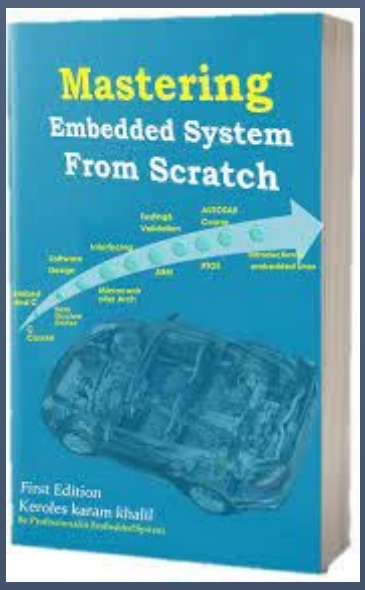

Student Management System

Mastering Embedded System Online Diploma

www.learn-in-depth.com

First Term Project (Final Project 2)

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Contents

1. case study

• Requirements

The client request is to implement a student management system through which students data could be stored and program user could have control over these data & some features like :-

1. students information could be added manually or from a text file.
2. student's information could be displayed by roll number or by first name .
3. Displaying number of students applied for a certain course.
4. Displaying total number of students and all students information.
5. delete or update student by roll number.

- Assumptions

1. Data will be erased when the program terminates.
2. maximum number of students could be added is 50.
3. Data validity is user's responsibility.
4. Data values that will be Entered have a logic limit.

