EXERCISE 15

Write a C program to implement hashing using Linear Probing method

Aim:

To implement hashing using the Linear Probing method in C.

Algorithm:

1. Initialize a hash table of fixed size with all elements set to -1 (indicating empty).
2. Use the hash function index = key % size to find the initial index.
3. If the slot is occupied, use linear probing to find the next available slot.
4. Insert the key in the found slot.
5. Display the final hash table.

Program :

```
#include <stdio.h>
#define SIZE 10
int hashTable[SIZE];
int hash(int key) {
   return key % SIZE;
}
void insert(int key) {
   int index = hash(key);
   int i = 0;
   while (hashTable[(index + i) % SIZE] != -1) {
      i++;
      if (i == SIZE) {
         printf("Hash table is full!\n");
         return;
      }
```

```
    }
    hashTable[(index + i) % SIZE] = key;
}
void display() {
    printf("\nHash Table:\n");
    for (int i = 0; i < SIZE; i++) {
        printf("[%d] => %d\n", i, hashTable[i]);
    }
}
int main() {
    // Initialize hash table
    for (int i = 0; i < SIZE; i++) {
        hashTable[i] = -1;
    }
    int n, key;
    printf("Enter number of elements to insert: ");
    scanf("%d", &n);
    for (int i = 0; i < n; i++) {
        printf("Enter key %d: ", i + 1);
        scanf("%d", &key);
        insert(key);
    }
    display();
    return 0;
}
```

Input and output:

```
Enter number of elements to insert: 5
Enter key 1: 23
Enter key 2: 43
Enter key 3: 13
Enter key 4: 27
Enter key 5: 33

Hash Table:
[0] => -1
[1] => -1
[2] => -1
[3] => 23
[4] => 43
[5] => 13
[6] => 33
[7] => 27
[8] => -1
[9] => -1


=== Code Execution Successful ===
```

RESULT:

The C program successfully implements hashing using the Linear Probing method