

First Term (Final Project 1)
Student Management System

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▪ Case Study:

Student Data Management is required for showing the list of all students, editing in their information, showing who are enrolled in some courses and deleting required students from the list.

```
FIFO.h  FIFO.c  students.txt  main.c x
11 int main()
12 {
13     int temp=0;
14     FIFO_Buffer_t FIFO_Buf;
15     FIFO_init(&FIFO_Buf, buffer, 50);
16
17     DPRINTF("Hello! \nWelcome to our 'Student Management System'");
18
19     while(1)
20     {
21         DPRINTF("\n--0. Exit");
22         DPRINTF("\n--1. Add a student");
23         DPRINTF("\n--2. Print Students' List");
24         DPRINTF("\n--3. Enter ID to search for");
25         DPRINTF("\n--4. Enter Student's First name to search for");
26         DPRINTF("\n--5. Enter Course ID to search students enrolled in it");
27         DPRINTF("\n--6. Print Total Number of students in the List");
28         DPRINTF("\n--7. Delete a student from the list");
29         DPRINTF("\n--8. Update a student in the list");
30         DPRINTF("\n--9. ADD Students from an external File");
31         DPRINTF("\n-----");
32         DPRINTF("\nEnter a number from the list:");
33
34         scanf("%d",&temp);
35         switch(temp)
36         {
37             case 0: printf("GOODBYE"); return 0; break;
```

■ Implementation:

Let's start implementing our code by initiallizing our FIFO(Queue). Then, implementing first required function to add students manually.

```
FIFO.h  FIFO.c  students.txt  main.c
67
68 FIFO_status add_Students(FIFO_Buffer_t* FIFO_Buf)
69 {
70     int temp =0,i;
71
72     //Checking if all pointers exist or not
73     if (! FIFO_Buf->base || ! FIFO_Buf->head || ! FIFO_Buf->tail)
74         return FIFO_NULL;
75
76     DPRINTF("Enter Student's ID number: ");
77     scanf("%d",&temp);
78
79     if(check_unique(FIFO_Buf,temp))
80     {
81         DPRINTF("\nID is already exist. please, Enter unique ID");
82         return FIFO_NULL;
83     }
84     FIFO_Buf->head->ID =temp;
85
86     DPRINTF("Enter Student's First Name: ");
87     gets(FIFO_Buf->head->firstName);
88     DPRINTF("Enter Student's Last Name: ");
89     gets(FIFO_Buf->head->lastName);
90     DPRINTF("Enter Student's GPA: ");
91     scanf("%f",&FIFO_Buf->head->gpa);
92
93     for(i=0;i<3;i++)
94     {
95         DPRINTF("Enter Student's %d Course: ",i+1);
96         scanf("%d",&FIFO_Buf->head->courseNum[i]);
97     }
98
99     //Checking Circular Queue
100    if(FIFO_Buf->head==(FIFO_Buf->base+(FIFO_Buf->length * sizeof(Sstudent))))
101        FIFO_Buf->head=FIFO_Buf->base;
102    else
103        FIFO_Buf->head++;
104    FIFO_Buf->count++;
105    DPRINTF("Added Successfully ");
106
107    return FIFO_noError;
108 }
```

```
Problems Tasks Console Properties
Mang System.exe [C/C++ Application] C:\Users\Ahmed Ali\workspace\KS.Cprog\Mang System\Debug\Mang System.exe (12/27/23, 4:34 PM)
Hello!
Welcome to our 'Student Management System'
--0. Exit
--1. Add a student
--2. Print Students' List
--3. Enter ID to search for
--4. Enter Student's First name to search for
--5. Enter Course ID to search students enrolled in it
--6. Print Total Number of students in the List
--7. Delete a student from the list
--8. Update a student in the list
--9. ADD Students from an external File
-----
Enter a number from the list:1
Enter Student's ID number: 01
Enter Student's First Name: eslam
Enter Student's Last Name: aly
Enter Student's GPA: 2.06
Enter Student's 1 Course: 36
Enter Student's 2 Course: 37
Enter Student's 3 Course: 38
Added Successfully
--0. Exit
--1. Add a student
--2. Print Students' List
--3. Enter ID to search for
```