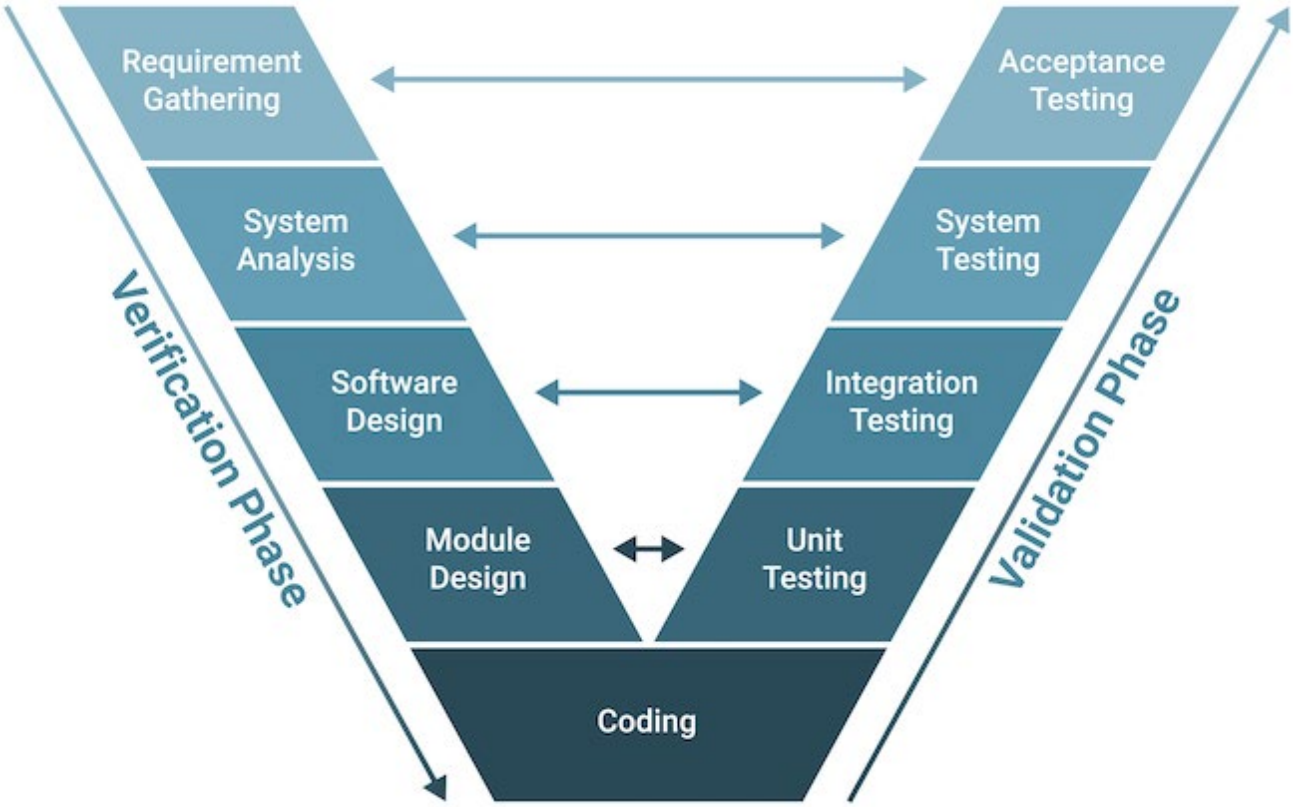
- Versioning

The probability of adding a feature to store students data in rom memory in the next version.

