRINT("9 : Show all information.                   \n");
18     DPRINT("10: Exit system.                           \n");
19     DPRINT("-------------------------------------------------\n");
20 }
```

```c
/*********************************************************************/
/*********************************************************************/
/***************         Author: Mohamed Magdy         ***************/
/***************         Layer:  APP                   ***************/
/***************         SWC: Student Management System ***************/
/*********************************************************************/
/*********************************************************************/

/* Include Application Header */
#include "APP.h"

/* Decleration of needed Variables */
const uint8_t QUEUE_SIZE = 50;
boolean ProgIsRunning = TRUE;
char UserInput[40];
FIFO_Buff_t StudentQueue;
FILE* StudentsData = NULL;

int main(void)
{
    /* Show Welcome message and Initialize the database */
    DPRINT("Welcome to the Student Management System.\n");
    CreateStudentDatabase(&StudentQueue,QUEUE_SIZE);

    /* Keep running the program until the user exit from it */
    while(ProgIsRunning)
    {
        /* Show Options List */
        ShowOptionsList();
        /* Take option from the User  */
        DPRINT("Enter your choice to perform the task: ");
        GETS(UserInput);
        DPRINT("-------------------------------------\n");
        /* Take an action based on the input of the user*/
        switch(atoi(UserInput))
        {
        case 1: AddStudentsFromTxtFile(&StudentQueue,StudentsData); break;
        case 2: AddStudentsManually(&StudentQueue);                 break;
        case 3: GetStudentByRollNum(&StudentQueue,GET_STUDENT);     break;
        case 4: GetStudentByFirstName(&StudentQueue);               break;
        case 5: GetStudentsInSpecificCourse(&StudentQueue);         break;
        case 6: GetNumberOfStudents();                              break;
        case 7: DeleteStudentInfoByRollNum(&StudentQueue);          break;
        case 8: UpdateStudentInfoByRollNum(&StudentQueue);          break;
        case 9: ShowAllStudentsInfo(&StudentQueue);                 break;
        case 10: ProgIsRunning = FALSE;                             break;
        }

        DPRINT("\n");
    }


    return 0;
}
```

1. Add Student Details from text file

```c
/*************************************************************************
 *          Function to Add students data from file in the database
 *************************************************************************/
void AddStudentsFromTxtFile(FIFO_Buff_t* studentDataBase,FILE* textFile)
{
    uint8_t i = 0 , j = 0 ,closeFileState = 0;
    /* Open the file with read command */
    textFile = fopen(FILE_NAME,"r");

    /* Check the file opened successfully or not */
    if(NULL != textFile)
    {
        /* Loop on each line(student) in the file */
        while(fgets(line,80,textFile) != NULL)
        {
            studentDataBase->data[i].rollNumber = atoi(strtok(line,","));
            /* Check the roll number is availabe or already taken */
            if(PresenceOfRollNumber(studentDataBase,studentDataBase->data[i].rollNumber) == TRUE)
            {
                DPRINT("[ERROR] Roll Number %d is already taken.\n",studentDataBase->data[i].rollNumber);
                continue;
            }
            /* Save the rest of the student details if the roll number is unique */
            strcpy(studentDataBase->data[i].FirstName , strtok(NULL,","));
            strcpy(studentDataBase->data[i].LastName , strtok(NULL,","));
            studentDataBase->data[i].GPA = atof(strtok(NULL,","));
            for(j=0 ; j<courses ; j++)
            {
                studentDataBase->data[i].coursesID[j] = atoi(strtok(NULL,","));
            }

            DPRINT("[INFO] Roll Number %d is saved successfully.\n",studentDataBase->data[i].rollNumber);

            NumberofStudents++;
            i++;
        }
    }
    else
    {
        DPRINT("[ERROR] Problem Reading the file.\n");
    }

    /* Closing the file after reading all the data */
    closeFileState = fclose(textFile);
    if(0 == closeFileState)
    {
        DPRINT("[INFO] Students Detail is added successfully.\n");
        DPRINT("---------------------------------------------\n");
        GetNumberOfStudents();
    }
    else
    {
        DPRINT("[ERROR] Problem Closing the file.\n");
    }
```

Example on Data from text file

