

# Rajalakshmi Engineering College

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## NeoColab\_REC\_CS23231\_DATA STRUCTURES

### REC\_DS using C\_Week 7\_COD\_Question 5

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

You are provided with a collection of numbers, each represented by an array of integers. However, there's a unique scenario: within this array, one element occurs an odd number of times, while all other elements occur an even number of times. Your objective is to identify and return the element that occurs an odd number of times in this arrangement.

Utilize mid-square hashing by squaring elements and extracting middle digits for hash codes. Implement a hash table for efficient integer occurrence tracking.

Note: Hash function: squared = key \* key.

Example

Input:

7

2 2 3 3 4 4 5

Output:

5

Explanation

The hash function and the calculated hash indices for each element are as follows:

2 ->  $\text{hash}(2*2) \% 100 = 4$

3 ->  $\text{hash}(3*3) \% 100 = 9$

4 ->  $\text{hash}(4*4) \% 100 = 16$

5 ->  $\text{hash}(5*5) \% 100 = 25$

The hash table records the occurrence of each element's hash index:

Index 4: 2 occurrences

Index 9: 2 occurrences

Index 16: 2 occurrences

Index 25: 1 occurrence

Among the elements, the integer 5 occurs an odd number of times (1 occurrence) and satisfies the condition of the problem. Therefore, the program outputs 5.

### ***Input Format***

The first line of input consists of an integer N, representing the size of the array.

The second line consists of N space-separated integers, representing the elements of the array.

### ***Output Format***

The output prints a single integer representing the element that occurs an odd

number of times.

If no such element exists, print -1.

Refer to the sample output for the formatting specifications.

### **Sample Test Case**

Input: 7

2 2 3 3 4 4 5

Output: 5

### **Answer**

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <stdbool.h>

#define MAX_SIZE 100

unsigned int hash(int key, int tableSize) {
    int squared = key * key;

    // Extract middle 2 digits from squared number
    char squareStr[20];
    sprintf(squareStr, "%d", squared);
    int len = strlen(squareStr);

    // Get middle part of square (1 or 2 digits based on length)
    int midStart = len / 2 - 1;
    if (midStart < 0) midStart = 0;

    char midDigits[3] = {0};
    midDigits[0] = squareStr[midStart];
    if (midStart + 1 < len)
        midDigits[1] = squareStr[midStart + 1];

    return atoi(midDigits) % tableSize;
}
```

```

int getOddOccurrence(int arr[], int size) {
    const int TABLE_SIZE = 100;
    int count[TABLE_SIZE] = {0};

    // Count occurrences using hash table
    for (int i = 0; i < size; i++) {
        unsigned int index = hash(arr[i], TABLE_SIZE);
        count[index]++;
    }

    // Find the element that occurs odd number of times
    for (int i = 0; i < size; i++) {
        unsigned int index = hash(arr[i], TABLE_SIZE);
        if (count[index] % 2 != 0) {
            return arr[i];
        }
    }

    return -1;
}

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

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

    printf("%d\n", getOddOccurrence(arr, n));

    return 0;
}

```

**Status :** Correct

**Marks :** 10/10