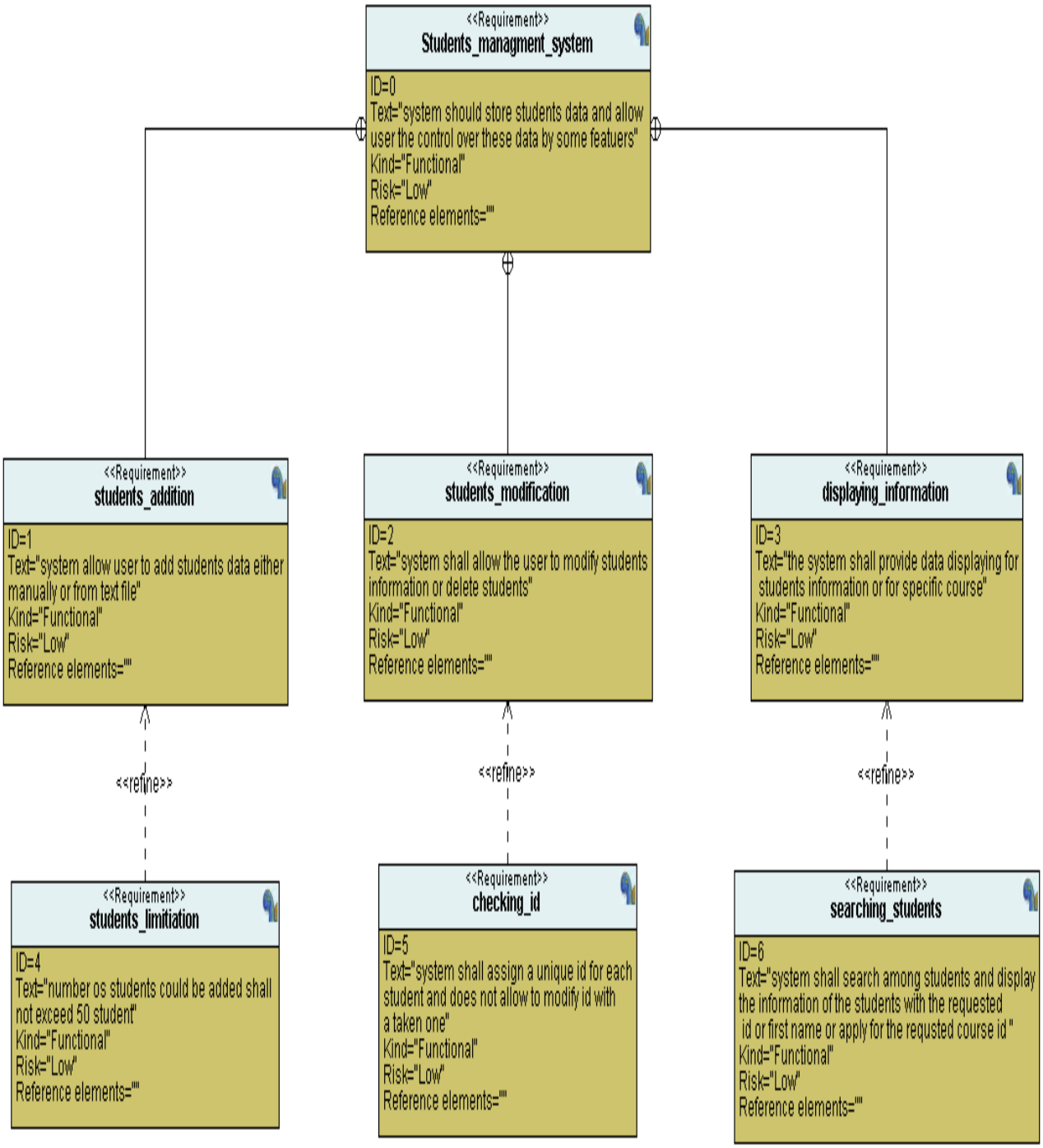
2. Method

- Software developing life cycle & software testing life cycle

The (SDLC) & (STLC) will be approached according to the V-Model.


Requirement Gathering
System Analysis
Software Design
Module Design
Coding
Unit Testing
Integration Testing
System Testing
Acceptance Testing
Verification Phase
Validation Phase

3. Requirement Diagram



4. Space Exploration

The system will be run on either pc or laptop with these minimum standards :-

- Standards

CPU : core i3 7th generation.

RAM : 4GB.

