SSN COLLEGE OF ENGINEERING (Autonomous)

DEPARTMENT OF CSE

UCS308 Data Structures Lab

Assignment 2

Array Implementation of List ADT

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1. Create a list of 5 student records (using array of structure) with the fields
   Regno
   Name
   Marks in 5 subjects
   Perform the following operations
   1. Insert a record in the front of the list
   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 students' record
   7. Display the previous and next record of a given student

Function.h

```
#include<stdio.h>
#include<string.h>
struct student
{     int Regno;
      char Name[20];
      int Marks[5];
};
int i,j;
void dispall(struct student list[],int n)
{
      for(i=0;i<n;i++)
      {     printf("\nStudent %d\n",(i+1));
            printf("\nName : %s\n",list[i].Name);
            printf("\nRegno: %d\n",list[i].Regno);
            printf("\nMarks\n");
            for(j=0;j<5;j++)
            {     printf("%d\n",list[i].Marks[j]);
            }
      }
}
void dispnext(struct student list[],int n)
{     printf("\nEnter position of student in list to get records before
and after\n");
      int i,j;
      scanf("%d",&i);
      printf("\nStudent Before\n");
      printf("\nName : %s\n",list[i-1].Name);
      printf("\nRegno: %d\n",list[i-1].Regno);
      printf("\nMarks\n");
      for(j=0;j<5;j++)
            printf("%d\n",list[i-1].Marks[j]);
      printf("\nStudent After\n");
      printf("\nName : %s\n",list[i+1].Name);
      printf("\nRegno: %d\n",list[i+1].Regno);
      printf("\nMarks\n");
      for(j=0;j<5;j++)
            printf("%d\n",list[i+1].Marks[j]);
}
void search(struct student list[],int n)
{     printf("Enter name of student to search");
      char nm[20];
      scanf("%s",nm);
      for(int i=0;i<n;i++)
      {     if(strcmp(nm,list[i].Name)==0)
            {     printf("\nName : %s\n",list[i].Name);
                  printf("\nRegno: %d\n",list[i].Regno);
                  printf("\nMarks\n");
                  for(int j=0;j<5;j++)
                        printf("%d\n",list[i].Marks[j]);
            }
      }
}
```

```
void insertend(struct student *list,int n)
{     printf("\nEnter Student Details to Add at end\n");
      scanf("%d",&(list+n)->Regno);
      scanf("%s",(list+n)->Name);
      printf("\nMarks\n");
      for(int i=0;i<n;i++)
      {     scanf("%d",&(list+n)->Marks[i]);
      }
}
void create(struct student *list,int n)
{     for(int i=0;i<n;i++)
      {     printf("\nEnter Student %d Details\n",(i+1));
            scanf("%d",&(list+i)->Regno);
            scanf("%s",(list+i)->Name);
            printf("\nMarks\n");
            for(j=0;j<5;j++)
                  {     scanf("%d",&(list+i)->Marks[j]);
                  }
      }
}
void delete(struct student *list, int n)
{     printf("\nEnter Student Name to Delete\n");
      char nm[20];
      scanf("%s",nm);
      for(int i=0;i<n;i++)
      {     if(strcmp((list+i)->Name,nm)==0)
            {     for(int j=i;j<n-1;j++)
                  {     *(list+j)=*(list+(j+1));
                  }
            }
      }
}
void insert(struct student *list,int n)
{     printf("\nEnter Reg Number to Add Record After it\n");
      int reg,j,pos;
      scanf("%d",&reg);
      for(int i=0;i<n;i++)
      {     if((list+i)->Regno==reg)
            {     for(j=n;j>i+1;j--)
                  {     *(list+j)=*(list+(j-1));
                  }
                  pos=i+1;
            }
      }
      printf("\nEnter Student Details\n");
      scanf("%d",&(list+pos)->Regno);
      scanf("%s",(list+pos)->Name);
      printf("\nMarks\n");
      for(i=0;i<n;i++)
      {     scanf("%d",&(list+pos)->Marks[i]);
      }
}
void insertbeg(struct student *list,int n)
{     printf("\nEnter Student Name And Details to add in the
Beginning\n");
      for(int i=n;i>0;i--)
      {     *(list+i)=*(list+(i-1));
      }
```

```
      scanf("%d",&(list+0)->Regno);
      scanf("%s",(list+0)->Name);
      printf("\nMarks\n");
      for(i=0;i<n;i++)
      {     scanf("%d",&(list+0)->Marks[i]);
      }
}
```

