

Data Structures and Algorithms Assignment

Second Semester 2021-22



BITS Pilani
Pilani | Dubai | Goa | Hyderabad

Submitted by:

Agrim Jain - 2020A7PS0143U

Arshdeep Singh - 2020A7PS0144U

Bharathwaj M - 2020A7PS0080U

TABLE OF CONTENTS

SNO	DESCRIPTION	PAGE NO
1	Acknowledgement	3
2	Introduction	4
3	Algorithm	5
4	Source Code	6
5	Output	17
6	References	26

Acknowledgement

I would like to express my sincere gratitude to our Data Structures And Algorithms Instructor, Dr. Sujala Shetty, for her vital support, guidance and encouragement without which this project would not come forth from our side. She helped us completing the project by giving ideas, thoughts and made this project easy and accurate.

I wish to thank my parents for their undivided support and interest who inspired me and encouraged me to go our own way, without which we would be unable to complete our project.

INTRODUCTION

This project enables users to easily store and find contact information, such as names, addresses and telephone numbers.

It has practical uses like saving contacts in phone directories, member information in hotels and clubs etc.

The project has a class manager which has several member functions.

Void modify() - used to take input from the user for an already existing contact and replace these newly entered values .

Void display() - Displays all values entered in the data members.

Void enter() - Used to take input for all data members .

The class also has separate functions to return values of the data members of the class so that they can be used by the functions which are not in the scope of the class.

We have used various concepts like File Handling, searching and many other concepts as well.

ALGORITHM

The method modify():

```
cout<<"Input for the USER"<<endl  
gets(INPUT);
```

The method Searchmno:

Int Searchmno (int x)

```
{  
Beginning = 0;  
End = n-1;  
Res = -1  
While (beg<= end):  
Mid = (beg+end)/2  
If A[mid]<=x  
beg=mid+1  
Res = mid  
Else:  
End = mid-1  
Return res  
}
```

Method display():

Includes file handling,

```
fstream f1;  
manager m1;  
char ch;  
f1.open("MANAGER.DAT",ios::binary|ios::app);  
m1.Enter();  
if(Searchmno(m1.getMno())==0)  
{  
f1.write((char*)&m1,sizeof(m1));  
cout<<"Contact added!! ";  
}
```

SOURCE CODE

```
/*  
Project Title : Contact Manager  
Developed By : Arshdeep Singh, Agrim Jain  
*/
```

```
#include<fstream.h>  
#include<conio.h>  
#include<stdio.h>  
#include<stdlib.h>  
#include<string.h>
```

```
int Searchmno(int);  
class manager  
{  
    int Mno;  
    char Name[20];  
    char Mobile[20];  
    char Landline[20];  
    char Email[50];  
    char Address[30];  
    char City[30];  
    char Country[30];  
    char Postalcode[20];  
    char Details[500];
```

```
public:  
    void Modify();  
    void Display();  
    void Enter();  
    int getMno()  
    {return Mno;}  
    char* getName()  
    {return Name;}  
    char* getMobile()  
    {return Mobile;}  
    char* getLandline()  
    {return Landline; }  
    char* getEmail()  
    {return Email; }  
    char* getAddress()  
    {return Address; }  
    char* getCity()  
    {return City; }
```

```

char* getCountry()
{return Country; }
char* getPostalcode()
{return Postalcode; }
char* getDetails()
{return Details; }
};

void manager::Enter()
{
    cout<<"Enter your member number:"<<endl;
    cin>>Mno;
    cout<<"Enter your name: "<<endl;
    gets(Name);
    cout<<"Enter mobile number: "<<endl;
    gets(Mobile);
    cout<<"Enter landline number: "<<endl;
    gets(Landline);
    cout<<"Enter your email: "<<endl;
    gets(Email);
    cout<<"Enter your address: "<<endl;
    gets(Address);
    cout<<"Enter your city: "<<endl;
    gets(City);
    cout<<"Enter your country: "<<endl;
    cin>>Country;
    cout<<"Enter your postal code: "<<endl;
    cin>>Postalcode;
    strcpy(Details,Name);
    strcat(Details,Mobile);
    strcat(Details,Landline);
    strcat(Details,Email);
    strcat(Details,Address);
    strcat(Details,City);
    strcat(Details,Country);
    strcat(Details,Postalcode);
}

void manager::Modify()
{
    cout<<"Re-enter details "<<endl;
    cout<<"Enter your name: "<<endl;
    gets(Name);
    cout<<"Enter mobile number: "<<endl;
    cin>>Mobile;
    cout<<"Enter landline number: "<<endl;
    cin>>Landline;
}

