

Rajalakshmi Engineering College

Name: Haripreeth CJ

Email: 241501065@rajalakshmi.edu.in

Roll no: 241501065

Phone: 9445359004

Branch: REC

Department: I AI & ML FA

Batch: 2028

Degree: B.E - AI & ML

Scan to verify results



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; // Initialize all slots to -1 (empty)
    }
}
```

```
int linearProbe(int table[], int size, int num) {
    int index = num % size; // Calculate initial index using hash function
    int originalIndex = index; // Store original index for loop control
```

```

// Loop until we find an empty slot or return to the original index
while (table[index] != -1) {
    if (table[index] == num) {
        return index; // Return index if the number is found
    }
    index = (index + 1) % size; // Move to the next index
    if (index == originalIndex) {
        break; // If we looped back to the original index, stop searching
    }
}
return -1; // Indicate that the number was not found
}

void insertIntoHashTable(int table[], int size, int arr[], int n) {
    for (int i = 0; i < n; i++) {
        int index = arr[i] % size; // Calculate initial index using hash function
        while (table[index] != -1) {
            index = (index + 1) % size; // Move to the next index
        }
        table[index] = arr[i]; // Insert the roll number at the found index
    }
}

int searchInHashTable(int table[], int size, int num) {
    return linearProbe(table, size, num) != -1; // Return true if 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