**DATA STRUCTURES**

**MINI-PROJECT REPORT**

**PROJECT DONE BY**

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**PROBLEM STATEMENT:**

Write a program using any data structure which will take the input of details of the flats in a building. User will choose the flat according to the floor, flat number and rate. The program will search for the best match and assign it accordingly after accepting payment.

**FEATURES/FUNCTIONALITIES**:

The project takes the input of all the details of the flat such as flat number, floor, size in BHK, area in square feet, rate, etc. Then the user is given the option of adding another flat, changing status of a flat from booked to not booked and vice versa, displaying all flats and exiting to purchase the flat. Then the flats are displayed according to their availability and rate. The user then can choose the flat no., floor, size of flat according to availability. The program will then ask for the budget (i.e maximum and minimum amount willing to spend) from the user and decide whether the flat can be purchased or not. Then the first installment for booking a flat is taken from the user and the flat is booked successfully.

**DATA STRUCTURE:**

A doubly linked list has been used for the implementation of this code. A doubly linked list or a two-way linked list is a more complex type of linked list which contains a pointer to the next as well as the previous node in the sequence. Therefore, it consists of three parts—data, a pointer to the next node, and a pointer to the previous node. A doubly linked list provides the ease to manipulate the elements of the list as it maintains pointers to nodes in both the directions (forward and backward). The main advantage of using a doubly linked list is that it makes searching twice as efficient.

**CODE:**

#include<stdio.h>

#include<stdlib.h>

struct owner

{ int RoomNumber; //Flat number

int size; //in BHK's

float area; //sq.ft area of each flat

float rate; //price of the flat

int floor; //on which floor is the flat

int status; //0 for not booked and 1 for booked

float balance;

struct owner \*next;

struct owner \*prev;

};

struct owner \*start=NULL;

void create\_owner() //creating new flats

{ struct owner \*newnode, \*ptr;

int rn,size,floor;

float area,rate;

printf("Enter the Flat's Details:\n");

printf("Enter the Room Number:\n");

scanf("%d",&rn);

printf("Enter the flat size in BHK:\n");

scanf("%d",&size);

printf("Enter the Floor:");

scanf("%d",&floor);

printf("Enter the area per sq.ft:");

scanf("%f",&area);

printf("Rate:");

scanf("%f",&rate);

newnode=(struct owner\*)malloc(sizeof(struct owner));

newnode->RoomNumber = rn;

newnode->size = size;

newnode->floor = floor;

newnode->rate = rate;

newnode->area = area;

newnode->status = 0;

newnode->balance=rate;

if(start==NULL)

{ newnode->prev = NULL;

newnode->next = NULL;

start=newnode;

}

else

{ ptr=start;

while(ptr->next!=NULL)

ptr=ptr->next;

ptr->next = newnode;

newnode->next = NULL;

newnode->prev = ptr;

}

}

void sort\_rate() //sort files accorinding to rate

{ struct owner \*ptr1,\*ptr2;

int temp;

ptr1=start;

while(ptr1->next!=NULL)

{ ptr2=ptr1->next;

while(ptr2!=NULL)

{ if(ptr1->rate > ptr2->rate)

{ temp=ptr1->rate;

ptr1->rate = ptr2->rate;

ptr2->rate=temp;

}

ptr2=ptr2->next;

}

ptr1=ptr1->next;

}

}

void display\_all() //display details of all flats

{ sort\_rate();

struct owner \*ptr;

ptr = start;

while(ptr!=NULL)

{ printf("Room Number:%d\n", ptr->RoomNumber);

printf("Flat area per sq.feet: %f\n",ptr->area);

printf("Flat Floor: %d\n",ptr->floor);

printf("Flat size:%dBHK\n", ptr->size);

printf("Rate:Rs %f\n",ptr->rate);

if(ptr->status == 1)

{ printf("Status : Booked\n");

printf("Amount to be paid:%f\n",ptr->balance);

}

else

printf("Status : Not Booked\n");

ptr=ptr->next;

}

}

void display1(struct owner \*ptr)

{ printf("Room Number:%d\n", ptr->RoomNumber);

printf("Flat size:%dBHK\n", ptr->size);

printf("Flat area per sq.feet: %f\n",ptr->area);

printf("Flat Floor: %d\n",ptr->floor);

printf("Rate:Rs %f\n",ptr->rate);

printf("Amount to be paid:%f\n",ptr->balance);