```

```

cout<<"Enter your email: "<<endl;
cin>>Email;
cout<<"Enter your address: "<<endl;
gets(Address);
cout<<"Enter your city: "<<endl;
gets(City);
cout<<"Enter your country: "<<endl;
gets(Country);
cout<<"Enter your postal code: "<<endl;
gets(Postalcode);
strcpy(Details,Name);
strcat(Details,Mobile);
strcat(Details,Landline);
strcat(Details,Email);
strcat(Details,Address);
strcat(Details,City);
strcat(Details,Country);
strcat(Details,Postalcode);
}
void manager::Display()
{
    cout<<"The member number is "<<Mno<<endl;
    cout<<"Name is "<<Name<<endl;
    cout<<"The mobile number is "<<Mobile<<endl;
    cout<<"The landline number is "<<Landline<<endl;
    cout<<"Email is "<<Email<<endl;
    cout<<"Address is "<<Address<<endl;
    cout<<"City is "<<City<<endl;
    cout<<"Postalcode is "<<Postalcode<<endl;
}
void create()
{
    fstream f1;
    manager m1;
    char ch;
    f1.open("MANAGER.DAT",ios::binary|ios::app);
    m1.Enter();
    if(Searchmno(m1.getMno())==0)
    {
        f1.write((char*)&m1,sizeof(m1));
        cout<<"Contact added!! ";
    }
    else
        cout<<"Mno is already present "<<endl;
    f1.close();
}

```



```

void Display()
{
    fstream f1;
    manager m1;
    f1.open("MANAGER.DAT" , ios::in|ios::binary) ;
    while(f1.read((char *)&m1,sizeof(m1)))
    {
        m1.Display();
    }
    f1.close();
}

void Delete()
{
    char ch;
    int x;
    cout<<"Enter the mno to be deleted: ";
    cin>>x;
    fstream f1,f2;
    manager m1;
    f1.open("MANAGER.DAT",ios::binary|ios::in);
    f2.open("TEMP.DAT",ios::binary|ios::out);
    int Enos,Del=0;
    while(f1.read((char *)&m1,sizeof(m1)))
    {
        if(m1.getMno()!=x)
            f2.write((char *)&m1,sizeof(m1));
        else
        {
            m1.Display();
            cout<<"\nAre you sure you want to delete this record? (Y/N)";
            cin>>ch;
            if(ch=='y'||ch=='Y')
                cout<<"\n Successfully Deleted "<<endl;
            else
                f2.write((char *)&m1,sizeof(m1));
            Del++;
        }
    }
    if(Del==0)
        cout<<x<<" This Mno does not exist! So no record deleted: "<<endl;
    f1.close();
    f2.close();
    remove("MANAGER.DAT");
    rename("TEMP.DAT","MANAGER.DAT");
}

void Edit()

