**SSN College of Engineering, Kalavakkam**

**Department of Computer Science and Engineering**

**III Semester - CSE 'A ',’B’ & ‘C’**

**UCS 1312 Data Structures Lab Laboratory**

**Academic Year: 2019-2020 Batch: 2018-2022**

**Exercise 2: Array Implementation of list ADT**

**//prototype.h**

typedef struct

{

int regno,mark[5];

char name[20];

}student;

void insertfront(student \*s,int \*n);

void insertlast(student \*s,int \*n);

void insertmiddle(student \*s,int \*n);

void search(student \*s,int \*n);

void delete(student \*s,int \*n);

void displayall(student \*s,int \*n);

void displaypnrec(student \*s,int \*n);

**//functions.h**

void insertfront(student s[],int \*n)

{

for(int i=\*n;i>0;i--)

{

s[i]=s[i-1];

}

printf("New Student's Record:\n");

printf("Enter the register number:");

scanf("%d",&s[0].regno);

printf("Enter the name of the Student:");

scanf("%s",s[0].name);

for(int j=0;j<5;j++)

{

printf("Enter the %dth mark:",j+1);

scanf("%d",&s[0].mark[j]);

}

\*n+=1;

}

void insertlast(student s[],int \*n)

{

printf("New Student's Record:\n");

printf("Enter the register number:");

scanf("%d",&s[\*n].regno);

printf("Enter the name of the Student:");

scanf("%s",s[\*n].name);

for(int j=0;j<5;j++)

{

printf("Enter the %dth mark:",j+1);

scanf("%d",&s[\*n].mark[j]);

}

\*n+=1;

}

void insertmiddle(student s[],int \*n)

{

int num,count=-1;

printf("Enter the Register Number:");

scanf("%d",&num);

for(int i=0;i<\*n;i++)

{

if(s[i].regno==num)

{

count=i;

break;

}

}

if(count==-1)

{

printf("Given Register Number not found!\n");

return;

}

for(int k=\*n;k>count;k--)

{

s[k]=s[k-1];

}

printf("New Student's Record:\n");

printf("Enter the register number:");

scanf("%d",&s[count+1].regno);

printf("Enter the name of the Student:");

scanf("%s",s[count+1].name);

for(int j=0;j<5;j++)

{

printf("Enter the %dth mark:",j+1);

scanf("%d",&s[count+1].mark[j]);

}

\*n+=1;

}

void search(student s[],int \*n)

{

int pos=-1,i;

char name1[20];

printf("Enter the name of the student:");

scanf("%s",name1);

for(i=0;i<\*n;i++)

{

if(strcmp(s[i].name,name1)==0)

{

pos=i;

}

}

if(pos==-1)

{

printf("Given Name is not found!\n");

return;

}

printf("Record is found in %d th position\n",i);

printf("Register Number : %d\n",s[pos].regno);

printf("Name : %s\n",s[pos].name);

for(int j=0;j<5;j++)

{

printf("Mark %d : %d\n",j+1,s[pos].mark[j]);

}

}

void delete(student s[],int \*n)

{

int tempno,count=-1;

printf("Enter the Register number of the student you want to delete:");

scanf("%d",&tempno);

for(int i=0;i<\*n;i++)

{

if(s[i].regno==tempno)

{

count=i;

break;

}

}

if(count==-1)

{

printf("Given Register Number not found!\n");

return;

}

for(int j=count;j<\*n-1;j++)

{

s[j]=s[j+1];

}

\*n-=1;

}

void displayall(student s[],int \*n)

{

for(int i=0;i<\*n;i++)

{

printf("Record :%d\n",i+1);

printf("Register Number : %d\n",s[i].regno);

printf("Name : %s\n",s[i].name);

for(int j=0;j<5;j++)

{

printf("Mark %d : %d\n",j+1,s[i].mark[j]);

}

}

}

void displaypnrec(student s[],int \*n)