Then, implementing a Function that print the data stored in the system.

```
FIFO.h FIFO.c students.txt main.c
41 void FIFO_print(FIFO_Buffer_t* FIFO_Buf)
42 {
43     Sstudent* ptr_temp = FIFO_Buf->base;
44     int i,j;
45     if (FIFO_Buf->count == 0)
46     {
47         printf("FIFO is empty");
48     }
49
50     DPRINTF("\n-----QUEUE PRINT-----\n");
51     for(i=0;i<FIFO_Buf->count;i++)
52     {
53         DPRINTF("\n-----\n");
54         DPRINTF("\n-----Info Student's ID:%d -----",ptr_temp->ID);
55         DPRINTF("\nStudent's First Name:%s",ptr_temp->firstName);
56         DPRINTF("\nStudent's Last Name:%s",ptr_temp->lastName);
57         DPRINTF("\nStudent's GPA:%.2f",ptr_temp->gpa);
58
59         for(j=0;j<3;j++)
60         {
61             DPRINTF("\nCourse Num:%d -->%d ",j+1,ptr_temp->courseNum[j]);
62         }
63         ptr_temp++;
64     }
65     printf("\n-----ENDED-----\n");
66 }
67
```

```
Problems Tasks Console Properties
Mang System.exe [C/C++ Application] C:\Users\Ahmed Ali\workspace\KS.Cprog\Mang System\Debug\Mang System.exe (12/27/23, 4:34 PM)

Enter a number from the list:2

-----QUEUE PRINT-----

-----Info Student's ID:1 -----
Student's First Name:eslam
Student's Last Name:aly
Student's GPA:2.06
Course Num:1 -->36
Course Num:2 -->37
Course Num:3 -->38
-----

-----Info Student's ID:2 -----
Student's First Name:mahmoud
Student's Last Name:hassan
Student's GPA:3.06
Course Num:1 -->25
Course Num:2 -->15
Course Num:3 -->39
-----ENDED-----

--0. Exit
1. Add a student
```

Then, implementing a function to find required student's ID in the list

```
FIFO.h FIFO.c students.txt main.c
123 }
124
125 FIFO_status find_ID(FIFO_Buffer_t* FIFO_Buf)
126 {
127     Sstudent* ptr_temp = FIFO_Buf->base;
128     int temp=0,i,j,flag=0;
129
130     if (! FIFO_Buf->base || ! FIFO_Buf->head || ! FIFO_Buf->tail)
131         return FIFO_NULL;
132
133     DPRINTF("-----");
134     DPRINTF("\nEnter Required ID: ");
135     scanf("%d",&temp);
136
137     for(i=0;i<FIFO_Buf->count;i++)
138     {
139         if(temp == ptr_temp->ID)
140         {
141             //FIFO_print(ptr_temp);
142             DPRINTF("\n-----Info Student's ID:%d -----",ptr_temp->ID);
143             DPRINTF("\nStudent's First Name:%s",ptr_temp->firstName);
144             DPRINTF("\nStudent's Last Name:%s",ptr_temp->lastName);
145             DPRINTF("\nStudent's GPA:%.2f",ptr_temp->gpa);
146
147             for(j=0;j<3;j++)
148             {
149                 DPRINTF("\nCourse Num:%d -->%d ",j+1,ptr_temp->courseNum[j]);
150             }
151             ptr_temp++;
152             flag=1;
153
154         }
155     }
156     if(flag)
157         return FIFO_noError;
158     else
159         DPRINTF("Name '%s' is not exist",temp);
160     return FIFO_NULL;
161 }
```



```
Problems Tasks Console Properties
Mang System.exe [C/C++ Application] C:\Users\Ahmed Ali\workspace\KS.Cprog\Mang System\Debug\Mang System.exe (12/27/23, 4:34 PM)

--9. ADD Students from an external File
-----
Enter a number from the list:3
-----
Enter Required ID: 01
[
-----Info Student's ID:1 -----
Student's First Name:eslam
Student's Last Name:aly
Student's GPA:2.06
Course Num:1 -->36
Course Num:2 -->37
Course Num:3 -->38
--0. Exit
--1. Add a student
--2. Print Students' List
--3. Enter ID to search for
```

Then, implementing a function to get required student from the list by his first name.

```
163 FIFO_status find_firstName(FIFO_Buffer_t* FIFO_Buf)
164 {
165
166     Sstudent* ptr_temp = FIFO_Buf->base;
167     int i,j,flag=0;
168     char temp[50];
169
170     if (! FIFO_Buf->base || ! FIFO_Buf->head || ! FIFO_Buf->tail)
171         return FIFO_NULL;
172
173     DPRINTF("-----");
174     DPRINTF("\nEnter Required Name: ");
175     gets(temp);
176
177     for(i=0;i<FIFO_Buf->count;i++)
178     {
179         if(strcmp(temp,ptr_temp->firstName) == 0) //comparing strings using strcmp function
180         {
181             DPRINTF("\n-----Info Student's First Name:%s -----",ptr_temp->firstName);
182             DPRINTF("\nStudent's ID:%d",ptr_temp->ID);
183             DPRINTF("\nStudent's Last Name:%s",ptr_temp->lastName);
184             DPRINTF("\nStudent's GPA:%.2f",ptr_temp->gpa);
185
186             for(j=0;j<3;j++)
187             {
188                 DPRINTF("\nCourse Num:%d -->%d ",j+1,ptr_temp->courseNum[j]);
189             }
190             ptr_temp++;
191             flag = 1;
192         }
193     }
194     if(flag)
195         return FIFO_noError;
196     else
197         DPRINTF("Name '%s' is not exist",temp);
198     return FIFO_NULL;
199 }
```

