

Mastering Embedded System Online Diploma

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First Term (Final Project 2)

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Problem statement

It is required software that help user to manage information of student in university this problem can called is students management system, this problem is solved by using static queue data structure (FIFO) each node of queue contains the following:

- 1- First name of the student.
- 2- Last name of the student.
- 3- Unique roll number.
- 4- GPA.
- 5- Courses.

Approach

- 1- Add student manually
- 2- Add student from text file
- 3- Delete certain student by roll number
- 4- Search by roll number
- 5- Search by first name
- 6- Search by Ids courses
- 7- Show all
- 8- Update certain student
- 9- Total number of students

1. Add student manually

```
Enter option number: 1
-----
Add the student details
Enter the roll number:1
Enter the first name: bassam
Enter the last name: khamis
Enter the GPA obtained: 4
Enter the course ID for each course
Course 1 id: 1
Course 2 id: 2
Course 3 id: 3
Course 4 id: 4
Course 5 id: 5

[INFO] Student details are added successfully
[INFO] the total number of student is:1
[INFO] you can add up to:50
[INFO] you can add 49 more students:
-----
```

If ID is already taken, it will be report ERROR

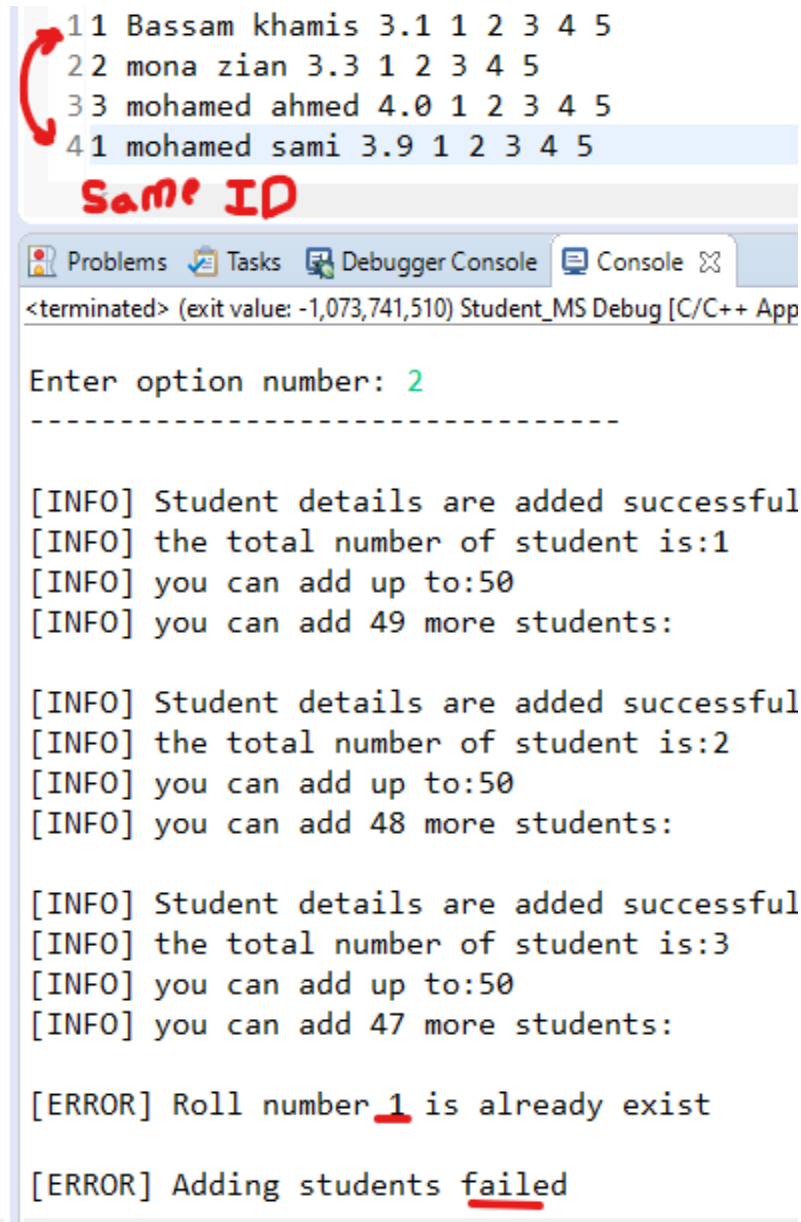
```
Enter option number: 1
-----
Add the student details
Enter the roll number:1
Enter the first name: bassam
Enter the last name: khamis
Enter the GPA obtained: 3
Enter the course ID for each course
Course 1 id: 1
Course 2 id: 2
Course 3 id: 3
Course 4 id: 4
Course 5 id: 5

[INFO] Student details are added successfully
[INFO] the total number of student is:1
[INFO] you can add up to:50
[INFO] you can add 49 more students:
-----
Choose the task that you want to perform
1- Add the student details manually
2- Add the student details from text file
3- Find the student details by roll number
4- Find the student details by first name
5- Find the student details by course id
6- Find the total number of students
7- Delete the student details by roll number
8- Update the student details by roll number
9- Show all information
10- Exit

Enter option number: 1
-----
Add the student details
Enter the roll number:1

[ERROR] Roll number 1 is already exist
```

