9. Write a C++ program to implement all the functions of a dictionary (ADT) using hashing.

```
#include<iostream>
#include<conio.h>
#include<stdlib.h>
using namespace std;
# define max 10

typedef struct list
{
int data;
struct list  *next;
}node_type;
node_type *ptr[max],*root[max],*temp[max];

class Dictionary
{
public:
int index;

Dictionary();
void insert(int);
void search(int);
void delete_ele(int);
};

Dictionary::Dictionary()
{
index=-1;
for(int i=0;i<max;i++)
{
root[i]=NULL;
ptr[i]=NULL;
temp[i]=NULL;
}
}

void Dictionary::insert(int key)
{
index=int(key%max);
ptr[index]=(node_type*)malloc(sizeof(node_type));
ptr[index]->data=key;
if(root[index]==NULL)
{
root[index]=ptr[index];
root[index]->next=NULL;
temp[index]=ptr[index];
}

else
{
temp[index]=root[index];
while(temp[index]->next!=NULL)
temp[index]=temp[index]->next;
temp[index]->next=ptr[index];
```

```
}
}

void Dictionary::search(int key)
{
int flag=0;
index=int(key%max);
temp[index]=root[index];
while(temp[index]!=NULL)
{
if(temp[index]->data==key)
{
cout<<"\nSearch key is found!!";
flag=1;
break;
}
else temp[index]=temp[index]->next;
}
if (flag==0)
cout<<"\nsearch key not found.......";
}

void Dictionary::delete_ele(int key)
{
index=int(key%max);
temp[index]=root[index];
while(temp[index]->data!=key && temp[index]!=NULL)
{
ptr[index]=temp[index];
temp[index]=temp[index]->next;
}
ptr[index]->next=temp[index]->next;
cout<<"\n"<<temp[index]->data<<" has been deleted.";
temp[index]->data=-1;
temp[index]=NULL;
free(temp[index]);
}

main()
{
int val,ch,n,num;
char c;
Dictionary d;

do
{
cout<<"\nMENU:\n1.Create";
cout<<"\n2.Search for a value\n3.Delete an value";
cout<<"\nEnter your choice:";
cin>>ch;
switch(ch)
{
case 1:cout<<"\nEnter the number of elements to be inserted:";
cin>>n;
cout<<"\nEnter the elements to be inserted:";
for(int i=0;i<n;i++)
{
cin>>num;
```

```
d.insert(num);
}
break;
case 2:cout<<"\nEnter the element to be searched:";
cin>>n;
d.search(n);
case 3:cout<<"\nEnter the element to be deleted:";
cin>>n;
d.delete_ele(n);
break;
default:cout<<"\nInvalid choice....";
}
cout<<"\nEnter y to continue......";
cin>>c;
}while(c=='y');
getch();
}
```

OUTPUT

MENU:

1.Create

2.Search for a value

3.Delete an value

Enter your choice:1

Enter the number of elements to be inserted:8

Enter the elements to be inserted:10 4 5 8 7 12 6 1

Enter y to continue.....y

MENU:

1.Create

2.Search for a value

3.Delete an value

Enter your choice:2

Enter the element to be searched:12

```
Search key is found!!
Enter the element to be deleted:1

1 has been deleted.
Enter y to continue.....y
```