**Program 9 :**

**Write a C program to implement Hashing using Linear probing. Implement insertion, deletion, search and display.**

**Program :**

#include<stdio.h>

#define max 10

int hash(int HT[ ], int key)

{

return ( key%10);

}

void display(int HT[])

{

int i;

printf("HASH TABLE : \n");

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

printf("\n%d->%d", i, HT[i]);

}

void insert\_LinerProbing(int HT[ ],int key)

{

int index,i;

index = hash(HT,key);

if(HT[index] ==-1)

{

HT[index] =key;

printf("\nSuccesful Insertion");

return;

}

for(i=index+1; i<max;i++)

{

if(HT[i] == -1)

{

HT[i] =key;

printf("\nSuccesful Insertion");

return;

}

}

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

{

if(HT[i] == -1)

{

HT[i] =key;

printf("\nSuccesful Insertion");

return;

}

}

printf("\nUnsuccessful Insertion : Hash Table is FULL");

}

void Delete\_LinerProbing(int HT[ ],int key)

{

int index,i;

index = hash(HT,key);

if(HT[index] ==key)

{

HT[index] =-1;

printf("\nSuccesful Deletion");

return;

}

for(i=index+1; i<max;i++)

{

if(HT[i] == key)

{

HT[i] =-1;

printf("\nSuccesful Deletion");

return;

}

}

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

{

if(HT[i] == key)

{

HT[i] =-1;

printf("\nSuccesful Deletion");

return;

}

}

printf("\nUnsuccessful Deletion: Key Not Found");

}

void main()

{

int HT[max]; // hash table

int key,i,choice;

printf("\n hash table\n");

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

HT[i] = -1;

while(1)

{

printf("\nEnter the choice \n1 : insert \n2 : delete\n3 : display\n4 : exit\n");

scanf("%d",&choice);

switch(choice)

{

case 1: printf("\nEnter the key to be inserted :");

scanf("%d",&key);

insert\_LinerProbing(HT,key);

break;

case 2: printf("\nEnter the key to be deleted :");

scanf("%d",&key);

Delete\_LinerProbing(HT,key);

break;

case 3: display(HT);

break;

default:exit(0);

}

}

}

**OUTPUTS :**

**OUTPUT 1 :**

hash table

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

1

Enter the key to be inserted :10

Succesful Insertion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

1

Enter the key to be inserted :20

Succesful Insertion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

1

Enter the key to be inserted :30

Succesful Insertion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

1

Enter the key to be inserted :70

Succesful Insertion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

1

Enter the key to be inserted :80

Succesful Insertion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

1

Enter the key to be inserted :90

Succesful Insertion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

3

HASH TABLE :

0->10

1->20

2->30

3->70

4->80

5->90

6->-1

7->-1

8->-1

9->-1

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

1

Enter the key to be inserted :90

Succesful Insertion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

3

HASH TABLE :

0->10

1->20

2->30

3->70

4->80

5->90

6->90

7->-1

8->-1

9->-1

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

2

Enter the key to be deleted :90

Succesful Deletion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

3

HASH TABLE :

0->10

1->20

2->30

3->70

4->80

5->-1

6->90

7->-1

8->-1

9->-1

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

2

Enter the key to be deleted :20

Succesful Deletion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

2

Enter the key to be deleted :70

Succesful Deletion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

3

HASH TABLE :

0->10

1->-1

2->30

3->-1

4->80

5->-1

6->90

7->-1

8->-1

9->-1

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

4

**OUTPUT 2 :**

hash table

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

2

Enter the key to be deleted :10

Unsuccessful Deletion: Key Not Found

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

3

HASH TABLE :

0->-1

1->-1

2->-1

3->-1

4->-1

5->-1

6->-1

7->-1

8->-1

9->-1

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

1

Enter the key to be inserted :10

Succesful Insertion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

1

Enter the key to be inserted :20

Succesful Insertion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

1

Enter the key to be inserted :1000

Succesful Insertion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

3

HASH TABLE :

0->10

1->20

2->1000

3->-1

4->-1

5->-1

6->-1

7->-1

8->-1

9->-1

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

2

Enter the key to be deleted :20

Succesful Deletion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

2

Enter the key to be deleted :1000

Succesful Deletion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

3

HASH TABLE :

0->10

1->-1

2->-1

3->-1

4->-1

5->-1

6->-1

7->-1

8->-1

9->-1

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

2

Enter the key to be deleted :10

Succesful Deletion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

3

HASH TABLE :

0->-1

1->-1

2->-1

3->-1

4->-1

5->-1

6->-1

7->-1

8->-1

9->-1

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

4

**OUTPUT 3 :**

hash table

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

2

Enter the key to be inerted :1

Unsuccessful Deletion: Key Not Found

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

3

HASH TABLE :

0->-1

1->-1

2->-1

3->-1

4->-1

5->-1

6->-1

7->-1

8->-1

9->-1

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

1

Enter the key to be inerted :34

Succesful Insertion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

1

Enter the key to be inerted :55

Succesful Insertion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

1

Enter the key to be inerted :46

Succesful Insertion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

1

Enter the key to be inerted :56

Succesful Insertion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

1

Enter the key to be inerted :89

Succesful Insertion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

1

Enter the key to be inerted :

1

Succesful Insertion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

1

Enter the key to be inerted :45

Succesful Insertion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

3

HASH TABLE :

0->-1

1->1

2->-1

3->-1

4->34

5->55

6->46

7->56

8->45

9->89

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

2

Enter the key to be inerted :2

Unsuccessful Deletion: Key Not Found

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

2

Enter the key to be inerted :45

Succesful Deletion

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

3

HASH TABLE :

0->-1

1->1

2->-1

3->-1

4->34

5->55

6->46

7->56

8->-1

9->89

Enter the choice

1 : insert

2 : delete

3 : display

4 : exit

4