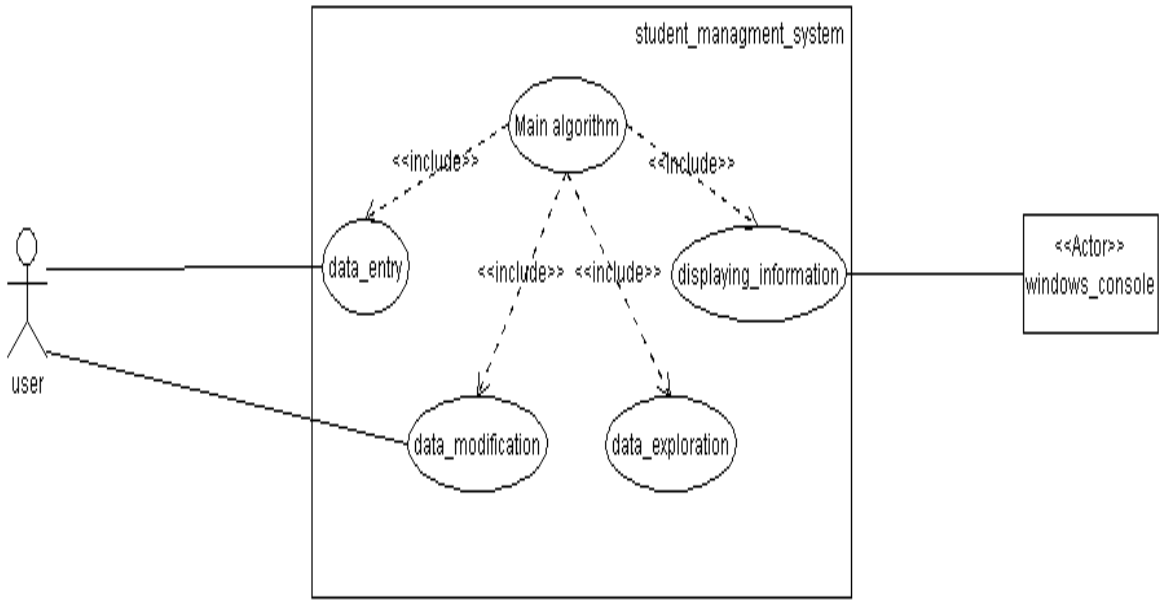
Compiler : gcc

OS : windows 10

5. System Analysis

- Use Case Diagram

pr



6. C codes

- Students.h

```c
/*
 * students.h
 *
 *  Created on: 23/10/2023
 *      Author: ahmed nabil
 */

#ifndef STUDENTS_H_
#define STUDENTS_H_
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

struct sinfo
{
    unsigned int roll_number;
    char first_name[50];
    char last_name[50];
    float gpa;
    unsigned int cid[5];
    }st[50];

     enum
    {
        fifo_full,
        fifo_empty,
        fifo_not_empty,
        fifo_null
    }fifo_status_t;

 struct Fifo
{
        struct sinfo * base;
        struct sinfo * head;
        unsigned char count;
        unsigned char length;
        }student_queue;


FILE *fpointer;

// function to initialize Fifo and assign it array of students struct
void queue_init();

// function to add students details from text file
void add_student_file();

// function to add students details manually by the user
void add_student_manually();

// function to find students details by student's roll number
void find_rl();

// function to find students details by student's first name
void find_fn();

// function to find students details by course id they are applied in
void find_c();

// function to find total number of students and number of students can be added to the list
void tot_s();

// function to delete student details by student's roll number
void del_s();

// function to update students details by student's roll number
void up_s();

// function to display all students informations in the list
void show_s();

#endif /* STUDENTS_H_ */
```

- Add student from file

```c
void add_student_file()
{
    //check if queue is full or not
    if(student_queue.length == student_queue.count)
    {
        printf("[Error] : list is full\n");
        return;
    }

    //open file
    fpointer = fopen("students.txt","r");

    // Check if the file exist ]
    if(fpointer == NULL)
    {
        printf("\n [ERROR] student.txt file not found. \n");
        fifo_status_t = fifo_null;
        return;
    }

    // Reading data until the end of the file
    ll: while(! feof(fpointer) )
    {
        if(fifo_status_t == fifo_empty)                                 //adding 1st element
        {
            fscanf(fpointer,"%d",&student_queue.head->roll_number);
            fscanf(fpointer,"%s",student_queue.head->first_name);
            fscanf(fpointer,"%s",student_queue.head->last_name);
            fscanf(fpointer,"%f",&student_queue.head->gpa);
            for(i=0; i<5; i++)
            {
                fscanf(fpointer,"%d",&student_queue.head->cid[i]);

            }
            printf("[INFO] roll number %d is added successfully\n",student_queue.head->roll_number);
            fifo_status_t = fifo_not_empty;
            student_queue.count ++;
            student_queue.head ++;
        }
        fscanf(fpointer,"%d",&student_queue.head->roll_number);
        for(i=0; i<student_queue.count; i++)
        {
            //checking if roll number is taken before
            if(student_queue.head->roll_number == (student_queue.base + i)->roll_number)
            {
                printf("[Error] roll number %d is already taken\n",student_queue.head->roll_number);
                fscanf(fpointer, "%*[^\n]");                    //ignore the rest of line
                goto ll;
            }
            fscanf(fpointer,"%s",student_queue.head->first_name);
            fscanf(fpointer,"%s",student_queue.head->last_name);
            fscanf(fpointer,"%f",&student_queue.head->gpa);
            fscanf(fpointer,"%f",&student_queue.head->gpa);
            for(i=0; i<5; i++)
            {
                fscanf(fpointer,"%d",&student_queue.head->cid[i]);

            }
            printf("[INFO] roll number %d is added successfully\n",student_queue.head->roll_number);
            fifo_status_t = fifo_not_empty;
            student_queue.count ++;
            student_queue.head ++;
            if(student_queue.count == student_queue.length)
            {
                fifo_status_t = fifo_full;
                student_queue.head --;


            }
        }

    }
    //close the file
    fclose(fpointer);
    printf("[INFO] total number of students : %d\n",student_queue.count);
    printf("[INFO] you can add up to %d students\n",50);
    printf("[INFO] you can add more %d students\n",50-student_queue.count);
    printf("-----------------------------------------\n");

}
```