```

```

{
    int x,c=0;
    cout<<"Enter the member no to be modified : ";
    cin>>x;
    Searchmno(x);
    fstream f1;
    manager m1;
    f1.open("MANAGER.DAT",ios::binary|ios::in|ios::out);
    while(f1.read((char*)&m1,sizeof(m1)))
    {
        if(m1.getMno()==x)
        {
            cout<<"\n Details of "<<m1.getMno()<<"are as follows "<<endl;
            m1.Display();
            m1.Modify();
            f1.seekp(f1.tellp()-sizeof(m1));
            f1.write((char*)&m1,sizeof(m1));
            c=1;
        }
    }
    if(c==0)
        cout<<"\n Sorry "<<x<<" does not Exist "<<endl;
    f1.close();
}

void Searchname()
{
    fstream f1;
    manager m1;
    f1.open("MANAGER.DAT",ios::binary|ios::in);
    char name[200];
    int found=0;
    cout<<"Enter the name to be searched: ";
    cin>>name;
    while(!found && f1.read((char *)&m1,sizeof(m1)))
    if(strcmpi(name,m1.getName())==0)
    {
        m1.Display();
        found++;
    }
    if(!found)
        cout<<"Employee not found";
    f1.close();
}

int Searchmno(int x)
{
    fstream f1;

```

```

manager m1;
f1.open("MANAGER.DAT",ios::binary|ios::in);
int found=0;
while(!found && f1.read((char *)&m1,sizeof(m1)))
{
    if(x==m1.getMno())
    {
        m1.Display();
        found++;
    }
}
f1.close();
return found;
}

void Searchmobile()
{
    fstream f1;
    manager m1;
    f1.open("MANAGER.DAT",ios::binary|ios::in);
    char mobile[10];
    int found=0;
    cout<<"Enter the name to be searched: ";
    cin>>mobile;
    while(!found && f1.read((char *)&m1,sizeof(m1)))
    if(strcmp(mobile,m1.getMobile())==0)
    {
        m1.Display();
        found++;
    }
    if(!found)
        cout<<"NOT FOUND!!";
}

void Searchcity()
{
    fstream f1;
    manager m1;
    f1.open("MANAGER.DAT",ios::binary|ios::in);
    char city[20];
    int found=0;
    cout<<"Enter the name to be searched: ";
    cin>>city;
    while(!found && f1.read((char *)&m1,sizeof(m1)))
    if(strcmp(city,m1.getCity())==0)
    {
        m1.Display();
        found++;
    }
}

```

```

    }
    if(!found)
        cout<<"NOT FOUND!!";
}
void Searchcountry()
{
    fstream f1;
    manager m1;
    f1.open("MANAGER.DAT",ios::binary|ios::in);
    char country[20];
    int found=0;
    cout<<"Enter the name to be searched: ";
    cin>>country;
    while(!found && f1.read((char *)&m1,sizeof(m1)))
    if(strcmp(country,m1.getCountry())==0)
    {
        m1.Display();
        found++;
    }
    if(!found)
        cout<<"NOT FOUND!!";
}
void Searchemail()
{
    fstream f1;
    manager m1;
    f1.open("MANAGER.DAT",ios::binary|ios::in);
    char email[50];
    int found=0;
    cout<<"Enter the name to be searched: ";
    cin>>email;
    while(!found && f1.read((char *)&m1,sizeof(m1)))
    if(strcmp(email,m1.getEmail())==0)
    {
        m1.Display();
        found++;
    }
    if(!found)
        cout<<"NOT FOUND!!";
}
void Powersearch()
{
    fstream f1;
    manager m1;
    f1.open("MANAGER.DAT",ios::binary|ios::in);
    manager E;

```

```

char s[20];
int found=0,j,k;
cout<<"Enter the keyword to be searched: ";
gets(s);
while(!found && f1.read((char *)&m1,sizeof(m1)))
{
    char t[2000];
    strcpy(t,m1.getDetails());
    int f=0;
    for(int i=0;t[i]!='\0' && f==0;i++)
    {
        if(t[i]==s[0])
        {
            for(j=0,k=i;s[j]!='\0';j++,k++)
            {
                if(s[j]!=t[k])
                    break;
            }
            if(s[j]=='\0')
                f=1;
        }
    }
    if(f==1)
    {
        m1.Display();
        found=1;
    }
}
if(found==0)
    cout<<" Keyword does not Present";
f1.close();
}
char* Changepassword(char z[])
{
    char p1[100],p2[100],p3[100];
    cout<<"\n Enter Old Password ";
    cin>>p1;
    if(strcmp(p1,z)==0)
    {
        cout<<"\n Enter New Password ";
        cin>>p2;
        cout<<"\n Confirm Password ";
        cin>>p3;
        if(strcmp(p2,p3)==0)
            strcpy(z,p2);
        else
    }
}