2. Add from text file



The screenshot shows a C++ application window with a menu bar (Problems, Tasks, Debugger Console, Console) and a title bar. The main area displays a list of students with their IDs, names, and scores. A red arrow points to the first student, and a red text overlay says "Same ID". The console output shows the program's execution, including successful additions and an error message for a duplicate roll number.

```
11 Bassam khamis 3.1 1 2 3 4 5
22 mona zian 3.3 1 2 3 4 5
33 mohamed ahmed 4.0 1 2 3 4 5
41 mohamed sami 3.9 1 2 3 4 5
```

Same ID

Problems Tasks Debugger Console Console

<terminated> (exit value: -1,073,741,510) Student_MS Debug [C/C++ App]

Enter option number: 2

[INFO] Student details are added successful
[INFO] the total number of student is:1
[INFO] you can add up to:50
[INFO] you can add 49 more students:

[INFO] Student details are added successful
[INFO] the total number of student is:2
[INFO] you can add up to:50
[INFO] you can add 48 more students:

[INFO] Student details are added successful
[INFO] the total number of student is:3
[INFO] you can add up to:50
[INFO] you can add 47 more students:

[ERROR] Roll number 1 is already exist

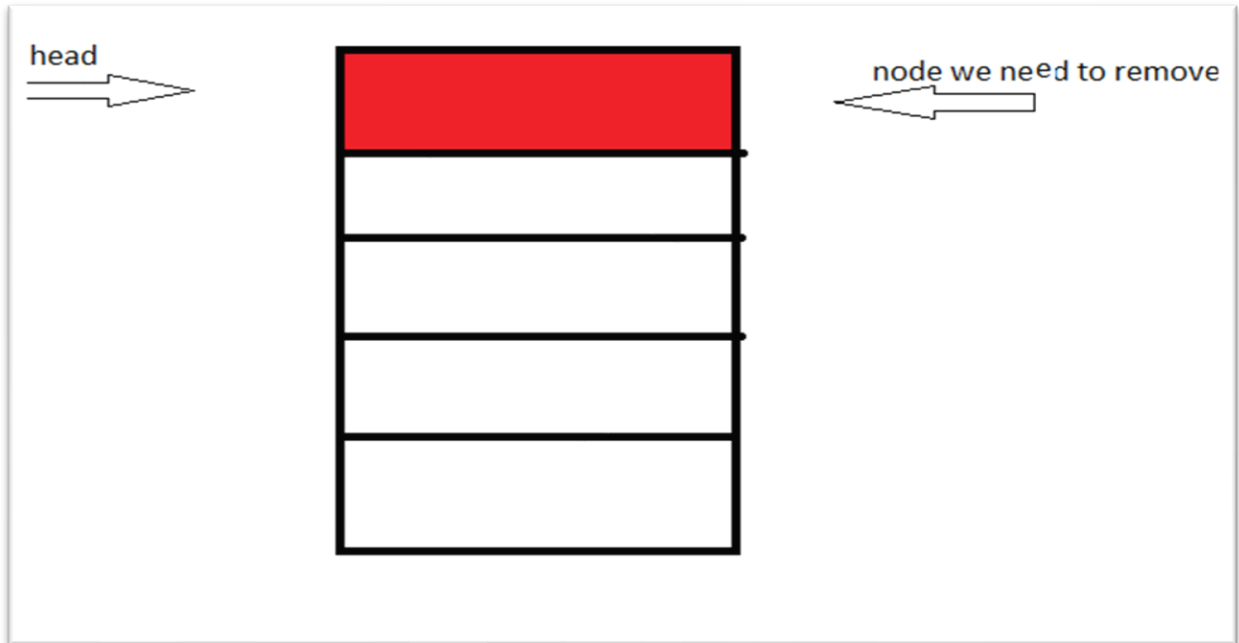
[ERROR] Adding students failed

Above also check before store if ID is taken or not.