- Add student from manually

```c

void add_student_manually()
{
    //check if queue is full or not
    if(student_queue.length == student_queue.count)
    {
        printf("[Error] : list is full\n");
        return;
    }
    if(fifo_status_t == fifo_empty)                                 //adding 1st element
    {
        printf("Enter student roll number : ");
        fflush(stdin); fflush(stdout);
        scanf("%d",&student_queue.head->roll_number);
        printf("Enter student first name : ");
        fflush(stdin); fflush(stdout);
        scanf("%s",student_queue.head->first_name);
        printf("Enter student last name : ");
        fflush(stdin); fflush(stdout);
        scanf("%s",student_queue.head->last_name);
        printf("Enter student GPA : ");
        fflush(stdin); fflush(stdout);
        scanf("%f",&student_queue.head->gpa);
        printf("Enter students courses id : ");
        fflush(stdin); fflush(stdout);
        for(i=0; i<5; i++)
        {
            scanf("%d",&student_queue.head->cid[i]);

        }
        printf("[INFO] student of roll number : %d is added successfully\n",student_queue.head->roll_number);
        printf("----------------------------------------\n");
        fifo_status_t = fifo_not_empty;
        student_queue.count ++;
        student_queue.head ++;
    }
    printf("Enter student roll number : ");
    fflush(stdin); fflush(stdout);
    scanf("%d",&student_queue.head->roll_number);
    //checking if roll number is taken before
    for(i=0; i<student_queue.count; i++)
    {
        if(student_queue.head->roll_number == (student_queue.base + i)->roll_number)
        {
            printf("[Error] roll number %d is already taken\n",student_queue.head->roll_number);
            printf("----------------------------------------\n");
            return;
        }
    }
    printf("Enter student first name : ");
    fflush(stdin); fflush(stdout);
    scanf("%s",student_queue.head->first_name);
    printf("Enter student last name : ");
    fflush(stdin); fflush(stdout);
     scanf("%s",student_queue.head->last_name);
     printf("Enter student GPA : ");
     fflush(stdin); fflush(stdout);
     scanf("%f",&student_queue.head->gpa);
     printf("Enter the course id for each course :- \n");
     for(i=0; i<5; i++)
     {
         printf("for course %d id : ",i+1);
         fflush(stdin); fflush(stdout);
         scanf("%d",&student_queue.head->cid[i]);

     }
     printf("[INFO] student of roll number : %d is added successfully\n",student_queue.head->roll_number);
     printf("----------------------------------------\n");
     fifo_status_t = fifo_not_empty;
     student_queue.count ++;
     student_queue.head ++;
     printf("[INFO] total number of students : %d\n",student_queue.count);
     printf("[INFO] you can add up to %d students\n",50);
     printf("[INFO] you can add more %d students\n",50-student_queue.count);
     printf("----------------------------------------\n");

     if(student_queue.count == student_queue.length)
     {
         fifo_status_t = fifo_full;
         student_queue.head --;
     }


}
```

- Find student by roll number

```c
void find_rl()
{
    if(fifo_status_t == fifo_empty)         // check if list is empty
    {
        printf("the list is empty there is no informations to show.\n");
        printf("---------------------------------------\n");
        return;
    }
    int roll,j;
    char flag =0;
    printf("Enter the roll number of student u want to view : ");
    fflush(stdin); fflush(stdout);
    scanf("%d",&roll);
    for(i=0; i<student_queue.count; i++)
    {
        if( (student_queue.base + i)->roll_number == roll)
        {
            printf("for student of roll number : %d\n",(student_queue.base + i)->roll_number);
            printf("student first name : %s\n",(student_queue.base + i)->first_name);
            printf("student last name : %s\n",(student_queue.base + i)->last_name);
            printf("student GPA : %.2f\n",(student_queue.base + i)->gpa);
            printf("students courses id : ");
            for(j=0; j<5; j++)
            {
                printf("%d ",(student_queue.base + i)->cid[j]);
            }
            flag =1;
            printf("\n");
            break;
        }
    }
    if(flag ==0 )
        printf("[Error] the roll number u Entered does not exist.\n");
    printf("---------------------------------------\n");

}
```