```
1 Welcome to the Student Management System.
2 -------------------------------------------------
3     Choose an Option from list to do:
4 -------------------------------------------------
5 1 : Add student from text file.
6 2 : Add student manually.
7 3 : Get student by Roll number.
8 4 : Get student by first name.
9 5 : Get students registered in specific course.
10 6 : Get number of students.
11 7 : Delete student by Roll number.
12 8 : Update student by Roll number.
13 9 : Show all information.
14 10: Exit system.
15 -------------------------------------------------
16 Enter your choice to perform the task: 1
17 -------------------------------------------------
18 [INFO] Roll Number 1 is saved successfully.
19 [ERROR] Roll Number 1 is already taken.
20 [INFO] Roll Number 3 is saved successfully.
21 [INFO] Roll Number 4 is saved successfully.
22 [INFO] Students Detail is added successfully.
23 -------------------------------------------------
24 [INFO] The total number of Student is 3.
25 [INFO] You can add up to 50 Students.
26 [INFO] You can add up 47 more Students.
```

2. Add Student Details Manually

```c
/****************************************************************
 *          Function to Add student data manually in the database
 ****************************************************************/
APP_Status_t AddStudentsManually(FIFO_Buff_t* studentDataBase)
{
    APP_Status_t ErrorStatus = APP_No_Errors;
    FIFO_Status_t QueueStatus = FIFO_No_Errors;
    uint8_t i = 0;
    StudentData_t inputData;

    /* Take the data from the user manually */
    DPRINT("Add the Student Details  \n");
    DPRINT("------------------------\n");

    DPRINT("Enter the Roll Number: ");
    GETS(Input);

    /* Check the roll number is availabe or already taken and keep asking until the user choose unique one */
    while(PresenceOfRollNumber(studentDataBase,atoi(Input)) == TRUE)
    {
        DPRINT("[ERROR] Roll Number %d is already taken.\n",atoi(Input));
        DPRINT("Enter unique Roll Number: ");
        GETS(Input);
    }
    inputData.rollNumber = atoi(Input);

    DPRINT("Enter the first name of student: ");
    GETS(Input);
    strcpy(inputData.FirstName,Input);

    DPRINT("Enter the last name of student: ");
    GETS(Input);
    strcpy(inputData.LastName,Input);

    DPRINT("Enter the GPA you obtained: ");
    GETS(Input);
    inputData.GPA = atof(Input);

    DPRINT("Enter the course ID for each course:\n");
    for(i = 0 ; i < courses ; i++)
    {
        DPRINT("Course %d ID: ",i+1);
        GETS(Input);
        if(checkCoursesID(inputData.coursesID,atoi(Input)) == TRUE)
        {
            DPRINT("===>Course ID entered before<===\n");
            i--;
            continue;
        }
        inputData.coursesID[i] = atoi(Input);
    }

    /* Enqueue the new student in the queue created for the database */
    QueueStatus = FIFO_EnqueueItem(studentDataBase,&inputData);

    /* Check the buffer can take this student or not */
    if(FIFO_Full == QueueStatus)
    {
        DPRINT("[ERROR] Student Database is full, We can't save this student.\n");
        ErrorStatus = APP_Error;
    }
    else
    {
        NumberofStudents++;
        DPRINT("[INFO] Student Details is added Successfully.\n");
        DPRINT("------------------------------------------\n");
        GetNumberOfStudents();
    }


    return ErrorStatus;
}
```

Example on Data added manually

```
1  Welcome to the Student Management System.
2  ----------------------------------------------
3      Choose an Option from list to do:
4  ----------------------------------------------
5  1 : Add student from text file.
6  2 : Add student manually.
7  3 : Get student by Roll number.
8  4 : Get student by first name.
9  5 : Get students registered in specific course.
10 6 : Get number of students.
11 7 : Delete student by Roll number.
12 8 : Update student by Roll number.
13 9 : Show all information.
14 10: Exit system.
15 ----------------------------------------------
16 Enter your choice to perform the task: 2
17 ----------------------------------------------
18 Add the Student Details
19 ----------------------------------------------
20 Enter the Roll Number: 1
21 Enter the first name of student: Mohamed
22 Enter the last name of student: Magdy
23 Enter the GPA you obtained: 3.15
24 Enter the course ID for each course:
25 Course 1 ID: 1
26 Course 2 ID: 2
27 Course 3 ID: 2
28 ===>Course ID entered before<===
29 Course 3 ID: 3
30 Course 4 ID: 4
31 Course 5 ID: 5
32 [INFO] Student Details is added Successfully.
33 ----------------------------------------------
34 [INFO] The total number of Student is 1.
35 [INFO] You can add up to 50 Students.
36 [INFO] You can add up 49 more Students.
```

