# Rajalakshmi Engineering College

Name: bharath kumar
Email: 241801032@rajalakshmi.edu.in
Roll no: 2116241801032
Phone: 7305320010
Branch: REC
Department: l AI & DS FA
Batch: 2028
Degree: B.E - AI & DS

## NeoColab_REC_CS23231_DATA STRUCTURES

## REC_DS using C_Week 7_COD_Question 1

Attempt : 1
Total Mark : 10
Marks Obtained : 10

## Section 1 : Coding

1.   Problem Statement

Ravi is building a basic hash table to manage student roll numbers for quick lookup. He decides to use Linear Probing to handle collisions.

Implement a hash table using linear probing where:

The hash function is: index = roll_number % table_sizeOn collision, check subsequent indexes (i+1, i+2, ...) until an empty slot is found.

You need to:

Insert a list of n student roll numbers into the hash table.Print the final state of the hash table. If a slot is empty, print -1.

*Input Format*

The first line of the input contains two integers n and table_size, where n is the

number of roll numbers to be inserted, and table_size is the size of the hash table.

The second line contains n space-separated integers — the roll numbers to insert into the hash table.

### Output Format

The output should print a single line with table_size space-separated integers representing the final state of the hash table after all insertions.

If any slot remains unoccupied, it should be represented as -1.

Refer to the sample output for formatting specifications.

### Sample Test Case

Input: 4 7
50 700 76 85
Output: 700 50 85 -1 -1 -1 76

### Answer

```c
#include <stdio.h>

#define MAX 100
// You are using GCC
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 originalIndex = index;
    while (table[index] != -1) {
        index = (index + 1) % size;
        if (index == originalIndex) {
            // Table is full, no free slot
            return -1;
```

```c
        }
    }
    return index;
}

void insertIntoHashTable(int table[], int size, int arr[], int n) {
    for (int i = 0; i < n; i++) {
        int rollNumber = arr[i];
        int index = rollNumber % size;
        if (table[index] == -1) {
            table[index] = rollNumber;
        } else {
            int newIndex = linearProbe(table, size, rollNumber);
            if (newIndex == -1) {
                // Table full, cannot insert
                // According to problem constraints this shouldn't happen
                continue;
            }
            table[newIndex] = rollNumber;
        }
    }
}

void printTable(int table[], int size) {
    for (int i = 0; i < size; i++) {
        printf("%d", table[i]);
        if (i != size - 1)
            printf(" ");
    }
    printf("\n");
}

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

    int arr[MAX];
    int table[MAX];

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

    initializeTable(table, table_size);
```

```
    insertIntoHashTable(table, table_size, arr, n);
    printTable(table, table_size);

    return 0;
}
```

*Status :* Correct                                          *Marks : 10/10*