- Find student by First name

```c
void find_fn()
{
    if(fifo_status_t == fifo_empty)         // check if list is empty
    {
        printf("the list is empty there is no informations to show.\n");
        return;
    }
    int j;
    char flag =0;
    char name[50];
    printf("Enter the first name of student u want to view : ");
    fflush(stdin); fflush(stdout);
    scanf("%s",name);
    for(i=0; i<student_queue.count; i++)
    {
        if( ! stricmp( (student_queue.base + i)->first_name , name) )
        {
            printf("for student of first name : %s\n",(student_queue.base + i)->first_name);
            printf("student roll number : %d\n",(student_queue.base + i)->roll_number);
            printf("student first name : %s\n",(student_queue.base + i)->first_name);
            printf("student last name : %s\n",(student_queue.base + i)->last_name);
            printf("student GPA : %.2f\n",(student_queue.base + i)->gpa);
            printf("students courses id : ");
            for(j=0; j<5; j++)
            {
                printf("%d ",(student_queue.base + i)->cid[j]);
            }
            printf("\n");
            flag =1;
        }
    }
    if(flag ==0 )
        printf("[Error] the first name u Entered does not exist.\n");
    printf("-------------------------------------\n");
}
```

- Find student by Course id

```
259  void find_c()
260  {
261      if(fifo_status_t == fifo_empty)         // check if list is empty
262      {
263          printf("the list is empty there is no informations to show.\n");
264          return;
265      }
266      int course_id,j;
267      char counter =0;
268      char flag =0;
269
270      printf("Enter the course id  : ");
271      fflush(stdin); fflush(stdout);
272      scanf("%d",&course_id);
273      for(i=0; i<student_queue.count; i++)
274      {
275          for(j=0; j<5; j++)
276          {
277              if( (student_queue.base+i)->cid[j] == course_id )
278              {
279                  counter++;
280                  flag = 1;
281                  printf("the student details are :-\n");
282                  printf("student roll number : %d\n",(student_queue.base + i)->roll_number);
283                  printf("student first name : %s\n",(student_queue.base + i)->first_name);
284                  printf("student last name : %s\n",(student_queue.base + i)->last_name);
285                  printf("student GPA : %.2f\n",(student_queue.base + i)->gpa);
286                  printf("---------------------------------------\n");
287              }
288          }
289      }
290      if(flag ==0 )
291          printf("[Error] the course id you Entered does not exist.\n");
292      else
293          printf("[INFO] total number of students in this course = %d\n",counter);
294      printf("---------------------------------------\n");
295
296  }
```

- Find total number of students

```
297
298  void tot_s()
299
300  {
301      if(fifo_status_t == fifo_empty)        // check if list is empty
302      {
303          printf("the list is empty there is no informations to show.\n");
304          return;
305      }
306      printf("[INFO] total number of students : %d\n",student_queue.count);
307      printf("[INFO] you can add up to %d students\n",50);
308      printf("[INFO] you can add more %d students\n",50-student_queue.count);
309      printf("-----------------------------------\n");
310
311
312  }
```

- Delete student

```
314  void del_s()
315  {
316      if(fifo_status_t == fifo_empty)         // check if list is empty
317      {
318          printf("the list is empty there is no informations to show.\n");
319          return;
320      }
321      int roll,j;
322      char flag=0;
323      printf("Enter the roll number of student you want to delete : ");
324      fflush(stdin); fflush(stdout);
325      scanf("%d",&roll);
326      for(i=0; i<student_queue.count; i++)
327      {
328          if (  (student_queue.base + i)->roll_number == roll )
329          {
330              for(j=i; j<=(student_queue.count-i); j++)
331              {
332
333                  if(j == student_queue.length-1)
334                  {
335                      student_queue.base[j].roll_number = 0;
336                      break;
337                  }
338                  student_queue.base[j] = student_queue.base[j+1];
339
340              }
341              student_queue.count--;
342              flag =1;
343          }
344      }
345      if(!flag)
346          printf("[Error] the roll number you Entered does not Exist\n");
347      else
348      {
349          printf("the student of roll number %d is deleted successfully\n",roll);
350          printf("[INFO] total number of students : %d\n",student_queue.count);
351          printf("[INFO] you can add up to %d students\n",50);
352          printf("[INFO] you can add more %d students\n",50-student_queue.count);
353      }
354      printf("---------------------------------------\n");
355
356  }
```