```
1  ----------------------------------------------
2      Choose an Option from list to do:
3  ----------------------------------------------
4  1 : Add student from text file.
5  2 : Add student manually.
6  3 : Get student by Roll number.
7  4 : Get student by first name.
8  5 : Get students registered in specific course.
9  6 : Get number of students.
10 7 : Delete student by Roll number.
11 8 : Update student by Roll number.
12 9 : Show all information.
13 10: Exit system.
14 ----------------------------------------------
15 Enter your choice to perform the task: 2
16 ----------------------------------------------
17 Add the Student Details
18 ----------------------------------------------
19 Enter the Roll Number: 1
20 [ERROR] Roll Number 1 is already taken.
21 Enter unique Roll Number: 1
22 [ERROR] Roll Number 1 is already taken.
23 Enter unique Roll Number: 2
24 Enter the first name of student: Nour
25 Enter the last name of student: Magdy
26 Enter the GPA you obtained: 3.65
27 Enter the course ID for each course:
28 Course 1 ID: 4
29 Course 2 ID: 5
30 Course 3 ID: 6
31 Course 4 ID: 9
32 Course 5 ID: 7
33 [INFO] Student Details is added Successfully.
34 ----------------------------------------------
35 [INFO] The total number of Student is 2.
36 [INFO] You can add up to 50 Students.
37 [INFO] You can add up 48 more Students.
```

3. Find the student by given the roll number.

```c
/*****************************************************************************
 *       Function to get the students from the database by Roll Number
 *  Note: This function is used also to return the place
 *        of the student's data to update its values
 *****************************************************************************/
int GetStudentByRollNum(FIFO_Buff_t* studentDataBase,uint8_t Command)
{
    uint8_t i = 0 , studentFound = 0;

    DPRINT("Enter the Roll Number of the student: ");
    GETS(Input);

    /* Loop on all the students in the database until finding the roll number */
    for(i=0 ; i<NumberofStudents ; i++)
    {
        if((atoi(Input)) == studentDataBase->data[i].rollNumber)
        {
            studentFound = 1;

            /* If the we want to only get the student details we will print it on the screen */
            if(Command == GET_STUDENT)
            {
                DPRINT("The Student Details are: \n");
                DPRINT("-------------------------------\n");
                GetOneStudent(&(studentDataBase->data[i]));
                DPRINT("-------------------------------\n");
            }
            /* If the command is to update the student we will return the index of the student's details */
            else if(Command == UPDATE_STUDENT)
            {
                return i;
            }
        }
    }

    /* If the student not found the flag will still zero so print error message */
    if(!studentFound)
    {
        DPRINT("[ERROR] Roll number %d not found.\n",atoi(Input));
    }
    /* Return -1 if we didn't find the student */
    return -1;
}
```

Example on finding the student by Roll number

```
1  -------------------------------------------
2      Choose an Option from list to do:
3  -------------------------------------------
4  1 : Add student from text file.
5  2 : Add student manually.
6  3 : Get student by Roll number.
7  4 : Get student by first name.
8  5 : Get students registered in specific course.
9  6 : Get number of students.
10 7 : Delete student by Roll number.
11 8 : Update student by Roll number.
12 9 : Show all information.
13 10: Exit system.
14 -------------------------------------------
15 Enter your choice to perform the task: 3
16 -----------------------------------
17 Enter the Roll Number of the student: 6
18 [ERROR] Roll number 6 not found.
19
20 -------------------------------------------
21      Choose an Option from list to do:
22 -------------------------------------------
23 1 : Add student from text file.
24 2 : Add student manually.
25 3 : Get student by Roll number.
26 4 : Get student by first name.
27 5 : Get students registered in specific course.
28 6 : Get number of students.
29 7 : Delete student by Roll number.
30 8 : Update student by Roll number.
31 9 : Show all information.
32 10: Exit system.
33 -------------------------------------------
34 Enter your choice to perform the task: 3
35 -----------------------------------
36 Enter the Roll Number of the student: 3
37 The Student Details are:
38 -----------------------------
39 Student first name: Abdelrahaman
40 Student last name: Ibrahim
41 Student roll number: 3
42 Student GPA number: 3.10
43 1. The Course ID: 45
44 2. The Course ID: 21
45 3. The Course ID: 55
46 4. The Course ID: 18
47 5. The Course ID: 46
48 -----------------------------
```

4. Find the student by given the first name.

