

Rajalakshmi Engineering College

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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: $\text{index} = \text{roll_number} \% \text{table_size}$ On 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

```
#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 originalIndex = index;  
    while (table[index] != -1) {  
        index = (index + 1) % size;  
        if (index == originalIndex)  
            return -1;  
    }  
    return index;  
}
```

```
}
```

```
void insertIntoHashTable(int table[], int size, int arr[], int n) {
```

```
    for (int i = 0; i < n; i++) {
```

```
        int pos = arr[i] % size;
```

```
        if (table[pos] == -1) {
```

```
            table[pos] = arr[i];
```

```
        } else {
```

```
            int newPos = linearProbe(table, size, arr[i]);
```

```
            if (newPos != -1)
```

```
                table[newPos] = arr[i];
```

```
        }
```

```
    }
```

```
}
```

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

```
    for (int i = 0; i < size; i++) {
```

```
        printf("%d ", table[i]);
```

```
    }
```

```
    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