--9. ADD Students from an external File

Enter a number from the list:4

Enter Required Name: eslam

[
-----Info Student's First Name:eslam -----

Student's ID:1

Student's Last Name:aly

Student's GPA:2.06

Course Num:1 -->36

Course Num:2 -->37

Course Num:3 -->38

--0. Exit

--1. Add a student

--2. Print Students' List

--3. Enter ID to search for

--4. Enter Student's First name to search for

--5. Enter Course ID to search students enrolled in it

--6. Print Total Number of students in the List

Then, implementing a function to count the numbers of all students in the list

```
235 FIFO_status countStudents(FIFO_Buffer_t* FIFO_Buf)
236 {
237     if (! FIFO_Buf->base || ! FIFO_Buf->head || ! FIFO_Buf->tail)
238         return FIFO_NULL;
239     if(FIFO_Buf->count == 0)
240         return FIFO_empty;
241
242     DPRINTF("Total Numbers of students in the list=%d",FIFO_Buf->count);
243     return FIFO_noError;
244 }
245
```

--0. Exit

--1. Add a student

--2. Print Students' List

--3. Enter ID to search for

--4. Enter Student's First name to search for

--5. Enter Course ID to search students enrolled in it

--6. Print Total Number of students in the List

--7. Delete a student from the list

--8. Update a student in the list

--9. ADD Students from an external File

Enter a number from the list:6

[Total Numbers of students in the list=2

--0. Exit

And there is a function to read data information of students from an external file.

Note: if there's an info of student without a unique ID number, it will be ignored.

```
FIFO.h  FIFO.c  students.txt  main.c
321 FIFO_status add_Students_file(FIFO_Buffer_t* FIFO_Buf)
322 {
323     int temp=0;
324     FILE* ptr_file = fopen("students.txt","r");           //Calling from "stdio.h"
325     if(ptr_file == NULL)
326     {
327         printf("File not Found");
328         return FIFO_NULL;
329     }
330
331     //while(fscanf(ptr_file,"%d %s %s %f %d %d %d",&FIFO_Buf->head->ID,FIFO_Buf->head->firstName,FIFO_Buf->head->lastName,&FIFO_Bu
332     while (fscanf(ptr_file,"%d %s %s %f %d %d %d",&FIFO_Buf->head->ID,FIFO_Buf->head->firstName,FIFO_Buf->head->lastName,&FIFO_Bu
333     {
334         if(check_unique(FIFO_Buf,FIFO_Buf->head->ID))
335         {
336             DPRINTF("\nThere is an ID is already exist. please, make sure that all IDs are unique\n");
337             continue;
338         }
339         if(FIFO_Buf->tail == (FIFO_Buf->base + (FIFO_Buf->length * sizeof(Sstudent))))
340             FIFO_Buf->head = FIFO_Buf->base;
341         else
342             FIFO_Buf->head++;
343         FIFO_Buf->count++;
344     }
345     fclose(ptr_file);
346     DPRINTF("ADDED SUCCESSFULLY");
347     return FIFO_noError;
```


Mang System.exe [C/C++ Application] C:\Users\Ahmed Ali\workspace\KS.Cprog\Mang System\I

```
--2. Print Students' List
--3. Enter ID to search for
--4. Enter Student's First name to search for
--5. Enter Course ID to search students enrolled in it
--6. Print Total Number of students in the List
--7. Delete a student from the list
--8. Update a student in the list
--9. ADD Students from an external File
```

Enter a number from the list:9

There is an ID is already exist. please, make sure that all IDs are un:
ADDED SUCCESSFULLY

```
--0. Exit
--1. Add a student
--2. Print Students' List
--3. Enter ID to search for
--4. Enter Student's First name to search for
--5. Enter Course ID to search students enrolled in it
--6. Print Total Number of students in the List
--7. Delete a student from the list
--8. Update a student in the list
--9. ADD Students from an external File
```

Enter a number from the list:2

-----QUEUE PRINT-----

-----Info Student's ID:1 -----
Student's First Name:eslam
Student's Last Name:khalil
Student's GPA:2.06
Course Num:1 -->10
Course Num:2 -->20
Course Num:3 -->30

-----Info Student's ID:2 -----
Student's First Name:mahmoud
Student's Last Name:essam
Student's GPA:3.18
Course Num:1 -->10
Course Num:2 -->20
Course Num:3 -->40

-----Info Student's ID:4 -----
Student's First Name:ibrahem
Student's Last Name:hamdy
Student's GPA:2.60
Course Num:1 -->20
Course Num:2 -->30
Course Num:3 -->40

-----Info Student's ID:5 -----
Student's First Name:mohammed
Student's Last Name:aly
Student's GPA:2.98
Course Num:1 -->10
Course Num:2 -->40
Course Num:3 -->50

-----ENDED-----