```c
1  /*********************************************************************
2   *       Function to get the students from the database  by First Name
3   *********************************************************************/
4  void GetStudentByFirstName(FIFO_Buff_t* studentDataBase)
5  {
6      uint8_t i = 0 , studentFound = 0;
7
8      DPRINT("Enter the first name of the student: ");
9      GETS(Input);
10
11     /* Loop on all the students in the database until finding students with entered first name
12      * and print every the student's details with the entered first name
13      *  */
14     for(i=0 ; i<NumberofStudents ; i++)
15     {
16         if(!strcmp(Input,studentDataBase->data[i].FirstName))
17         {
18             DPRINT("The Student Details are: \n");
19             DPRINT("--------------------------------\n");
20             GetOneStudent(&(studentDataBase->data[i]));
21             DPRINT("--------------------------------\n");
22             studentFound = 1;
23         }
24     }
25
26     /* If the student not found the flag will still zero so print error message */
27     if(!studentFound)
28     {
29         DPRINT("[ERROR] first name %s not found.\n",Input);
30     }
31  }
```

Example on finding the student by first name

```
1 ------------------------------------------------
2      Choose an Option from list to do:
3 ------------------------------------------------
4 1 : Add student from text file.
5 2 : Add student manually.
6 3 : Get student by Roll number.
7 4 : Get student by first name.
8 5 : Get students registered in specific course.
9 6 : Get number of students.
10 7 : Delete student by Roll number.
11 8 : Update student by Roll number.
12 9 : Show all information.
13 10: Exit system.
14 ------------------------------------------------
15 Enter your choice to perform the task: 4
16 ------------------------------------------------
17 Enter the first name of the student: Nour
18 The Student Details are:
19 --------------------------------
20 Student first name: Nour
21 Student last name: Ahmed
22 Student roll number: 4
23 Student GPA number: 2.60
24 1. The Course ID: 45
25 2. The Course ID: 21
26 3. The Course ID: 55
27 4. The Course ID: 18
28 5. The Course ID: 46
29 --------------------------------
30
31 ------------------------------------------------
32      Choose an Option from list to do:
33 ------------------------------------------------
34 1 : Add student from text file.
35 2 : Add student manually.
36 3 : Get student by Roll number.
37 4 : Get student by first name.
38 5 : Get students registered in specific course.
39 6 : Get number of students.
40 7 : Delete student by Roll number.
41 8 : Update student by Roll number.
42 9 : Show all information.
43 10: Exit system.
44 ------------------------------------------------
45 Enter your choice to perform the task: 4
46 ------------------------------------------------
47 Enter the first name of the student: Mohamed
48 [ERROR] first name Mohamed not found.
```

5. Get students registered in specific course.

```c
/**********************************************************************************
 *      Function to get the students enrolled in specific course
 **********************************************************************************/
void GetStudentsInSpecificCourse(FIFO_Buff_t* studentDataBase)
{
    boolean courseFound = FALSE;
    uint8_t i = 0;

    DPRINT("Enter the course ID: ");
    GETS(Input);

    /* Loop on all the students in the database and print there data if they take the entered course ID */
    for(i=0 ; i<NumberofStudents ; i++)
    {
        if(checkCoursesID(studentDataBase->data[i].coursesID,atoi(Input)) == TRUE)
        {
            DPRINT("The Student Details are: \n");
            DPRINT("--------------------------------\n");
            DPRINT("Student first name: %s\n"  , studentDataBase->data[i].FirstName);
            DPRINT("Student last name: %s\n"    , studentDataBase->data[i].LastName  );
            DPRINT("Student roll number: %d\n" , studentDataBase->data[i].rollNumber);
            DPRINT("Student GPA number: %.2f\n", studentDataBase->data[i].GPA        );
            DPRINT("--------------------------------\n");
            courseFound = TRUE;
        }
    }

    /* Print Error message if there is no one registered the course */
    if(!courseFound)
    {
        DPRINT("Course ID %d not found\n",atoi(Input));
    }
}
```

Example on getting students registered in specific course

```
 1 ------------------------------------------------
 2     Choose an Option from list to do:
 3 ------------------------------------------------
 4 1 : Add student from text file.
 5 2 : Add student manually.
 6 3 : Get student by Roll number.
 7 4 : Get student by first name.
 8 5 : Get students registered in specific course.
 9 6 : Get number of students.
10 7 : Delete student by Roll number.
11 8 : Update student by Roll number.
12 9 : Show all information.
13 10: Exit system.
14 ------------------------------------------------
15 Enter your choice to perform the task: 5
16 ------------------------------------
17 Enter the course ID: 2
18 The Student Details are:
19 --------------------------------
20 Student first name: Ahmed
21 Student last name: Mahmoud
22 Student roll number: 1
23 Student GPA number: 3.25
24 --------------------------------
25
26 ------------------------------------------------
27     Choose an Option from list to do:
28 ------------------------------------------------
29 1 : Add student from text file.
30 2 : Add student manually.
31 3 : Get student by Roll number.
32 4 : Get student by first name.
33 5 : Get students registered in specific course.
34 6 : Get number of students.
35 7 : Delete student by Roll number.
36 8 : Update student by Roll number.
37 9 : Show all information.
38 10: Exit system.
39 ------------------------------------------------
40 Enter your choice to perform the task: 5
41 ------------------------------------
42 Enter the course ID: 106
43 Course ID 106 not found
```

6. Count of students.

