Lab program:-

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 -> L as H(K)=K mod 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.

```
#include <stdio.h>

#define MAX 100

int hashTable[MAX];
int m;

/* Initialize Hash Table */
void init()
{
   for (int i = 0; i < m; i++)
      hashTable[i] = -1;
}

/* Insert Key using Linear Probing */
void insert(int key)
{
   int index = key % m;
   int startIndex = index;

   while (hashTable[index] != -1)
   {
      index = (index + 1) % m;
```

```
        if (index == startIndex)
        {
            printf("Hash Table Overflow! Cannot insert %d\n", key);
            return;
        }
    }

    hashTable[index] = key;
    printf("Key %d inserted at address %d\n", key, index);
}

/* Display Hash Table */
void display()
{
    printf("\nHash Table Contents:\n");
    for (int i = 0; i < m; i++)
    {
        if (hashTable[i] == -1)
            printf("HT[%d] --> EMPTY\n", i);
        else
            printf("HT[%d] --> %d\n", i, hashTable[i]);
    }
}

/* Main Function */
int main()
{
    int n, key;
```

```
    printf("Enter size of hash table (m): ");
    scanf("%d", &m);

    init();

    printf("Enter number of employee records (N): ");
    scanf("%d", &n);

    for (int i = 0; i < n; i++)
    {
        printf("Enter 4-digit employee key: ");
        scanf("%d", &key);
        insert(key);
    }

    display();

    return 0;
}
```

```
Enter size of hash table (m): 2
Enter number of employee records (N): 3
Enter 4-digit employee key: 1234
Key 1234 inserted at address 0
Enter 4-digit employee key: 1324
Key 1324 inserted at address 1
Enter 4-digit employee key: 1143
Hash Table Overflow! Cannot insert 1143

Hash Table Contents:
HT[0] --> 1234
HT[1] --> 1324

Process returned 0 (0x0)   execution time : 13.665 s
Press any key to continue.
```