#include<iostream>

#include<string.h>

using namespace std;

class HashFunction

{

typedef struct hash

{

long key;

char name[10];

}hash;

hash h[10];

public:

HashFunction();

void insert();

void display();

int find(long);

void Delete(long);

};

HashFunction::HashFunction()

{

int i;

for(i=0;i<10;i++)

{

h[i].key=-1;

strcpy(h[i].name,"NULL");

}

}

void HashFunction::Delete(long k)

{

int index=find(k);

if(index==-1)

{

cout<<"\n\tKey Not Found";

}

else

{

h[index].key=-1;

strcpy(h[index].name,"NULL");

cout<<"\n\tKey is Deleted";

}

}

int HashFunction::find(long k)

{

int i;

for(i=0;i<10;i++)

{

if(h[i].key==k)

{

cout<<"\n\t"<<h[i].key<<" is Found at "<<i<<" Location With Name "<<h[i].name;

return i;

}

}

if(i==10)

{

return -1;

}

}

void HashFunction::display()

{

int i;

cout<<"\n\t\tKey\t\tName";

for(i=0;i<10;i++)

{

cout<<"\n\th["<<i<<"]\t"<<h[i].key<<"\t\t"<<h[i].name;

}

}

void HashFunction::insert()

{

char ans,n[10],ntemp[10];

long k,temp;

int v,hi,cnt=0,flag=0,i;

do

{

if(cnt>=10)

{

cout<<"\n\tHash Table is FULL";

break;

}

cout<<"\n\tEnter a Telephone No: ";

cin>>k;

cout<<"\n\tEnter a Client Name: ";

cin>>n;

hi=k%10;// hash function

if(h[hi].key==-1)

{

h[hi].key=k;

strcpy(h[hi].name,n);

}

else

{

if(h[hi].key%10!=hi)

{

temp=h[hi].key;

strcpy(ntemp,h[hi].name);

h[hi].key=k;

strcpy(h[hi].name,n);

for(i=hi+1;i<10;i++)

{

if(h[i].key==-1)

{

h[i].key=temp;

strcpy(h[i].name,ntemp);

flag=1;

break;

}

}

for(i=0;i<hi && flag==0;i++)

{

if(h[i].key==-1)

{

h[i].key=temp;

strcpy(h[i].name,ntemp);

break;

}

}

}

else

{

for(i=hi+1;i<10;i++)

{

if(h[i].key==-1)

{

h[i].key=k;

strcpy(h[i].name,n);

flag=1;

break;

}

}

for(i=0;i<hi && flag==0;i++)

{

if(h[i].key==-1)

{

h[i].key=k;

strcpy(h[i].name,n);

break;

}

}

}

}

flag=0;

cnt++;

cout<<"\n\t..... Do You Want to Insert More Key: y/n";

cin>>ans;

}while(ans=='y'||ans=='Y');

}

int main()

{

long k;

int ch,index;

char ans;

HashFunction obj;

do

{

cout<<"\n\t\*\*\* Telephone (ADT) \*\*\*\*\*";

cout<<"\n\t1. Insert\n\t2. Display\n\t3. Find\n\t4. Delete\n\t5. Exit";

cout<<"\n\t..... Enter Your Choice: ";

cin>>ch;

switch(ch)

{

case 1: obj.insert();

break;

case 2: obj.display();

break;

case 3: cout<<"\n\tEnter a Key Which You Want to Search: ";

cin>>k;

index=obj.find(k);

if(index==-1)

{

cout<<"\n\tKey Not Found";

}

break;

case 4: cout<<"\n\tEnter a Key Which You Want to Delete: ";

cin>>k;

obj.Delete(k);

break;

case 5:

break;

}

cout<<"\n\t..... Do You Want to Continue in Main Menu:y/n ";

cin>>ans;

}while(ans=='y'||ans=='Y');

}