```
1 //*********************************************************************
2 *        Function to get the number of students in the database
3 //*********************************************************************/
4 void GetNumberOfStudents(void)
5 {
6     DPRINT("[INFO] The total number of Student is %d.\n",NumberofStudents);
7     DPRINT("[INFO] You can add up to 50 Students.\n");
8     DPRINT("[INFO] You can add up %d more Students.\n",50-NumberofStudents);
9 }
```

Example on counting students

```
 1 Welcome to the Student Management System.
 2 -----------------------------------------------
 3     Choose an Option from list to do:
 4 -----------------------------------------------
 5 1 : Add student from text file.
 6 2 : Add student manually.
 7 3 : Get student by Roll number.
 8 4 : Get student by first name.
 9 5 : Get students registered in specific course.
10 6 : Get number of students.
11 7 : Delete student by Roll number.
12 8 : Update student by Roll number.
13 9 : Show all information.
14 10: Exit system.
15 -----------------------------------------------
16 Enter your choice to perform the task: 6
17 -----------------------------------------------
18 [INFO] The total number of Student is 0.
19 [INFO] You can add up to 50 Students.
20 [INFO] You can add up 50 more Students.
21
22 -----------------------------------------------
23     Choose an Option from list to do:
24 -----------------------------------------------
25 1 : Add student from text file.
26 2 : Add student manually.
27 3 : Get student by Roll number.
28 4 : Get student by first name.
29 5 : Get students registered in specific course.
30 6 : Get number of students.
31 7 : Delete student by Roll number.
32 8 : Update student by Roll number.
33 9 : Show all information.
34 10: Exit system.
35 -----------------------------------------------
36 Enter your choice to perform the task: 1
37 -----------------------------------------------
38 [INFO] Roll Number 1 is saved successfully.
39 [ERROR] Roll Number 1 is already taken.
40 [INFO] Roll Number 3 is saved successfully.
41 [INFO] Roll Number 4 is saved successfully.
42 [INFO] Students Detail is added successfully.
43 -----------------------------------------------
44 [INFO] The total number of Student is 3.
45 [INFO] You can add up to 50 Students.
46 [INFO] You can add up 47 more Students.
47
48 -----------------------------------------------
49     Choose an Option from list to do:
50 -----------------------------------------------
51 1 : Add student from text file.
52 2 : Add student manually.
53 3 : Get student by Roll number.
54 4 : Get student by first name.
55 5 : Get students registered in specific course.
56 6 : Get number of students.
57 7 : Delete student by Roll number.
58 8 : Update student by Roll number.
59 9 : Show all information.
60 10: Exit system.
61 -----------------------------------------------
62 Enter your choice to perform the task: 6
63 -----------------------------------------------
64 [INFO] The total number of Student is 3.
65 [INFO] You can add up to 50 Students.
66 [INFO] You can add up 47 more Students.
```

7. Delete a student Details by a roll number.

```c
/**********************************************************************
 *       Function to delete the student details by the Roll Number
 **********************************************************************/
void DeleteStudentInfoByRollNum(FIFO_Buff_t* studentDataBase)
{
    int chosenStudent = 0;
    uint8_t i = 0;

    /* Get the student roll number with checking if it occurs or not */
    chosenStudent = GetStudentByRollNum(studentDataBase,UPDATE_STUDENT);
    if(chosenStudent == -1)
        return;