3. Delete student

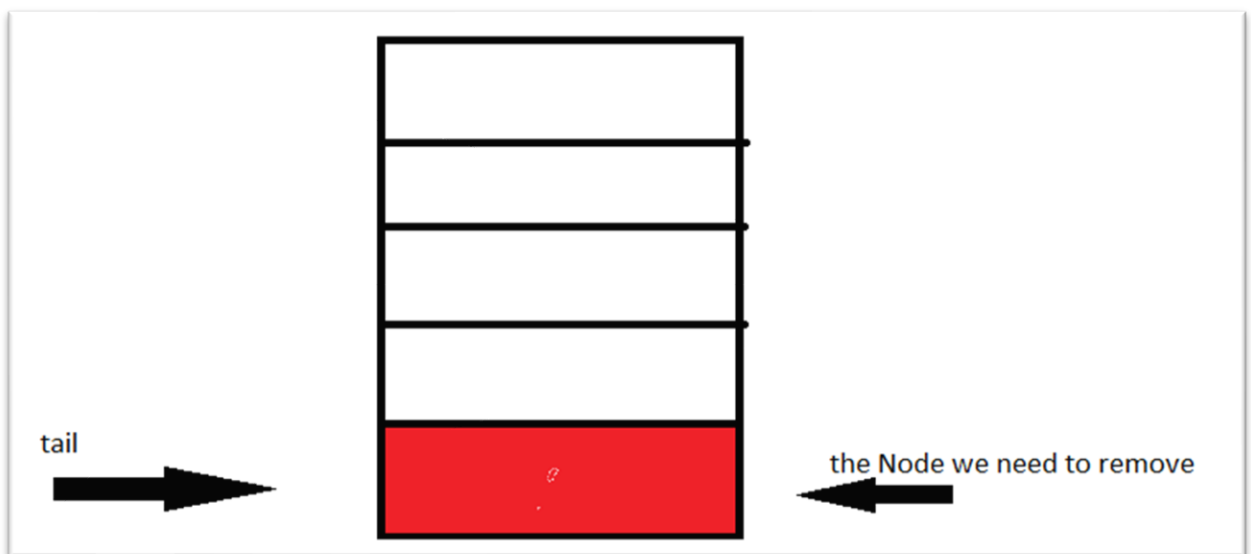
The problem is to find student by ID and modify the queue since we use static circular queue, so we need to decrement the size and update proper location for each pointer (tail and head) there are 3 cases.

a-



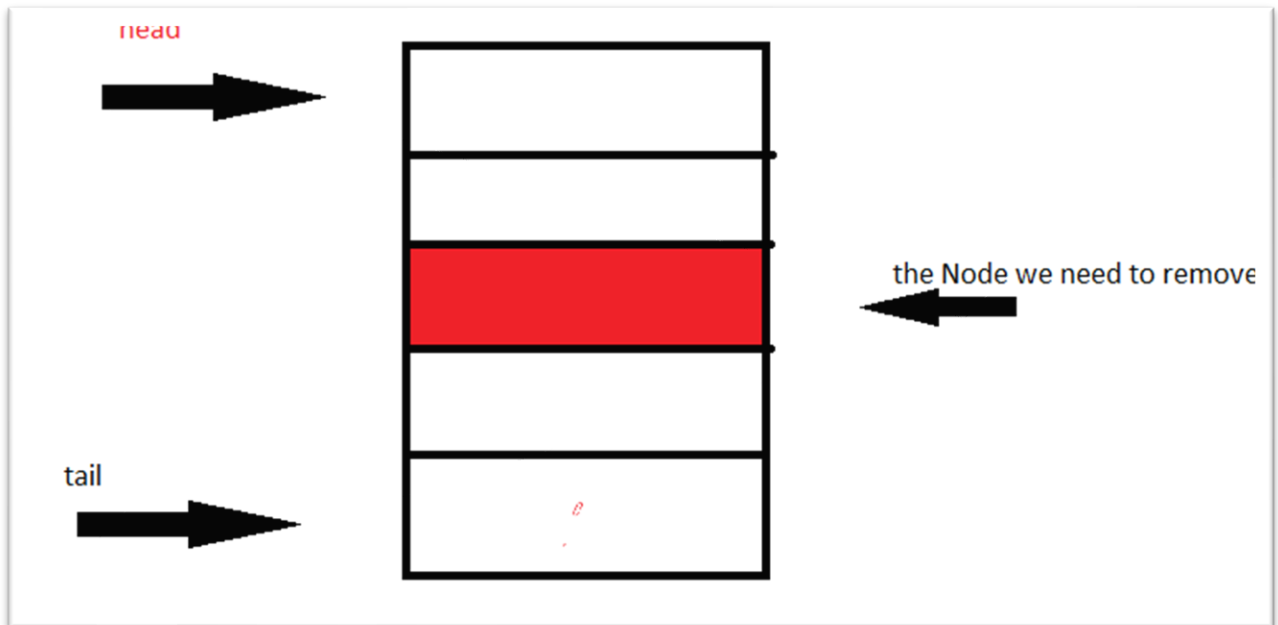
At this situation we need only to decrease head pointer by 1