}

void display\_available()

{ struct owner \*ptr;

ptr=start;

while(ptr!=NULL)

{ if(ptr->status == 0)

{ display1(ptr);

}

ptr=ptr->next;

}

}

void change\_status()

{ struct owner \*ptr;

int st,se,flag=0;

printf("Enter the Room Number you want to change status:\n");

scanf("%d",&st);

ptr=start;

while(ptr!=NULL)

{ if(ptr->RoomNumber==st)

{ printf("Is the Flat Book? If yes enter 1 else enter 0");

scanf("%d",&se);

ptr->status = se;

flag=1;

break;

}

ptr = ptr->next;

}

if(flag==0)

printf("Flat Not Found\n");

}

int display\_floor(int ft)

{ struct owner \*ptr;

int flag=0;

ptr=start;

while(ptr!=NULL)

{ if(ptr->status == 0)

{ if(ptr->floor == ft)

{ flag=1;

display1(ptr);

}

}

ptr = ptr->next;

}

if(flag==0)

{ printf("No flats found\n");

}

return flag;

}

int display\_bhk(int ft,int bhk)

{ struct owner \*ptr;

int flag=0;

ptr=start;

while(ptr!=NULL)

{ if(ptr->status == 0)

{ if(ptr->floor == ft)

{ if(ptr->size == bhk)

{ flag=1;

display1(ptr);

}

}

}

ptr = ptr->next;

}

if(flag==0)

{ printf("No flats found\n");

}

return flag;

}

int display\_best\_flat(int ft,int bhk,float us,float ms)

{ struct owner \*ptr;

int flag=0;

ptr=start;

while(ptr!=NULL)

{ if(ptr->status == 0)

{ if(ptr->floor == ft)

{ if(ptr->size == bhk)

{ if((ptr->rate >ms) && (ptr->rate < us))

{ flag=1;

display1(ptr);

}

}

}

}

ptr = ptr->next;

}

if(flag==0)

{ printf("No flats found\n");

}

return flag;

}

void change\_status\_customer(int rns,float m)

{ struct owner \*ptr;

ptr=start;

while(ptr->RoomNumber != rns)

{ ptr=ptr->next;

}

ptr->status = 1;

ptr->balance=ptr->balance-m;

printf("Your Flat has been Booked\nDetails of your Flat are:\n");

display1(ptr);

}

void sort\_display\_area()

{ struct owner \*ptr1,\*ptr2;

int temp;

ptr1=start;

while(ptr1->next!=NULL)

{ ptr2=ptr1->next;

while(ptr2!=NULL)

{ if(ptr1->area > ptr2->area)

{ temp=ptr1->area;

ptr1->area = ptr2->area;

ptr2->area=temp;

}

ptr2=ptr2->next;

}

ptr1=ptr1->next;

}

if(start==NULL)

printf("Empty");

else

{ display\_all();

}

}

void main()

{ struct owner \*ptr;

int n,i,op;

char s[50];

printf("Enter building name:\n");

scanf("%s",&s);

printf("Enter the number of Flats:\n");

scanf("%d",&n);

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

create\_owner();

printf("\*\*\*\*FOR OFFICE USE\*\*\*\*\n");

do

{ printf("\n1: Add Flats to Database\n");

printf("2: Change the status of a particular flat\n");

printf("3: Display all the Flats in the building\n");

printf("4: EXIT\n");

printf("Enter your option\n");

scanf("%d", &op);

switch(op)

{ case 1: create\_owner();

break;

case 2: change\_status();

break;

case 3: printf("%s\n",s);

display\_all();

break;

case 4: break;

default:printf("WRONG CHOICE");

break;