    /* Shift back all the remaining students */
    for(i=chosenStudent ; i<NumberofStudents-1 ; i++)
    {
        strcpy(studentDataBase->data[i].FirstName,studentDataBase->data[i+1].FirstName);
        strcpy(studentDataBase->data[i].LastName,studentDataBase->data[i+1].LastName);
        studentDataBase->data[i].rollNumber = studentDataBase->data[i+1].rollNumber;
        studentDataBase->data[i].GPA = studentDataBase->data[i+1].GPA;
        studentDataBase->data[i].coursesID[0] = studentDataBase->data[i+1].coursesID[0];
        studentDataBase->data[i].coursesID[1] = studentDataBase->data[i+1].coursesID[1];
        studentDataBase->data[i].coursesID[2] = studentDataBase->data[i+1].coursesID[2];
        studentDataBase->data[i].coursesID[3] = studentDataBase->data[i+1].coursesID[3];
        studentDataBase->data[i].coursesID[4] = studentDataBase->data[i+1].coursesID[4];
    }
    DPRINT("[INFO] Student Details is removed Successfully.\n");
    /* Dequeue the last student in the buffer after shifting all the students */
    FIFO_DequeueItem(studentDataBase,NULL);
    /* Decremenet the number of the students */
    NumberofStudents--;
}
```

Example on deleting student

```
1  -----------------------------------------------
2      Choose an Option from list to do:
3  -----------------------------------------------
4  1 : Add student from text file.
5  2 : Add student manually.
6  3 : Get student by Roll number.
7  4 : Get student by first name.
8  5 : Get students registered in specific course.
9  6 : Get number of students.
10 7 : Delete student by Roll number.
11 8 : Update student by Roll number.
12 9 : Show all information.
13 10: Exit system.
14 -----------------------------------------------
15 Enter your choice to perform the task: 7
16 -------------------------------------
17 Enter the Roll Number of the student: 4
18 [INFO] Student Details is removed Successfully.
19
20 -----------------------------------------------
21      Choose an Option from list to do:
22 -----------------------------------------------
23 1 : Add student from text file.
24 2 : Add student manually.
25 3 : Get student by Roll number.
26 4 : Get student by first name.
27 5 : Get students registered in specific course.
28 6 : Get number of students.
29 7 : Delete student by Roll number.
30 8 : Update student by Roll number.
31 9 : Show all information.
32 10: Exit system.
33 -----------------------------------------------
34 Enter your choice to perform the task: 9
35 -------------------------------------
36 The Student Details are:
37 -------------------------------
38 Student first name: Ahmed
39 Student last name: Mahmoud
40 Student roll number: 1
41 Student GPA number: 3.25
42 1. The Course ID: 1
43 2. The Course ID: 2
44 3. The Course ID: 3
45 4. The Course ID: 4
46 5. The Course ID: 5
47 -------------------------------
48 The Student Details are:
49 -------------------------------
50 Student first name: Abdelrahaman
51 Student last name: Ibrahim
52 Student roll number: 3
53 Student GPA number: 3.10
54 1. The Course ID: 45
55 2. The Course ID: 21
56 3. The Course ID: 55
57 4. The Course ID: 18
58 5. The Course ID: 46
59 -------------------------------
60
61 -----------------------------------------------
62      Choose an Option from list to do:
63 -----------------------------------------------
64 1 : Add student from text file.
65 2 : Add student manually.
66 3 : Get student by Roll number.
67 4 : Get student by first name.
68 5 : Get students registered in specific course.
69 6 : Get number of students.
70 7 : Delete student by Roll number.
71 8 : Update student by Roll number.
72 9 : Show all information.
73 10: Exit system.
74 -----------------------------------------------
75 Enter your choice to perform the task: 7
76 -------------------------------------
77 Enter the Roll Number of the student: 10
78 [ERROR] Roll number 10 not found.
```

8. Update student Details by a roll number.

```c
/**************************************************************
 *      Function to update the student details by the Roll Number
 **************************************************************/
void UpdateStudentInfoByRollNum(FIFO_Buff_t* studentDataBase)
{
    int chosenStudent = 0;
    char choice[10] , courseID[2];

    /* Get the student roll number with checking if it occurs or not */
    chosenStudent = GetStudentByRollNum(studentDataBase,UPDATE_STUDENT);
    if(chosenStudent == -1)
        return;

    /* Label to come back and re-enter the correct option if the user entered wrong one */
    VIEW_AGAIN:
    DPRINT("--------------------------------\n");
    DPRINT("1. first name.\n");
    DPRINT("2. last name.\n");
    DPRINT("3. Roll Number.\n");
    DPRINT("4. GPA.\n");
    DPRINT("5. Courses.\n");
    DPRINT("Choose the sector you want to update: ");
    GETS(choice);

