Mastering embedded system diploma

Project 2: student database using queue.

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Project GitHub url:
https://github.com/abdelrhmansalah44/embedded-diploma/tree/2f152368d4767f87731a1b8e5086610344b1daee/unit%205%20first%20term%20projects/project%202%20student%20database

1) Header file content (queue.h)

- **Enumeration for all used states and structures for the database**

```
typedef struct {

char first_name[15];
     char last_name[15];
    datatype student_id;
    float gpa;
    unsigned int course_id[5];

}student_element;



typedef struct {

    student_element *head;
    student_element *tail;
    student_element *base;
    datatype length;
    datatype count;

}queue_elements;

student_element queue_arr[50];

typedef enum{

    queue_no_error,
    queue_full,
    queue_null,
    queue_empty,
    queue_error


```

- **Functions used in the student database**

```
extern queue_status add_student_manually();
extern queue_status add_student_file();
extern queue_status find_ID();
extern queue_status find_firstname();
extern queue_status find_course();
extern queue_status count();
extern queue_status delete_student();
extern queue_status update_student();
extern queue_status show_all();
extern void show_student_data();
extern void queue_init();
#endif /* QUEUE_H_ */

```

2) Main.c

```c
#include <stdio.h>
#include <stdlib.h>
#include "queue.h"
int main(void) {

    queue_init();
    while(1)
    {
    int x;

    printf("welcome to the student database\n");
    printf("enter the operation you want to make\n");
    printf("1. add student manually\n");
    printf("2. add student by file\n");
    printf("3. find student by id\n");
    printf("4. find student by first name\n");
    printf("5. delete student\n");
    printf("6. number of student appliying to a course\n");
    printf("7. number of students in the database\n");
    printf("8. update student data\n");
    printf("9. show all students\n");
    printf("==========================================\n");
    fflush(stdin);fflush(stdout);
    scanf("%d",&x);
```

```c
    switch(x)
    {
    case 1:
        add_student_manually();
        break;
    case 2:
        add_student_file();
        break;

    case 3:
        find_ID();
        break;

    case 4:
        find_firstname();
        break;

    case 5:
        delete_student();
        break;

    case 6:
        find_course();
        break;

    case 7:
        count();
        break;

    case 8:
        update_student();
        break;

    case 9:
        show_all();
        break;
```

3) Operations sequence

- ## Adding student manually

```
proj2.exe [C/C++ Application] D:\ks embedded system ass\first term projects\project 2\Debug\proj2.exe (8/22/23, 6:17 PM)
enter the operation you want to make
1. add student manually
2. add student by file
3. find student by id
4. find student by first name
5. delete student
6. number of student appliying to a course
7. number of students in the database
8. update student data
9. show all students
==========================================
1
enter the student data
=======================
enter student id
12
enter student first name
abdelrhman
enter student last name
salah
enter student gpa
3.4
course 1 ID:1

course 2 ID:2

course 3 ID:3

course 4 ID:4

course 5 ID:5
```

```
proj2.exe [C/C++ Application] D:\ks embedded system ass\first term projects\project 2\Debug\proj2.exe (8/22/23, 6:17 PM)
1. add student manually
2. add student by file
3. find student by id
4. find student by first name
5. delete student
6. number of student appliying to a course
7. number of students in the database
8. update student data
9. show all students
==========================================
1
enter the student data
=======================
enter student id
13
enter student first name
ahmed
enter student last name
waleed
enter student gpa
3.9
course 1 ID:1

course 2 ID:2

course 3 ID:3

course 4 ID:4

course 5 ID:5

[info] student data has been updated
```

```
proj2.exe [C/C++ Application] D:\ks embedded system ass\first term projects\project 2\Debug\proj2.exe (8/22/23, 6:17 PM)
welcome to the student database
enter the operation you want to make
1. add student manually
2. add student by file
3. find student by id
4. find student by first name
5. delete student
6. number of student appliying to a course
7. number of students in the database
8. update student data
9. show all students
==========================================
1
enter the student data
=======================
enter student id
14
enter student first name
hossam
enter student last name
mohamed
enter student gpa
3.1
course 1 ID:1

course 2 ID:2

course 3 ID:3

course 4 ID:4

course 5 ID:5
```

- **find student with id: 12.**

```
==========================================
welcome to the student database
enter the operation you want to make
1. add student manually
2. add student by file
3. find student by id
4. find student by first name
5. delete student
6. number of student appliying to a course
7. number of students in the database
8. update student data
9. show all students
==========================================
3
enter the id you want to found
12
student id no:12 is found
student id number is: 12
student first name is: abdelrhman
student last name is: salah
student gpa is: 3.400000
student course no:1 id is:1
 student course no:2 id is:2
 student course no:3 id is:3
 student course no:4 id is:4
```

- **find student with his first name.**

```
welcome to the student database
enter the operation you want to make
1. add student manually
2. add student by file
3. find student by id
4. find student by first name
5. delete student
6. number of student appliying to a course
7. number of students in the database
8. update student data
9. show all students
==========================================
4
enter the student first name you want to found
abdelrhman
student id number is: 12
student first name is: abdelrhman
student last name is: salah
student gpa is: 3.400000
student course no:1 id is:1
 student course no:2 id is:2
 student course no:3 id is:3
 student course no:4 id is:4
```

- **number of students**

```
 ========================================
welcome to the student database
enter the operation you want to make
1. add student manually
2. add student by file
3. find student by id
4. find student by first name
5. delete student
6. number of student appliying to a course
7. number of students in the database
8. update student data
9. show all students
========================================
7
number of students in the data base is: 3
you can add more 47 students
========================================
```

- **number of students applying to the same course**

```
6
Enter the Course ID: 1
student id number is: 12
student first name is: abdelrhman
student last name is: salah
student gpa is: 3.400000
student course no:1 id is:1
 student course no:2 id is:2
 student course no:3 id is:3
 student course no:4 id is:4
 student course no:5 id is:1701668961
 ========================================
student id number is: 13
student first name is: ahmed
student last name is: waleed
student gpa is: 3.900000
student course no:1 id is:1
 student course no:2 id is:2
 student course no:3 id is:3
 student course no:4 id is:4
 student course no:5 id is:1936945000
 ========================================
student id number is: 14
student first name is: hossam
student last name is: mohamed
student gpa is: 3.100000
student course no:1 id is:1
 student course no:2 id is:2
 student course no:3 id is:3
 student course no:4 id is:4
 student course no:5 id is:5
 ========================================
```

- **deleting student with id:12**
  and making sure he is not in the data no more.

```
proj2.exe [C/C++ Application] D:\ks embedded system ass\first term projects\project 2\Debug\proj2.exe (8/22/23, 6:17 PM)
2. add student by file
3. find student by id
4. find student by first name
5. delete student
6. number of student appliying to a course
7. number of students in the database
8. update student data
9. show all students
==========================================
5
enter the id of the student you want to delete
12
student deleted
==========
welcome to the student database
enter the operation you want to make
1. add student manually
2. add student by file
3. find student by id
4. find student by first name
5. delete student
6. number of student appliying to a course
7. number of students in the database
8. update student data
9. show all students
==========================================
3
enter the id you want to found
12
[error] id not found
----------
welcome to the student database
```

- **number of students after deleting**

```
 ==========================================
welcome to the student database
enter the operation you want to make
1. add student manually
2. add student by file
3. find student by id
4. find student by first name
5. delete student
6. number of student appliying to a course
7. number of students in the database
8. update student data
9. show all students
==========================================
7
number of students in the data base is: 2
you can add more 48 students
==========================================
```

- **updating the data of student with id:13**