

# Rajalakshmi Engineering College

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## NeoColab\_REC\_CS23231\_DATA STRUCTURES

### REC\_DS using C\_Week 7\_COD\_Question 2

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Priya is developing a simple student management system. She wants to store roll numbers in a hash table using Linear Probing, and later search for specific roll numbers to check if they exist.

Implement a hash table using linear probing with the following operations:

Insert all roll numbers into the hash table. For a list of query roll numbers, print "Value x: Found" or "Value x: Not Found" depending on whether it exists in the table.

##### ***Input Format***

The first line contains two integers,  $n$  and  $table\_size$  — the number of roll numbers to insert and the size of the hash table.

The second line contains n space-separated integers – the roll numbers to insert.

The third line contains an integer q – the number of queries.

The fourth line contains q space-separated integers – the roll numbers to search for.

### ***Output Format***

The output print q lines – for each query value x, print: "Value x: Found" or "Value x: Not Found"

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 5 10  
21 31 41 51 61  
3  
31 60 51

Output: Value 31: Found  
Value 60: Not Found  
Value 51: Found

### ***Answer***

```
#include <stdio.h>

#define MAX 100
```

```
void initializeTable(int table[], int size) {
```

```
    for (int i = 0; i < size; i++) {
        table[i] = -1;
    }
}
```

```
int linearProbe(int table[], int size, int num) {
```

```
int index = num % size;
int start_index = index;

while (table[index] != -1) {
    index = (index + 1) % size;
```

```
    if (index == start_index) {
        return -1;
    }
}
```

```
return index;
}
```

```
void insertIntoHashTable(int table[], int size, int arr[], int n) {
    for (int i = 0; i < n; i++) {
        int pos = linearProbe(table, size, arr[i]);
        if (pos != -1) {
            table[pos] = arr[i];
        }
    }
}
```

```
int searchInHashTable(int table[], int size, int num) {
    int index = num % size;
    int start_index = index;
```

```
    while (table[index] != -1) {
        if (table[index] == num) {
            return 1; // Found
        }
    }
```

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

```
    if (index == start_index) {
        break; // Searched the entire table
    }
}
```

```
    return 0; // Not found
}
```

```
int main() {
    int n, table_size;
    scanf("%d %d", &n, &table_size);

    int arr[MAX], table[MAX];
    for (int i = 0; i < n; i++)
        scanf("%d", &arr[i]);

    initializeTable(table, table_size);
    insertIntoHashTable(table, table_size, arr, n);

    int q, x;
    scanf("%d", &q);
    for (int i = 0; i < q; i++) {
        scanf("%d", &x);
        if (searchInHashTable(table, table_size, x))
            printf("Value %d: Found\n", x);
        else
            printf("Value %d: Not Found\n", x);
    }

    return 0;
}
```

**Status :** Correct

**Marks :** 10/10