**SSN COLLEGE OF ENGINEERING**

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**ASSIGNMENT 2**

**DATA STRUCTURES LAB**

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**FILE 1: VARIABLES FILE**

**CODE:**

#include<stdio.h>

#include<stdlib.h>

#ifndef \_var\_h var.h

#define \_var\_h

int rno;

char name[40];

int marks[5];

};

struct LIST{

int size;

int capacity;

struct stu s[20];

};

typedef struct LIST\* list;

#endif

**FILE 2: FUNCTION DEFINITIONS**

**CODE:**

#include<stdio.h>

#include<stdlib.h>

#ifndef \_func\_h func.h

#define \_func\_h

int isfull(list l){

if(l->size==l->capacity)return 1;

else return 0;

}

int isempty(list l){

if(l->size==0)return 1;

else return 0;

}

void insertfirst( list l){

int i,m;

struct stu a;

if(isfull(l))printf("list is full");

else{

printf("name");scanf("%s",&a.name);

printf("rollno");

scanf("%d",&a.rno);

printf("marks");for(i=0;i<5;i++){

scanf("%d",&a.marks[i]);

}

m=l->size;

for(i=m;i>0;i--){

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

}

l->s[0]=a;

l->size=l->size+1;}

}

void insertlast(list l){

int index,i;struct stu a;

if(isfull(l))printf("list is full");

else{

index=l->size;

printf("name:");scanf("%s",&a.name);

printf("roll");scanf("%d",&a.rno);

for(i=0;i<5;i++)scanf("%d",&a.marks[i]);

l->s[index]=a;

l->size=l->size+1;

}

}

void insertpos(list l){

int i,j,pos;

int n;

struct stu a;

int index=l->size;

if(isfull(l)){printf("list is full");}

else{

printf("name");scanf("%s",&a.name);

printf("roll");scanf("%d",&a.rno);

for(i=0;i<5;i++){

scanf("%d",&a.marks[i]);

}

printf("enter the regno to insert");scanf("%d",&n);

for(i=0;i<index;i++){

if(l->s[i].rno==n){pos=i+1;

break;

}} for(i=index;i>pos-1;i--){

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

}l->s[pos-1]=a;

}

l->size=l->size+1;

}

void search(list l){

int i,j;

char s[30];

printf("enter name to search\n");scanf("%s",&s);

for(i=0;i<l->size;i++){

if(!strcmp(s,l->s[i].name)){

printf("\n%d\n",l->s[i].rno);

printf("%s",l->s[i].name);

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

printf("%d ",l->s[i].marks[j]);

}

}

}

}

void delete(list l){

int i,pos,n,index;

struct stu a;

if(isempty(l))printf("list is empty");

else{

index=l->size;

printf("name");scanf("%s",a.name);

printf("roll");scanf("%d",&a.rno);

n=a.rno;

for(i=0;i<l->size;i++){

if(l->s[i].rno==n){

pos=i;

}

}

for(i=pos-1;i<index;i++){

l->s[i]=l->s[i+1];

}l->size=l->size-1;

printf("record at %d deleted ",pos);}

}

void prevnext(list l,int n){

int i,j,pos,index;

index=l->size;

for(i=0;i<index;i++){

if(l->s[i].rno==n){

pos=i;break;

}

}if((pos-1)>-1){printf("\n%d\n",l->s[pos-1].rno);

printf("%s",l->s[pos-1].name);

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

printf("%d ",l->s[pos-1].marks[j]);

}}

if((pos+1)<index){

printf("\n%d\n",l->s[pos+1].rno);

printf("%s",l->s[pos+1].name);

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

printf("%d ",l->s[pos+1].marks[j]);

}

}

}

void print(list l){

int i,j,index=l->size;;

if(isempty(l))printf("sorry list is empty");

else{

for(i=0;i<index;i++){

printf("\nrollno:%d\n",l->s[i].rno);

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

printf("marks");

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

printf("%d ",l->s[i].marks[j]);

}

}

}

}

#endif

**FILE 3: IMPLEMENTATION**

**CODE:**

#include"var.h"

#include"func.h"

#include <stdio.h>

#include<stdlib.h>

#include<string.h>

typedef struct LIST\* list;

int main()

{

int i,j,choice=0,num,roll;

struct stu st;

char c='s';

list lt= malloc(1\*sizeof(struct LIST));

lt->capacity=20;

printf("enter no of students");

scanf("%d",&num);

lt->size=num;

for(i=0;i<num;i++){

printf("enter name");scanf("%s",&lt->s[i].name);

printf("enter roll");scanf("%d",&lt->s[i].rno);

printf("enter marks");for(j=0;j<5;j++){

scanf("%d",&lt->s[i].marks[j]);