    /* Take the action based on the choice taken */
    switch (atoi(choice)) {
    case 1:
        DPRINT("Enter the new first name: ");
        GETS(choice);
        strcpy(studentDataBase->data[chosenStudent].FirstName,choice);
        break;
    case 2:
        DPRINT("Enter the new last name: ");
        GETS(choice);
        strcpy(studentDataBase->data[chosenStudent].LastName,choice);
        break;
    case 3:
        DPRINT("Enter the new roll number: ");
        GETS(choice);
        studentDataBase->data[chosenStudent].rollNumber = atoi(choice);
        break;
    case 4:
        DPRINT("Enter the new GPA: ");
        GETS(choice);
        studentDataBase->data[chosenStudent].GPA = atof(choice);
        break;
    case 5:
        DPRINT("Enter the which course: ");
        GETS(choice);
        DPRINT("Enter the new course ID: ");
        GETS(courseID);
        studentDataBase->data[chosenStudent].coursesID[atoi(choice)] = atof(courseID);
        break;
    default:
        DPRINT("Wrong Choice, Choose again.\n");
        goto VIEW_AGAIN;
        break;
    }

}
```

Example on updating student

```
 1 --------------------------------------
 2    Choose an Option from list to do:
 3 --------------------------------------
 4 1 : Add student from text file.
 5 2 : Add student manually.
 6 3 : Get student by Roll number.
 7 4 : Get student by first name.
 8 5 : Get students registered in specific course.
 9 6 : Get number of students.
10 7 : Delete student by Roll number.
11 8 : Update student by Roll number.
12 9 : Show all information.
13 10: Exit system.
14 --------------------------------------
15 Enter your choice to perform the task: 8
16 --------------------------------------
17 Enter the Roll Number of the student: 1
18 --------------------------------
19 1. first name.
20 2. last name.
21 3. Roll Number.
22 4. GPA.
23 5. Courses.
24 Choose the sector you want to update: 6
25 Wrong Choice, Choose again.
26 --------------------------------
27 1. first name.
28 2. last name.
29 3. Roll Number.
30 4. GPA.
31 5. Courses.
32 Choose the sector you want to update: 1
33 Enter the new first name: Mohamed
34
35 --------------------------------------
36    Choose an Option from list to do:
37 --------------------------------------
38 1 : Add student from text file.
39 2 : Add student manually.
40 3 : Get student by Roll number.
41 4 : Get student by first name.
42 5 : Get students registered in specific course.
43 6 : Get number of students.
44 7 : Delete student by Roll number.
45 8 : Update student by Roll number.
46 9 : Show all information.
47 10: Exit system.
48 --------------------------------------
49 Enter your choice to perform the task: 9
50 --------------------------------
51 The Student Details are:
52 --------------------------------
53 Student first name: Mohamed
54 Student last name: Mahmoud
55 Student roll number: 1
56 Student GPA number: 3.25
57 1. The Course ID: 1
58 2. The Course ID: 2
59 3. The Course ID: 3
60 4. The Course ID: 4
61 5. The Course ID: 5
```
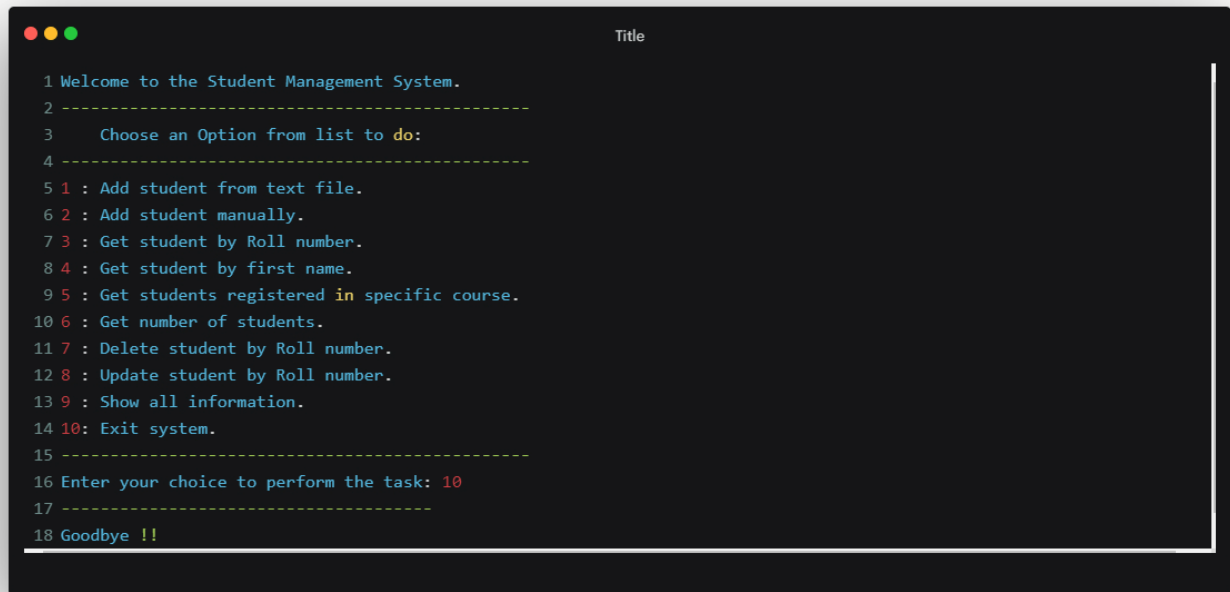
9. Show all the information.