b-



At this situation we need only to increase tail pointer by 1

C-



At this situation we need sweep the node by the below node then decrement tail by on

C code for this problem

```

if(student == students_queue->head){
    students_queue->head--;
}
else if(student == students_queue->tail){
    students_queue->tail++;
}
else{
    while( student != (students_queue->tail) ){
        *student = *(student-1);
        student--;
    }
    students_queue->tail++;
}

```

Enter the role number witch you want to delete

2 

[INFO] The roll number is removed successfully

Choose the task that you want to perform


- 1- Add the student details manually
- 2- Add the student details from text file
- 3- Find the student details by roll number
- 4- Find the student details by first name
- 5- Find the student details by course id
- 6- Find the total number of students
- 7- Delete the student details by roll number
- 8- Update the student details by roll number
- 9- Show all information
- 10- Exit

Enter option number: 9

the first name is:bassam

the last name is:khamis

the last name is:3.000000

the Roll number is:1 

the course ID is:1

the course ID is:2

the course ID is:3


the course ID is:4

the course ID is:5

the first name is:bassam

the last name is:ahmed

the last name is:4.000000

the Roll number is:3 

the course ID is:1

the course ID is:22

the course ID is:33

the course ID is:44

the course ID is:55

4. Find student by the name

```
Enter option number: 4
-----
Enter the first name of student:mohamed
The student details are:
the first name is:mohamed
the last name is:sami
the last name is:4.000000
the course ID is:1
the course ID is:2
the course ID is:3
the course ID is:4
the course ID is:5
-----
```

5. Find student by the roll

```
Enter option number: 3
-----
Enter the roll number of the student:
1
The student details are:
the first name is:bassam
the last name is:khamis
the last name is:3.000000
the course ID is:1
the course ID is:2
the course ID is:3
the course ID is:4
the course ID is:5
-----
```


6. Find student by course

```
Enter option number: 5
-----
Enter the course ID: 1
The student details are:
the first name is:bassam
the last name is:khamis
the role number is:1
the GPA is:3.000000
The student details are:
the first name is:mohamed
the last name is:sami
the role number is:2
the GPA is:4.000000
The student details are:
the first name is:bassam
the last name is:ahmed
the role number is:3
the GPA is:4.000000
-----
```

7. Find total number of students

```
-----
Choose the task that you want to perform
1- Add the student details manually
2- Add the student details from text file
3- Find the student details by roll number
4- Find the student details by first name
5- Find the student details by course id
6- Find the total number of students
7- Delete the student details by roll number
8- Update the student details by roll number
9- Show all information
10- Exit

Enter option number: 6
-----
[INFO] the total number of student is:3
[INFO] you can add up to:50
[INFO] you can add 47 more students:
-----
```

8. Update student

```
Choose the task that you want to perform
1- Add the student details manually
2- Add the student details from text file
3- Find the student details by roll number
4- Find the student details by first name
5- Find the student details by course id
6- Find the total number of students
7- Delete the student details by roll number
8- Update the student details by roll number
9- Show all information
10- Exit
```

```
Enter option number: 8
```

```
-----
Enter the role number to update the entry
```

```
3
```

```
1. First name
2. Last name
3. GPA
4. Roll number
5. courses
```

```
2
```

```
Enter the New last name
```

```
khamis
```

```
INFO! UPDATED successfully
```

C code

```
switch(choose){

case 1: DPRINTF("Enter the new First name\n");
        scanf("%s",student->fname);break;

case 2: DPRINTF("Enter the New last name\n");
        scanf("%s",student->lname); break;

case 3: DPRINTF("Enter the New GPA\n");
        scanf("%f",&student->GPA); break;

case 4: DPRINTF("Enter the New Roll number\n");
        scanf("%d",&student->roll); break;

case 5: for(i=0; i<NUM_COURSES; i++ ){
        DPRINTF("Enter the course %d:\n", i+1);
        scanf("%d",&student->cid[i]);
        } break;
```