```

```

        cout<<" \nPassword does not match "<<endl;
    }
    else
        cout<<"\n Password does not matched "<<endl;
        return z ;
}
void main()
{
    clrscr();
    char x, y[100],ch,t, z[10]="bitsdxb",k[100];
    do
    {
        clrscr();
        cout<<"[A] Admin"<<endl;
        cout<<"[S] Search"<<endl;
        cout<<"[Q] Quit "<<endl;
        cin>>x;
        if(x=='a' || x=='A')
        {
            clrscr();
            cout<<" Enter Password "<<endl;
            cin>>y;
            if(strcmp(z,y)==0)
            {
                do
                {
                    clrscr();
                    cout<<"[A] Add Contact"<<endl;
                    cout<<"[R] Remove Contact"<<endl;
                    cout<<"[S] Show All Contact List"<<endl;
                    cout<<"[E] Edit Contact "<<endl ;
                    cout<<"[C] Change Password "<<endl;
                    cout<<"[Q] Quit to Main Menu "<<endl;
                    cin>>t;
                    switch(t)
                    {
                        case 'a':
                        case 'A':
                            create();
                            break;
                        case 'r':
                        case 'R':
                            Delete();
                            break;
                        case 's':
                        case 'S':

```

```

        Display();
        break;
    case 'e':
    case 'E':
        Edit();
        break;
    case 'c':
    case 'C':
        strcpy(k,z);
        strcpy(z,Changepassword(z));
        if (strcmp(k,z)==0)
            t='q';
        else
            cout<<" password changed successfully "<<endl;
        break;
    case 'q':
    case 'Q':
        break;
    default:
        cout<<"\n Invalid Option "<<endl;
}
getch();
while(t!='q'&& t!='Q');
}
}
else if(x=='s' || x=='S')
{
    char ch;
    clrscr();
    do
    {
        cout<<"\n\n[A] Search by Name"<<endl;
        cout<<"[B] Search by Mno"<<endl;
        cout<<"[C] Search by Mobile"<<endl;
        cout<<"[D] Search by City"<<endl;
        cout<<"[E] Search by Country"<<endl;
        cout<<"[F] Search by Email"<<endl;
        cout<<"[P] Power Search"<<endl;
        cout<<"[Q] Quit"<<endl;
        cin>>ch;
        if(ch=='a' || ch=='A')
            Searchname();
        else if(ch=='b' || ch=='B')
        {
            int x;
            cout<<"Enter the mno to be searched : ";

```

```

        cin>>x;
        Searchmno(x);
    }
    else if(ch=='c' || ch=='C')
        Searchmobile();
    else if(ch=='d' || ch=='D')
        Searchcity();
    else if(ch=='e' || ch=='E')
        Searchcountry();
    else if(ch=='f' || ch=='F')
        Searchemail();
    else if(ch=='p' || ch=='P')
        Powersearch();
    }while(!(ch=='q' || ch=='Q'));
}
}
cout<<"\n \n Press any key to continue...";
getch();
}while(!(x=='q' || x=='Q'));
getch();
}