```c
/******************************************************************
 *          Function to show all the data of all students
 ******************************************************************/
void ShowAllStudentsInfo(FIFO_Buff_t* studentDataBase)
{
    uint8_t i = 0;

    if(0 == NumberofStudents)
    {
        DPRINT("There are no students yet in the database.\n");
    }
    else
    {
        for(i=0 ; i<NumberofStudents ; i++)
        {
            DPRINT("The Student Details are: \n");
            DPRINT("---------------------------------\n");
            GetOneStudent(&(studentDataBase->data[i]));
            DPRINT("---------------------------------\n");
        }
    }

}
```

```
 1 Welcome to the Student Management System.
 2 ---------------------------------------------
 3     Choose an Option from list to do:
 4 ---------------------------------------------
 5 1 : Add student from text file.
 6 2 : Add student manually.
 7 3 : Get student by Roll number.
 8 4 : Get student by first name.
 9 5 : Get students registered in specific course.
10 6 : Get number of students.
11 7 : Delete student by Roll number.
12 8 : Update student by Roll number.
13 9 : Show all information.
14 10: Exit system.
15 ---------------------------------------------
16 Enter your choice to perform the task: 1
17 ---------------------------------------
18 [INFO] Roll Number 1 is saved successfully.
19 [ERROR] Roll Number 1 is already taken.
20 [INFO] Roll Number 3 is saved successfully.
21 [INFO] Roll Number 4 is saved successfully.
22 [INFO] Students Detail is added successfully.
23 ---------------------------------------------
24 [INFO] The total number of Student is 3.
25 [INFO] You can add up to 50 Students.
26 [INFO] You can add up 47 more Students.
27
28 ---------------------------------------------
29     Choose an Option from list to do:
30 ---------------------------------------------
31 1 : Add student from text file.
32 2 : Add student manually.
33 3 : Get student by Roll number.
34 4 : Get student by first name.
35 5 : Get students registered in specific course.
36 6 : Get number of students.
37 7 : Delete student by Roll number.
38 8 : Update student by Roll number.
39 9 : Show all information.
40 10: Exit system.
41 ---------------------------------------------
42 Enter your choice to perform the task: 9
43 ---------------------------------------
44 The Student Details are:
45 --------------------------------
46 Student first name: Ahmed
47 Student last name: Mahmoud
48 Student roll number: 1
49 Student GPA number: 3.25
50 1. The Course ID: 1
51 2. The Course ID: 2
52 3. The Course ID: 3
53 4. The Course ID: 4
54 5. The Course ID: 5
55 --------------------------------
56 The Student Details are:
57 --------------------------------
58 Student first name: Abdelrahaman
59 Student last name: Ibrahim
60 Student roll number: 3
61 Student GPA number: 3.10
62 1. The Course ID: 45
63 2. The Course ID: 21
64 3. The Course ID: 55
65 4. The Course ID: 18
66 5. The Course ID: 46
67 --------------------------------
68 The Student Details are:
69 --------------------------------
70 Student first name: Nour
71 Student last name: Ahmed
72 Student roll number: 4
73 Student GPA number: 2.60
74 1. The Course ID: 45
75 2. The Course ID: 21
76 3. The Course ID: 55
77 4. The Course ID: 18
78 5. The Course ID: 46
79 --------------------------------
```

10.   Exit the program.

```
 1 Welcome to the Student Management System.
 2 ------------------------------------------------
 3     Choose an Option from list to do:
 4 ------------------------------------------------
 5 1 : Add student from text file.
 6 2 : Add student manually.
 7 3 : Get student by Roll number.
 8 4 : Get student by first name.
 9 5 : Get students registered in specific course.
10 6 : Get number of students.
11 7 : Delete student by Roll number.
12 8 : Update student by Roll number.
13 9 : Show all information.
14 10: Exit system.
15 ------------------------------------------------
16 Enter your choice to perform the task: 10
17 ------------------------------------
18 Goodbye !!
```