

Given a File of N employee records with a set K of Keys(4-digit) which uniquely determine the records in file F. Assume that file F is maintained in memory by a Hash Table (HT) of m memory locations with L as the set of memory addresses (2-digit) of locations in HT. Let the keys in K and addresses in L are Integers. Design and develop a Program in C that uses Hash function H:  $K \rightarrow L$  as  $H(K) = K \bmod m$  (remainder method), and implement hashing technique to map a given key K to the address space L. Resolve the collision (if any) using linear probing

**Student Name:** Neha Sharma

**UID:**20BCS4576

**Branch:** CSE-IOT

**Section/Group:** 20BIT-1/A

**Semester:** 3<sup>rd</sup>

**Date of Performance:** 22/11/2021

**Subject Name:** Data Structures Lab

**Subject Code:** 20CSP-236

**1. Aim/Overview of the practical:** To write a program based Hashing Concept and use it to provide effective search.

**2. Task to be done:** Develop a Program in C that uses Hash function H:  $K \rightarrow L$  as  $H(K) = K \bmod m$  (remainder method), and implement hashing technique to map a given key K to the address space L. Resolve the collision (if any) using linear probing

**3. Algorithm:**

**Step 1:** Start

**Step 2:** Given a File of N employee records with a set K of Keys (of 4 digits) which uniquely determine the records in file F

**Step 3:** Assume that file F is maintained in memory by a Hash Table (HT) of m memory locations with L as the set of memory addresses (2-digit) of locations in HT

**Step 4:** Let the keys in K and addresses in L are Integers

**Step 5:** Hash function H:  $K \rightarrow L$  as  $H(K) = K \bmod m$  (remainder method)

**Step 6:** Hashing as to map a given key K to the address space L, Resolve the collision (if any) is using linear probing

**Step 7:** Stop

#### 4. Steps for experiment/practical:

```
#include<stdio.h>
```

```
#include<stdlib.h>
```

```
int key[20],n,m;
```

```
int *ht,index;
```

```
int count = 0;
```

```
void insert(int key)
```

```
{
```

```
    index = key % m;
```

```
    while(ht[index] != -1)
```

```
    {
```

```
        index = (index+1)%m;
```

```
    }
```

```
    ht[index] = key;
```

```
    count++;
```

```
}
```

```
void display()
```

```
{
```

```
    int i;
```

```
    if(count == 0)
```

```
    {
```

```
        printf("\nHASH TABLE IS EMPTY!!");
```

```
        return;

    }

    printf("\nHASH TABLE CONTENTS =\n");

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

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

}

int main()

{

    int i;

    printf("\nENTER THE NUMBER OF EMPLOYEE RECORDS(N):");

    scanf("%d", &n);

    printf("\nENTER THE TWO DIGIT MEMORY LOCATIONS (m) FOR HASH TABLE:");

    scanf("%d", &m);

    ht = (int *)malloc(m*sizeof(int));

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

        ht[i] = -1;

    printf("\nENTER THE FOUR DIGIT KEY VALUES (K) FOR N EMPLOYEE RECORDS:\n");

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

        scanf("%d", &key[i]);
```

---

```
for(i=0;i<n;i++)  
{  
    if(count == m)  
    {  
        printf("\n***HASH TABLE IS FULL CANNOT INSERT THE RECORD %d KEY***",i+1);  
        break;  
    }  
    insert(key[i]);  
}  
  
display();  
}
```

## 5. OUTPUT:

```
ENTER THE NUMBER OF EMPLOYEE RECORDS (N) :12
ENTER THE TWO DIGIT MEMORY LOCATIONS (m) FOR HASH TABLE:15
ENTER THE FOUR DIGIT JFY VALUES (K) FOR N EMPLOYEE RECORDS:
4576
4544
4545
4585
4570
4506
4628
4602
4568
4504
1234
4444

HASH TABLE CONTENTS =

T[0] --> 4545
T[1] --> 4576
T[2] --> -1
T[3] --> -1
T[4] --> 4504
T[5] --> 1234
T[6] --> 4506
```

input

button

Snipping Tool is moving  
In a future update, Snipping Tool will move to a new home. Try improved features with Snip & Sketch (or try the classic Snipping Tool) by pressing the Windows logo key + Shift + S.

Go to Snip & Sketch

```

input
4506
4628
4602
4568
4504
1234
4444

HASH TABLE CONTENTS =

T[0] --> 4545
T[1] --> 4576
T[2] --> -1
T[3] --> -1
T[4] --> 4504
T[5] --> 1234
T[6] --> 4506
T[7] --> 4444
T[8] --> 4628
T[9] --> 4568
T[10] --> 4585
T[11] --> 4570
T[12] --> 4602
T[13] --> -1
T[14] --> 4544

...Program finished with exit code 0
Press ENTER to exit console.

```

### Learning outcomes (What I have learnt):

1. To write a program based Hashing Concept and use it to provide effective search.
2. Respective syntax and implementation.

**Evaluation Grid (To be created as per the SOP and Assessment guidelines by the faculty):**

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.			
2.			
3.			