}

}while(op!=4);

printf("\*\*\*\*\*\*\*CUSTOMER\*\*\*\*\*\*\*\n");

do

{ int ft,bhk,rns,in,f,b,d;

float amt,us,ms,m;

printf("Number of available Flats are as Following:\n");

display\_available();

printf("\nFLats available according to Area:\n");

sort\_display\_area();

flat:

printf("Enter the Floor on which you want the Flat:\n");

scanf("%d",&ft);

f=display\_floor(ft);

if(f==0)

goto flat;

bhk:

printf("\nEnter the BHK's you want:\n");

scanf("%d",&bhk);

b=display\_bhk(ft,bhk);

if(b==0)

goto bhk;

money:

printf("Enter the maximum you can spend:\n");

scanf("%f",&us);

printf("Enter the minimum amount:\n");

scanf("%f",&ms);

d=display\_best\_flat(ft,bhk,us,ms);

if(d==0)

goto money;

printf("Enter the Room Number which you want to book:\n");

scanf("%d",&rns);

book:

printf("Enter first installment to confirm booking\n");

scanf("%f",&m);

if(m>=ms)

change\_status\_customer(rns,m);

else

{ printf("Insufficinet money\n");

goto book;

}

printf("Enter 1 to EXIT or anything else to continue:\n ");

scanf("%d",&in);

if(in == 1)

exit(1);

else

continue;

}while(1);

}

**OUTPUT:**

Enter building name:

NeelDhara

Enter the number of Flats:

12

Enter the Flat's Details:

Enter the Room Number:

101

Enter the flat size in BHK:

2

Enter the Floor:1

Enter the area per sq.ft:700

Rate:2500000

Enter the Flat's Details:

Enter the Room Number:

102

Enter the flat size in BHK:

3

Enter the Floor:1

Enter the area per sq.ft:800

Rate:3000000

Enter the Flat's Details:

Enter the Room Number:

103

Enter the flat size in BHK:

1

Enter the Floor:1

Enter the area per sq.ft:600

Rate:2000000

Enter the Flat's Details:

Enter the Room Number:

104

Enter the flat size in BHK:

4

Enter the Floor:1

Enter the area per sq.ft:1000

Rate:4000000

Enter the Flat's Details:

Enter the Room Number:

201

Enter the flat size in BHK:

5

Enter the Floor:2

Enter the area per sq.ft:1200

Rate:5000000

Enter the Flat's Details:

Enter the Room Number:

202

Enter the flat size in BHK:

3

Enter the Floor:2

Enter the area per sq.ft:800

Rate:3500000

Enter the Flat's Details:

Enter the Room Number:

203

Enter the flat size in BHK:

2

Enter the Floor:2

Enter the area per sq.ft:600

Rate:2500000

Enter the Flat's Details:

Enter the Room Number:

204

Enter the flat size in BHK:

4

Enter the Floor:2

Enter the area per sq.ft:1000

Rate:5000000

Enter the Flat's Details:

Enter the Room Number:

301

Enter the flat size in BHK:

3

Enter the Floor:3

Enter the area per sq.ft:800

Rate:4000000

Enter the Flat's Details:

Enter the Room Number:

302

Enter the flat size in BHK:

3

Enter the Floor:3

Enter the area per sq.ft:800

Rate:5000000

Enter the Flat's Details:

Enter the Room Number:

401

Enter the flat size in BHK:

1

Enter the Floor:4

Enter the area per sq.ft:1200

Rate:6000000

Enter the Flat's Details:

Enter the Room Number:

503

Enter the flat size in BHK:

3

Enter the Floor:5

Enter the area per sq.ft:800

Rate:5000000

\*\*\*\*FOR OFFICE USE\*\*\*\*

1: Add Flats to Database

2: Change the status of a particular flat

3: Display all the Flats in the building

4: EXIT

Enter your option

1

Enter the Flat's Details:

Enter the Room Number:

602

Enter the flat size in BHK:

2

Enter the Floor:6

Enter the area per sq.ft:700

Rate:3500000

1: Add Flats to Database

2: Change the status of a particular flat

3: Display all the Flats in the building

4: EXIT

Enter your option

2

Enter the Room Number you want to change status:

102

Is the Flat Book? If yes enter 1 else enter 01

1: Add Flats to Database

2: Change the status of a particular flat

3: Display all the Flats in the building

4: EXIT

Enter your option

3

NeelDhara

Room Number:101

Flat area per sq.feet: 700.000000

Flat Floor: 1

Flat size:2BHK

Rate:Rs 2000000.000000

Status : Not Booked

Room Number:102

Flat area per sq.feet: 800.000000

Flat Floor: 1

Flat size:3BHK

Rate:Rs 2500000.000000

Status : Booked

Amount to be paid:3000000.000000

Room Number:103

Flat area per sq.feet: 600.000000

Flat Floor: 1

Flat size:1BHK

Rate:Rs 2500000.000000

Status : Not Booked

Room Number:104

Flat area per sq.feet: 1000.000000

Flat Floor: 1

Flat size:4BHK

Rate:Rs 3000000.000000

Status : Not Booked

Room Number:201

Flat area per sq.feet: 1200.000000

Flat Floor: 2

Flat size:5BHK

Rate:Rs 3500000.000000

Status : Not Booked

Room Number:202

Flat area per sq.feet: 800.000000

Flat Floor: 2

Flat size:3BHK

Rate:Rs 3500000.000000

Status : Not Booked

Room Number:203

Flat area per sq.feet: 600.000000

Flat Floor: 2

Flat size:2BHK

Rate:Rs 4000000.000000

Status : Not Booked

Room Number:204

Flat area per sq.feet: 1000.000000

Flat Floor: 2

Flat size:4BHK

Rate:Rs 4000000.000000

Status : Not Booked

Room Number:301

Flat area per sq.feet: 800.000000

Flat Floor: 3

Flat size:3BHK

Rate:Rs 5000000.000000

Status : Not Booked

Room Number:302

Flat area per sq.feet: 800.000000

Flat Floor: 3

Flat size:3BHK

Rate:Rs 5000000.000000

Status : Not Booked

Room Number:401

Flat area per sq.feet: 1200.000000

Flat Floor: 4

Flat size:1BHK

Rate:Rs 5000000.000000

Status : Not Booked

Room Number:503

Flat area per sq.feet: 800.000000

Flat Floor: 5

Flat size:3BHK

Rate:Rs 5000000.000000

Status : Not Booked

Room Number:602

Flat area per sq.feet: 700.000000

Flat Floor: 6

Flat size:2BHK

Rate:Rs 6000000.000000

Status : Not Booked

1: Add Flats to Database

2: Change the status of a particular flat

3: Display all the Flats in the building

4: EXIT

Enter your option

4

\*\*\*\*\*\*\*CUSTOMER\*\*\*\*\*\*\*

Number of available Flats are as Following:

Room Number:101

Flat size:2BHK

Flat area per sq.feet: 700.000000

Flat Floor: 1

Rate:Rs 2000000.000000

Amount to be paid:2500000.000000

Room Number:103

Flat size:1BHK

Flat area per sq.feet: 600.000000

Flat Floor: 1

Rate:Rs 2500000.000000

Amount to be paid:2000000.000000

Room Number:104

Flat size:4BHK

Flat area per sq.feet: 1000.000000

Flat Floor: 1

Rate:Rs 3000000.000000

Amount to be paid:4000000.000000

Room Number:201

Flat size:5BHK

Flat area per sq.feet: 1200.000000

Flat Floor: 2

Rate:Rs 3500000.000000

Amount to be paid:5000000.000000

Room Number:202

Flat size:3BHK

Flat area per sq.feet: 800.000000

Flat Floor: 2

Rate:Rs 3500000.000000

Amount to be paid:3500000.000000

Room Number:203

Flat size:2BHK

Flat area per sq.feet: 600.000000

Flat Floor: 2

Rate:Rs 4000000.000000

Amount to be paid:2500000.000000

Room Number:204

Flat size:4BHK

Flat area per sq.feet: 1000.000000

Flat Floor: 2

Rate:Rs 4000000.000000

Amount to be paid:5000000.000000

Room Number:301

Flat size:3BHK

Flat area per sq.feet: 800.000000

Flat Floor: 3

Rate:Rs 5000000.000000

Amount to be paid:4000000.000000

Room Number:302

Flat size:3BHK

Flat area per sq.feet: 800.000000

Flat Floor: 3

Rate:Rs 5000000.000000

Amount to be paid:5000000.000000

Room Number:401

Flat size:1BHK

Flat area per sq.feet: 1200.000000

Flat Floor: 4

Rate:Rs 5000000.000000

Amount to be paid:6000000.000000

Room Number:503

Flat size:3BHK

Flat area per sq.feet: 800.000000

Flat Floor: 5

Rate:Rs 5000000.000000

Amount to be paid:5000000.000000

Room Number:602

Flat size:2BHK

Flat area per sq.feet: 700.000000

Flat Floor: 6

Rate:Rs 6000000.000000

Amount to be paid:3500000.000000

FLats available according to Area:

Room Number:101

Flat area per sq.feet: 600.000000

Flat Floor: 1

Flat size:2BHK

Rate:Rs 2000000.000000

Status : Not Booked

Room Number:102

Flat area per sq.feet: 600.000000

Flat Floor: 1

Flat size:3BHK

Rate:Rs 2500000.000000

Status : Booked

Amount to be paid:3000000.000000

Room Number:103

Flat area per sq.feet: 700.000000

Flat Floor: 1

Flat size:1BHK

Rate:Rs 2500000.000000

Status : Not Booked

Room Number:104

Flat area per sq.feet: 700.000000

Flat Floor: 1

Flat size:4BHK

Rate:Rs 3000000.000000

Status : Not Booked

Room Number:201

Flat area per sq.feet: 800.000000

Flat Floor: 2

Flat size:5BHK

Rate:Rs 3500000.000000

Status : Not Booked

Room Number:202

Flat area per sq.feet: 800.000000

Flat Floor: 2

Flat size:3BHK

Rate:Rs 3500000.000000

Status : Not Booked

Room Number:203

Flat area per sq.feet: 800.000000

Flat Floor: 2

Flat size:2BHK

Rate:Rs 4000000.000000

Status : Not Booked

Room Number:204

Flat area per sq.feet: 800.000000

Flat Floor: 2

Flat size:4BHK

Rate:Rs 4000000.000000

Status : Not Booked

Room Number:301

Flat area per sq.feet: 800.000000

Flat Floor: 3

Flat size:3BHK

Rate:Rs 5000000.000000

Status : Not Booked

Room Number:302

Flat area per sq.feet: 1000.000000

Flat Floor: 3

Flat size:3BHK

Rate:Rs 5000000.000000

Status : Not Booked

Room Number:401

Flat area per sq.feet: 1000.000000

Flat Floor: 4

Flat size:1BHK

Rate:Rs 5000000.000000

Status : Not Booked

Room Number:503

Flat area per sq.feet: 1200.000000

Flat Floor: 5

Flat size:3BHK

Rate:Rs 5000000.000000

Status : Not Booked

Room Number:602

Flat area per sq.feet: 1200.000000

Flat Floor: 6

Flat size:2BHK

Rate:Rs 6000000.000000

Status : Not Booked

Enter the Floor on which you want the Flat:

8

No flats found

Enter the Floor on which you want the Flat:

2

Room Number:201

Flat size:5BHK

Flat area per sq.feet: 800.000000

Flat Floor: 2

Rate:Rs 3500000.000000

Amount to be paid:5000000.000000

Room Number:202

Flat size:3BHK

Flat area per sq.feet: 800.000000

Flat Floor: 2

Rate:Rs 3500000.000000

Amount to be paid:3500000.000000

Room Number:203

Flat size:2BHK

Flat area per sq.feet: 800.000000

Flat Floor: 2

Rate:Rs 4000000.000000

Amount to be paid:2500000.000000

Room Number:204

Flat size:4BHK

Flat area per sq.feet: 800.000000

Flat Floor: 2

Rate:Rs 4000000.000000

Amount to be paid:5000000.000000

Enter the BHK's you want:

5

Room Number:201

Flat size:5BHK

Flat area per sq.feet: 800.000000

Flat Floor: 2

Rate:Rs 3500000.000000

Amount to be paid:5000000.000000

Enter the maximum you can spend:

600000

Enter the minimum amount:

2300

No flats found

Enter the maximum you can spend:

580000000

Enter the minimum amount:

45000

Room Number:201

Flat size:5BHK

Flat area per sq.feet: 800.000000

Flat Floor: 2

Rate:Rs 3500000.000000

Amount to be paid:5000000.000000

Enter the Room Number which you want to book:

201

Enter first installment to confirm booking

493000

Your Flat has been Booked

Details of your Flat are:

Room Number:201

Flat size:5BHK

Flat area per sq.feet: 800.000000

Flat Floor: 2

Rate:Rs 3500000.000000

Amount to be paid:4507000.000000

Enter 1 to EXIT or anything else to continue:

1