```


OUTPUT

```
[A] Admin  
[S] Search  
[Q] Quit  
-
```

```
Enter Password
bitsdxb
```

```
[A] Add Contact
[R] Remove Contact
[S] Show All Contact List
[E] Edit Contact
[C] Change Password
[Q] Quit to Main Menu
-
```

```
[R] Remove Contact
[S] Show All Contact List
[E] Edit Contact
[C] Change Password
[Q] Quit to Main Menu
A
Enter your member number:
100000
Enter your name:
Agrim Jain
Enter mobile number:
0544298660
Enter landline number:
023456789
Enter your email:
f20200143@dubai.bits-pilani.ac.in
Enter your address:
BITS Dubai C Block
Enter your city:
Dubai
Enter your country:
Country
Enter your postal code:
345055
Contact added!!
```

```
[R] Remove Contact
[S] Show All Contact List
[E] Edit Contact
[C] Change Password
[Q] Quit to Main Menu
A
Enter your member number:
2000030
Enter your name:
Arshdeep Singh
Enter mobile number:
0547866845
Enter landline number:
024567789
Enter your email:
f20200144@dubai.bits-pilani.ac.in
Enter your address:
BITS Dubai C Block
Enter your city:
Dubai
Enter your country:
UAE
Enter your postal code:
3005400
Contact added!! _
```

```
The member number is 16960
Name is Agrim Jain
The mobile number is 0544298660
The landline number is 0222223334
Email is agrimjain041203@gmail.com
Address is BITS Dubai C Block
City is Dubai
Postalcode is 10120
The member number is -31072
Name is Agrim Jain
The mobile number is 0544298660
The landline number is 023456789
Email is f20200143@dubai.bits-pilani.ac.in
Address is BITS Dubai C Block
City is Dubai
Postalcode is 345055
The member number is -31586
Name is Arshdeep Singh
The mobile number is 0547866845
The landline number is 024567789
Email is f20200144@dubai.bits-pilani.ac.in
Address is BITS Dubai C Block
City is Dubai
Postalcode is 3005400
```

```
[A] Add Contact
[R] Remove Contact
[S] Show All Contact List
[E] Edit Contact
[C] Change Password
[Q] Quit to Main Menu
R_
```

```
[A] Add Contact
[R] Remove Contact
[S] Show All Contact List
[E] Edit Contact
[C] Change Password
[Q] Quit to Main Menu
R
Enter the mno to be deleted: 100000
The member number is -31072
Name is Agrim Jain
The mobile number is 0544298660
The landline number is 023456789
Email is f20200143@dubai.bits-pilani.ac.in
Address is BITS Dubai C Block
City is Dubai
Postalcode is 345055

Are you sure you want to delete this record? (Y/N)Y

Successfully Deleted
```

```
[A] Add Contact
[R] Remove Contact
[S] Show All Contact List
[E] Edit Contact
[C] Change Password
[Q] Quit to Main Menu
E_
```

```
[C] Change Password
[Q] Quit to Main Menu
E
Enter the member no to be modified : 16960
The member number is 16960
Name is John Paul
The mobile number is 0455443553
The landline number is 023435533
Email is jhd13@gmail.com
Address is Salt Lake City
City is Utah
Postalcode is 12023340
```

```
Details of 16960 are as follows
The member number is 16960
Name is John Paul
The mobile number is 0455443553
The landline number is 023435533
Email is jhd13@gmail.com
Address is Salt Lake City
City is Utah
Postalcode is 12023340
Re-enter details
Enter your name:
```

```
[A] Add Contact  
[R] Remove Contact  
[S] Show All Contact List  
[E] Edit Contact  
[C] Change Password  
[Q] Quit to Main Menu  
c
```

Enter Old Password bitsdxb

Enter New Password bitsdubai

Confirm Password bitsdubai
password changed successfully

```
[A] Add Contact  
[R] Remove Contact  
[S] Show All Contact List  
[E] Edit Contact  
[C] Change Password  
[Q] Quit to Main Menu  
Q
```

Press any key to continue..._

REFERENCES

1. Class Notes
2. Michael T. Goodrich and Roberto Tamassia: Algorithm Design: Foundations, Analysis and Internet examples (John Wiley & Sons, Inc., 2006).
3. Cormen T.H., Leiserson, C. E., Rivest, R.L., and C. Stein, "Introduction to Algorithms", MIT Press, 3rd Edition, 2009. (Indian reprint: Prentice Hall)
4. Ellis Horowitz, Sartaj Sahni, and Sanguthevar Rajasekaran, Computer Algorithms C++, Silicon Press Baker & Taylor, Barnes & Noble, 2nd edition, 2010.
5. <https://www.geeksforgeeks.org/c-plus-plus/?ref=ghm>
6. Youtube.com