Prototype.h

```
#include<stdio.h>
#include<string.h>
#include"function.h"
void dispall(struct student list[],int n);
void dispnext(struct student list[],int n);
void search(struct student list[],int n);
void insertend(struct student *list,int n);
void create(struct student *list,int n);
void delete(struct student *list, int n);
void insert(struct student *list,int n);
void insertbeg(struct student *list,int n);
```

Main.c

```
#include<stdio.h>
#include"prototype.h"
int main()
{     struct student list[10];
      int n=5,op,cont;
      create(list,n);
      do
      {
      printf("\nPick\n1.Insert at Beginning\n2.Insert at
End\n3.Insert\n4.Search\n5.Delete\n6.Display all\n7.Display Before And
After\n");
      scanf("%d",&op);
      switch(op)
      {     case 1: insertbeg(list,n);
                        n++;
                        break;
            case 2: insertend(list,n);
                        n++;
                        break;
            case 3: insert(list,n);
                        n++;
                        break;
            case 4:     search(list,n);
                        break;
            case 5: delete(list,n);
                        n--;
                        break;
            case 6: dispall(list,n);
                        break;
            case 7: dispnext(list,n);
```

```
                    break;
        }
        printf("CONTINUE?\n 1. YES\n2. NO");
        scanf("%d",&cont);
        }while(cont==1);
        return(0);
}
```

Output:

```
Enter Student 1 Details
1
Sai

Marks
1
2
3
4
5

Enter Student 2 Details
2
tim

Marks
5
4
3
2
1
```

```
Enter Student 3 Details
3
bob

Marks
6
5
6
5
65

Enter Student 4 Details
6 4
kanye     ye

Marks
7
8
5
4
6

Enter Student 5 Details
5
pa op

Marks
7
7
7
7
7
```

```
Pick
1.Insert at Beginning
2.Insert at End
3.Insert
4.Search
5.Delete
6.Display all
7.Display Before And After
1

Enter Student Name And Details to add in the Beginning
23
ying

Marks
1
1
1
1
1
CONTINUE?
 1. YES
2. NO1

Pick
1.Insert at Beginning
2.Insert at End
3.Insert
4.Search
5.Delete
6.Display all
7.Display Before And After
```

```
2

Enter Student Details to Add at end
24
ying2 e     lole    bam

Marks
9
9
9
9
9
CONTINUE?
 1. YES
2. NO1

Pick
1.Insert at Beginning
2.Insert at End
3.Insert
4.Search
5.Delete
6.Display all
7.Display Before And After
3

Enter Reg Number to Add Record After it
3

Enter Student Details
44
a mac
```

Marks

4

5

6

4

5

CONTINUE?

1. YES

2. NO1

Pick

1.Insert at Beginning

2.Insert at End

3.Insert

4.Search

5.Delete

6.Display all

7.Display Before And After

4

Enter name of student to searchmac

Name : mac

Regno: 44

Marks

4

5

6

4

5

CONTINUE?

1. YES

2. NO1

Pick

1.Insert at Beginning

2.Insert at End

3.Insert

4.Search

5.Delete

6.Display all

7.Display Before And After

5

Enter Student Name to Delete

bob

CONTINUE?

1. YES

2. NO1

Pick

1.Insert at Beginning

2.Insert at End

3.Insert

4.Search

5.Delete

6.Display all

7.Display Before And After

6

Student 1

Name : ying

Regno: 23

Marks

1

1

1

1

1

Student 2

Name : Sai

Regno: 1

Marks

1

2

3

4

5

Student 3

Name : tim

Regno: 2

Marks

5

4

3

2

1

Student 4

Name : mac

Regno: 44

Marks
4
5
6
4
5

Student 5

Name :

Regno: 6

Marks
7
8
5
4
6

Student 6

Name : pop

Regno: 5

Marks

7

7

7

7

7

Student 7

Name : bam

Regno: 24

Marks

9

9

9

9

9

CONTINUE?

1. YES

2. NO1

Pick

1.Insert at Beginning

2.Insert at End

3.Insert

4.Search

5.Delete

6.Display all

7.Display Before And After

7

```
Enter position of student in list to get records before and after
4

Student Before

Name : mac

Regno: 44

Marks
4
5
6
4
5

Student After

Name : pop

Regno: 5

Marks
7
7
7
7
7
CONTINUE?
 1. YES
2. NO2
```