#include <iostream>

#include<math.h>

using namespace std;

#define TABLE\_SIZE 10

class QuadraticProbing

{

 int HTable[TABLE\_SIZE];

 public:

 QuadraticProbing()

 {

 int i;

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

 HTable[i]=NULL;

 }

 void Insert();

 void Search();

 void Display();

 void Delete();

};

void QuadraticProbing :: Insert()

{

 int value, index, i, flag=0, hkey;

 cout << "\nEnter the value to insert into the hash table " << endl;

 cin >> value;

 hkey = value % TABLE\_SIZE;

 if(HTable[hkey] == NULL)

 HTable[hkey] = value;

 else

 {

 for(i=1;i <= TABLE\_SIZE;i++)

 {

 index = (hkey + i\*i )% TABLE\_SIZE;

 if(HTable[index] == NULL)

 {

 HTable[index] = value;

 break;

 }

 }

 if(i > TABLE\_SIZE)

 cout << "\nElement cannot be inserted, Table Full." << endl;

 }

}

void QuadraticProbing :: Search()

{

 int value, index, i, flag = 0, hkey;

 cout << "\nEnter search element : " << endl;

 cin >> value;

 hkey = value % TABLE\_SIZE;

 if (HTable[hkey] == value)

 cout << value << " is found at index " << hkey << endl;

 else

 {

 for(i=1; i <= TABLE\_SIZE; i++)

 {

 index = (hkey + i\*i) % TABLE\_SIZE;

 if(HTable[index] == value)

 {

 cout << value << " is found at index " << index << endl;

 break;

 }

 }

 if(i > TABLE\_SIZE)

 cout << "Sorry, " << value << " is not found in the Hash Table" << endl;

 }

}

void QuadraticProbing :: Delete()

{

 int value, index, i, flag = 0, hkey;

 cout << "\nEnter value to delete from Hash Table : " << endl;

 cin >> value;

 hkey = value % TABLE\_SIZE;

 if (HTable[hkey] == value)

 {

 HTable[hkey] = NULL;

 cout << value << " deleted from the Hash Table" << endl;

 }

 else

 {

 for(i=1; i <= TABLE\_SIZE ; i++)

 {

 index = (hkey + i\*i) % TABLE\_SIZE;

 if(HTable[index] == value)

 {

 HTable[index] = NULL;

 cout << value << " deleted from the Hash Table" << endl;

 break;

 }

 }

 if(i > TABLE\_SIZE)

 cout << "Sorry Deletion not possible. " << value << " is not found in the Hash Table" << endl;

 }

}

void QuadraticProbing :: Display()

{

 int i;

 cout << "\n HASH TABLE" << endl;

 cout << "Index\t\tValue" << endl;

 for(i=0;i< TABLE\_SIZE; i++)

 cout << i << "\t\t" << HTable[i] << endl;

}

int main()

{

 QuadraticProbing QP;

 int choice;

 while(1)

 {

 cout << "\nQUADRATIC PROBING MENU\n1.Insert\n2.Display\n3.Search\n4.Delete\n5.Exit" << endl;

 cout << "What's your choice : ";

 cin >> choice;

 switch(choice)

 {

 case 1:

 QP.Insert();

 break;

 case 2:

 QP.Display();

 break;

 case 3:

 QP.Search();

 break;

 case 4:

 QP.Delete();

 break;

 case 5:

 cout << "\nHappy Learning..!! Bye Bye...\n\n";

 exit(0);

 default: cout << "\n Sorry, You have entered wrong choice..!! " << endl << "\nTry again..!! or Exit";

 }

 }

 return 0;

}