{

int num,count=-1,i;

printf("Enter the Register Number:");

scanf("%d",&num);

for(i=0;i<\*n;i++)

{

if(s[i].regno==num)

{

count=i;

break;

}

}

if(count==-1)

{

printf("Given Register Number not found!\n");

return;

}

if(i==0)

{

printf("Record is found in the 1st position.\nDisplaying 2nd Record...\n");

printf("Register Number : %d\n",s[1].regno);

printf("Name : %s\n",s[1].name);

for(int j=0;j<5;j++)

{

printf("Mark %d : %d\n",j+1,s[1].mark[j]);

}

}

else if(i==\*n-1)

{

printf("Record is found in the last position.\nDisplaying n-1th Record...\n");

printf("Register Number : %d\n",s[\*n-1].regno);

printf("Name : %s\n",s[\*n-1].name);

for(int j=0;j<5;j++)

{

printf("Mark %d : %d\n",j+1,s[\*n-2].mark[j]);

}

}

else

{

printf("Record is found in the %dth position.\n",count+1);

printf("Displaying %dth record...\n",count);

printf("Register Number : %d\n",s[count-1].regno);

printf("Name : %s\n",s[count-1].name);

for(int j=0;j<5;j++)

{

printf("Mark %d : %d\n",j+1,s[count-1].mark[j]);

}

printf("Displaying %dth record...\n",count+2);

printf("Register Number : %d\n",s[count+1].regno);

printf("Name : %s\n",s[count+1].name);

for(int j=0;j<5;j++)

{

printf("Mark %d : %d\n",j+1,s[count+1].mark[j]);

}

}

}

**//assignment2.c**

#include<stdio.h>

#include<string.h>

#include"prototype.h"

#include"functions.h"

int main()

{

student stu[20];

int n=0;

int sel;

printf("Press\n1.Insert Record at front.\n2.Insert a record at the end of the list.\n3.Insert a record after a given Regno in the list.\n4.Search a given record in the list based on Name.\n5.Delete a given student record.\n6.Display all student's record.\n7.Display the previous and next record of a given student.\n8.Exit.\n");

scanf("%d",&sel);

while(sel!=8)

{

switch(sel)

{

case 1:insertfront(stu,&n);break;

case 2:insertlast(stu,&n);break;

case 3:insertmiddle(stu,&n);break;

case 4:search(stu,&n);break;

case 5:delete(stu,&n);break;

case 6:displayall(stu,&n);break;

case 7:displaypnrec(stu,&n);break;

case 8:return 0;

default:printf("Invalid Input!\n");

}

printf("Press\n1.Insert Record at front.\n2.Insert a record at the end of the list.\n3.Insert a record after a given Regno in the list.\n4.Search a given record in the list based on Name.\n5.Delete a given student record.\n6.Display all student's record.\n7.Display the previous and next record of a given student.\n8.Exit.\n");

scanf("%d",&sel);

}

return 0;

}

**Output:**

Press

1.Insert Record at front.

2.Insert a record at the end of the list.

3.Insert a record after a given Regno in the list.

4.Search a given record in the list based on Name.

5.Delete a given student record.

6.Display all student's record.

7.Display the previous and next record of a given student.

8.Exit.

1

New Student's Record:

Enter the register number:1

Enter the name of the Student:rahul

Enter the 1th mark:76

Enter the 2th mark:87

Enter the 3th mark:76

Enter the 4th mark:98

Enter the 5th mark:87

Press

1.Insert Record at front.

2.Insert a record at the end of the list.

3.Insert a record after a given Regno in the list.

4.Search a given record in the list based on Name.

5.Delete a given student record.

6.Display all student's record.

7.Display the previous and next record of a given student.

8.Exit.

2

New Student's Record:

Enter the register number:3

Enter the name of the Student:rama

Enter the 1th mark:99

Enter the 2th mark:99

Enter the 3th mark:99

Enter the 4th mark:99

Enter the 5th mark:99

Press

1.Insert Record at front.

