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 functionH: 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>
FILE *fp;
struct employee
{
char name[20];
int key,salary;
}emp[20];
int n,m;
int *ht,ind;
int count = 0;

void insert(int key)
{

            ind= key % m;
            while(ht[ind] != -1)
            {
                        printf("\ncollision detected for %d and resloved using linear probing",key);
                        ind = (ind+1)%m;
            }
            ht[ind] = 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;
        fp=fopen("C:\\PROGRAM1.txt","w");
        printf("\nEnter the four digit key,name,salary values (K) for N Employee Records:\n  ");
        for(i=0; i<n; i++)
        {
                scanf("%d%s%d",&emp[i].key,&emp[i].name,&emp[i].salary);
                fprintf(fp,"%d\t%s\t%d\n",emp[i].key,emp[i].name,emp[i].salary);
        }
        fclose(fp);
        fp=fopen("C:\\PROGRAM1.txt","r");
        for(i=0;i<n;i++)
        {
                if(count == m)
                {
                        printf("\n~~~Hash table is full. Cannot insert the record %d key~~~",i+1);
                        break;
                }
                fscanf(fp,"%d",&emp[i].key);
                insert(emp[i].key);

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

}
```

OUTPUT:-

```
Enter the number of employee  records (N) :   5
Enter the two digit memory locations (m) for hash table:   10
```

Enter the four digit key,name,salary values (K) for N Employee Records:
1111 ajay 12345
7689 bhavya 12323
2222 chaitra 13212
2341 divya 14231
2342 girija 15231
collision detected for 2341 and resloved using linear probing
collision detected for 2341 and resloved using linear probing
collision detected for 2342 and resloved using linear probing
collision detected for 2342 and resloved using linear probing
Hash Table contents are:
T[0] --> -1
T[1] --> 1111
T[2] --> 2222
T[3] --> 2341
T[4] --> 2342
T[5] --> -1
T[6] --> -1
T[7] --> -1
T[8] --> -1
T[9] --> 7689