}

}

while(c=='s' ||c=='S'){

printf("menu\n1.insertfirst\n2.insertlast\n3.delete\n4.print prev and next record\n5.insert at pos\n6.search by name\n7.print");

printf(“enter choice”);

scanf("%d",&choice);

switch(choice){

case 1:printf("enter record to be inserted");

insertfirst(lt);printf("successfully inserted");

break;

case 2:printf("enter record to be inserted");

insertlast(lt);

break;

case 3:printf("enter record to be deleted");

delete(lt);break;

case 4:printf("enter the reg no");

scanf("%d",&roll);

printf("printing prev and next records");

prevnext(lt,roll);

break;

case 5:

insertpos(lt);break;

case 6:

search(lt);break;

case 7:printf("displaying all records in list");

print(lt);

default:printf("enter valid option");

}printf("enter s/S to continue and other options to quit");

fflush(stdin);

scanf(" %c",&c);

}

return 0:

}

**SAMPLE OUTPUT:**

enter no of students3

enter namepriya

enter roll5

enter marks99

99

99

99

99

enter nameharini

enter roll6

enter marks99

99

99

99

99

enter nameragini

enter roll87

enter marks99

99

99

99

99

menu

1.insertlast

2.insertfirst

3.delete

4.print prev and next record

5.insert at pos

6.search by name

7.print enter choice5 **(INSERT AT A PARTICULAR POSITION)**

name hari

roll4

99

99

99

99

99

enter the regno to insert6

enter s/S to continue and other options to quit s

menu

1.insertlast

2.insertfirst

3.delete

4.print prev and next record

5.insert at pos

6.search by name

7.print enter choice7 **(PRINTING ALL RECORDS)**

displaying all records in list

rollno:5

name:priya

marks99 99 99 99 99

rollno:4

name:hari

marks99 99 99 99 99

rollno:6

name:harini

marks99 99 99 99 99

rollno:7

name:ragini

marks99 99 99 99 99 enter s/S to continue and other options to quit s

menu

1.insertlast

2.insertfirst

3.delete

4.print prev and next record

5.insert at pos

6.search by name

7.print enter choice4 **(DISPLAY PREV AND NEXT RECORD)**

enter the reg no4

printing prev and next records

5

Priya

99 99 99 99 99

6

harini

99 99 99 99 99enter s/S to continue and other options to quit s

menu

1.insertlast

2.insertfirst

3.delete

4.print prev and next record

5.insert at pos

6.search by name

7.print enter choice 1 **(INSERT AT FIRST)**

enter record to be insertednamedivya

rollno1

marks99

99

99

99

99

successfully insertedenter s/S to continue and other options to quits

menu

1.insertlast

2.insertfirst

3.delete

4.print prev and next record

5.insert at pos

6.search by name

7.print enter choice 2 **(INSERT AT LAST)**

enter record to be insertedname:fathima

roll10

99

99

99

99

99

enter s/S to continue and other options to quit s

menu

1.insertlast

2.insertfirst

3.delete

4.print prev and next record

5.insert at pos

6.search by name

7.print enter choice 3 **(DELETE A RECORD)**

enter record to be deletednamehari

roll4

record at 2 deleted enter s/S to continue and other options to quit s

menu

1.insertlast

2.insertfirst

3.delete

4.print prev and next record

5.insert at pos

6.search by name

7.print enter choice 6 **(SEARCHING FOR A RECORD)**

enter name to search

hari

4

hari

99 99 99 99 99 enter s/S to continue and other options to quit s

menu

1.insertlast

2.insertfirst

3.delete

4.print prev and next record

5.insert at pos

6.search by name

7.print enter choice 7

displaying all records in listrollno:1

name:divya

marks99 99 99 99 99 rollno:4

name:hari

marks99 99 99 99 99 rollno:6

name:harini

marks99 99 99 99 99 rollno:7

name:ragini

marks99 99 99 99 99 rollno:10

name:fathima

marks99 99 99 99 99 enter valid optionenter s/S to continue and other options to quit n

entereenter no of students3

enter namepriya

enter roll5

enter marks99

99

99

99

99

enter nameharini

enter roll6

enter marks99

99

99

99

99

enter nameragini

enter roll7

enter marks99

99

99

99

99