2.Insert a record at the end of the list.

3.Insert a record after a given Regno in the list.

4.Search a given record in the list based on Name.

5.Delete a given student record.

6.Display all student's record.

7.Display the previous and next record of a given student.

8.Exit.

3

Enter the Register Number:1

New Student's Record:

Enter the register number:2

Enter the name of the Student:kumaresh

Enter the 1th mark:89

Enter the 2th mark:89

Enter the 3th mark:98

Enter the 4th mark:89

Enter the 5th mark:89

Press

1.Insert Record at front.

2.Insert a record at the end of the list.

3.Insert a record after a given Regno in the list.

4.Search a given record in the list based on Name.

5.Delete a given student record.

6.Display all student's record.

7.Display the previous and next record of a given student.

8.Exit.

4

Enter the name of the student:rahul

Record is found in 1 th position

Register Number : 1

Name : rahul

Mark 1 : 76

Mark 2 : 87

Mark 3 : 76

Mark 4 : 98

Mark 5 : 87

Press

1.Insert Record at front.

2.Insert a record at the end of the list.

3.Insert a record after a given Regno in the list.

4.Search a given record in the list based on Name.

5.Delete a given student record.

6.Display all student's record.

7.Display the previous and next record of a given student.

8.Exit.

5

Enter the Register number of the student you want to delete:3

Press

1.Insert Record at front.

2.Insert a record at the end of the list.

3.Insert a record after a given Regno in the list.

4.Search a given record in the list based on Name.

5.Delete a given student record.

6.Display all student's record.

7.Display the previous and next record of a given student.

8.Exit.

6

Record :1

Register Number : 1

Name : rahul

Mark 1 : 76

Mark 2 : 87

Mark 3 : 76

Mark 4 : 98

Mark 5 : 87

Record :2

Register Number : 2

Name : kumaresh

Mark 1 : 89

Mark 2 : 89

Mark 3 : 98

Mark 4 : 89

Mark 5 : 89

Press

1.Insert Record at front.

2.Insert a record at the end of the list.

3.Insert a record after a given Regno in the list.

4.Search a given record in the list based on Name.

5.Delete a given student record.

6.Display all student's record.

7.Display the previous and next record of a given student.

8.Exit.

2

New Student's Record:

Enter the register number:3

Enter the name of the Student:rama

Enter the 1th mark:89

Enter the 2th mark:89

Enter the 3th mark:98

Enter the 4th mark:89

Enter the 5th mark:98

Press

1.Insert Record at front.

2.Insert a record at the end of the list.

3.Insert a record after a given Regno in the list.

4.Search a given record in the list based on Name.

5.Delete a given student record.

6.Display all student's record.

7.Display the previous and next record of a given student.

8.Exit.

2

New Student's Record:

Enter the register number:4

Enter the name of the Student:ram

Enter the 1th mark:87

Enter the 2th mark:78

Enter the 3th mark:87

Enter the 4th mark:87

Enter the 5th mark:87

Press

1.Insert Record at front.

2.Insert a record at the end of the list.

3.Insert a record after a given Regno in the list.

4.Search a given record in the list based on Name.

5.Delete a given student record.

6.Display all student's record.

7.Display the previous and next record of a given student.

8.Exit.

7

Enter the Register Number:3

Record is found in the 3th position.

Displaying 2th record...

Register Number : 2

Name : kumaresh

Mark 1 : 89

Mark 2 : 89

Mark 3 : 98

Mark 4 : 89

Mark 5 : 89

Displaying 4th record...

Register Number : 4

Name : ram

Mark 1 : 87

Mark 2 : 78

Mark 3 : 87

Mark 4 : 87

Mark 5 : 87

Press

1.Insert Record at front.

2.Insert a record at the end of the list.

3.Insert a record after a given Regno in the list.

4.Search a given record in the list based on Name.

5.Delete a given student record.

6.Display all student's record.

7.Display the previous and next record of a given student.

8.Exit.

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