Laboratory Component 12

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>
#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 are:\n ");
       for(i=0; i<m; i++)
              printf("\n T[%d] --> %d ", i, ht[i]);
}


void 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]);
   }

          //Displaying Keys inserted into hash table
           display();
}
```

Output:

```
Enter the number of employee  records (N) :   12

Enter the two digit memory locations (m) for hash table:   15

Enter the four digit key values (K) of 'N' Employee Records:
1234
5678
3456
2345
6799
1235
7890
3214
3456
1235
5679
```

```
2346

Hash Table contents are:

 T[0] --> 7890
 T[1] --> -1
 T[2] --> -1
 T[3] --> -1
 T[4] --> 1234
 T[5] --> 2345
 T[6] --> 3456
 T[7] --> 6799
 T[8] --> 5678
 T[9] --> 1235
 T[10] --> 3214
 T[11] --> 3456
 T[12] --> 1235
 T[13] --> 5679
 T[14] --> 2346
```