- Update student

```
358     void up_s()
359     {
360         if(fifo_status_t == fifo_empty)          // check if list is empty
361         {
362             printf("the list is empty there is no informations to show.\n");
363             printf("-----------------------------------------\n");
364             return;
365         }
366         int roll,options,j,new_roll,z;
367         char flag=0;
368         printf("Enter the roll number to update the Entry : ");
369         fflush(stdin); fflush(stdout);
370         scanf("%d",&roll);
371         for(i=0; i<student_queue.count; i++)
372         {
373             if ( (student_queue.base + i)->roll_number == roll )
374             {
375                 flag =1;
376                 printf("1. First name : \n");
377                 printf("2. last name : \n");
378                 printf("3. roll number : \n");
379                 printf("4. GPA : \n");
380                 printf("5. courses : \n");
381                 ll: printf("Enter your choice : ");
382                 fflush(stdin); fflush(stdout);
383                 scanf("%d",&options);
384                 switch(options)
385                 {
386                 case 1 :
387                     printf("new first name : ");
388                     fflush(stdin); fflush(stdout);
389                     scanf("%s", (student_queue.base+i)->first_name);
390                     break;
391                 case 2 :
392                     printf("new first name : ");
393                     fflush(stdin); fflush(stdout);
394                     scanf("%s", (student_queue.base+i)->last_name);
395                     break;
396                 case 3 :
397                     printf("Enter new roll number : ");
398                     aa: fflush(stdin); fflush(stdout);
399                     scanf("%d", &new_roll);
400                     for(z=0; z<student_queue.count; z++)
401                     {
402                         if ( (student_queue.base+z)->roll_number == new_roll )
403                         {
404                             printf("[Error] this roll number is already taken\n");
405                             printf("please Enter a valid roll number : ");
406                             goto aa;
407                         }
409                     }
410                     (student_queue.base+i)->roll_number =  new_roll;
411                     break;
412                 case 4 :
413                     printf("new GPA : ");
414                     fflush(stdin); fflush(stdout);
415                     scanf("%f", & ((student_queue.base+i)->gpa));
416                     break;
417                 case 5 :
418                     for(j=0; j<5; j++)
419                     {
420                         printf("for course %d id : ",j+1);
421                         fflush(stdin); fflush(stdout);
422                         scanf("%d",&student_queue.head->cid[j]);
423                     }
424                     break;
425                 default :
426                     printf("[Error] : Enter correct number : ");
427                     goto ll;
428                     break;
429                 }
430             }
431
432         }
433         if(flag)
434             printf("[INFO] updated successfully\n");
435         else
436             printf("[ERROR] the roll number u Entered does not exist\n");
437         printf("-----------------------------------------\n");
438     }
439
```

- Show all information

```
440  void show_s()
441  {
442      if(fifo_status_t == fifo_empty)         // check if list is empty
443      {
444          printf("the list is empty there is no informations to show.\n");
445          return;
446      }
447      int j;
448      printf("---------------------------------------\n");
449
450      for(i=0; i<student_queue.count; i++)
451      {
452          printf("student roll number : %d\n",(student_queue.base + i)->roll_number);
453          printf("student first name : %s\n",(student_queue.base + i)->first_name);
454          printf("student last name : %s\n",(student_queue.base + i)->last_name);
455          printf("student GPA : %.2f\n",(student_queue.base + i)->gpa);
456          printf("student courses id : ");
457          for(j=0; j<5; j++)
458          {
459              printf("%d ",(student_queue.base+i)->cid[j]);
460          }
461          printf("\n---------------------------------------\n");
462      }
463      printf("[INFO] total number of students : %d\n",student_queue.count);
464      printf("[INFO] you can add up to %d students\n",50);
465      printf("[INFO] you can add more %d students\n",50-student_queue.count);
466      printf("---------------------------------------\n");
467
468  }
469
```