

# WEEK 6

Check pair with difference k

Problem Statement:

Given an array A of sorted integers and another non negative integer k, find if there exists 2 indices i and j such that  $A[i] - A[j] = k$ ,  $i \neq j$ .

Input Format

1. First line is number of test cases T. Following T lines contain:
2. N, followed by N integers of the array
3. The non-negative integer k

Output format

Print 1 if such a pair exists and 0 if it doesn't.

Sample Input:

```
1
3 1 3 5
4
```

Sample Output:

```
1
```

```
1 #include<stdio.h>
2 int main()
3 {
4     int t;
5     scanf("%d",&t);
6     while(t-->0)
7     {
8         int n;
9         scanf("%d",&n);
10        int a[n];
11        for(int i=0;i<n;i++)
12        {
13            scanf("%d",&a[i]);
14        }
15        int k;
16        scanf("%d",&k);
17        int flag = 0;
18        for (int i=0;i<n;i++)
19        {
20            for(int j =i+1;j<n;j++)
21            {
22                if (a[i]-a[j]==k||a[j]-a[i]==k)
23                {
24                    flag = 1;
25                    break;
26                }
27            }
28            if(flag)break;
29        }
30        printf("%d\n",flag);
31    }
32 }
```

	Input	Expected	Got	
✓	1 3 1 3 5 4	1	1	✓
✓	1 3 1 3 5 99	0	0	✓

Passed all tests! ✓

## Chocolates

### Problem Statement:

Sam loves chocolates and starts buying them on the 1st day of the year. Each day of the year,  $x$ , is numbered from 1 to  $Y$ . On days when  $x$  is odd, Sam will buy  $x$  chocolates; on days when  $x$  is even, Sam will not purchase any chocolates.

Complete the code in the editor so that for each day  $N_i$  (where  $1 \leq x \leq N \leq Y$ ) in array `arr`, the number of chocolates Sam purchased (during days 1 through  $N$ ) is printed on a new line. This is a function-only challenge, so input is handled for you by the locked stub code in the editor.

### Input Format

The program takes an array of integers as a parameter.

The locked code in the editor handles reading the following input from `stdin`, assembling it into an array of integers (`arr`), and calling `calculate(arr)`.

The first line of input contains an integer,  $T$  (the number of test cases). Each line  $i$  of the  $T$  subsequent lines describes the  $i$ th test case as an integer,  $N_i$  (the number of days).

### Constraints

$$1 \leq T \leq 2 \times 10^5$$

$$1 \leq N \leq 2 \times 10^6$$

$$1 \leq x \leq N \leq Y$$

### Output Format

For each test case,  $T_i$  in `arr`, your `calculate` method should print the total number of

chocolates Sam purchased by day Ni on a new line.

Sample Input 0

3  
1  
2  
3

Sample Output 0

1  
1  
4

```
1 #include<stdio.h>
2 int main()
3 {
4     int t;
5     scanf("%d", &t);
6     while(t-->0)
7     {
8         int n,c=0;
9         scanf("%d",&n);
10        for(int i = 0;i<=n;i++)
11        {
12            if(i%2 != 0)
13            {
14                c = c+ i;
15            }
16        }
17        printf("%d\n",c);
18    }
19 }
```

	Input	Expected	Got	
✓	3	1	1	✓
	1	1	1	
	2	4	4	
	3			
✓	10	1296	1296	✓
	71	2500	2500	
	100	1849	1849	
	86	729	729	
	54	400	400	
	40	25	25	
	9	1521	1521	
	77	25	25	
	9	49	49	
	13	2401	2401	
	98			

Passed all tests! ✓

## Football Scores

### Problem Statement:

The number of goals achieved by two football teams in matches in a league is given in the form of two lists. Consider:

- Football team A, has played three matches, and has scored { 1 , 2 , 3 } goals in each match respectively.
- Football team B, has played two matches, and has scored { 2, 4 } goals in each match respectively.
- Your task is to compute, for each match of team B, the total number of matches of team A, where team A has scored less than or equal to the number of goals scored by team B in that match.

In the above case:

- For 2 goals scored by team B in its first match, team A has 2 matches with scores 1 and 2.
- For 4 goals scored by team B in its second match, team A has 3 matches with scores 1, 2 and 3. Hence, the answer: {2, 3}.

Complete the code in the editor below. The program must return an array of  $m$  positive integers, one for each  $maxes[i]$  representing the total number of elements  $nums[j]$  satisfying  $nums[j] \leq maxes[i]$  where  $0 \leq j < n$  and  $0 \leq i < m$ , in the given order.

It has the following:

$nums[nums[0], \dots, nums[n-1]]$ : first array of positive integers

$maxes[maxes[0], \dots, maxes[m-1]]$ : second array of positive integers

Constraints:

$2 \leq n, m \leq 105$ ,  $1 \leq nums[j] \leq 109$ , where  $0 \leq j < n$ ,  $1 \leq maxes[i] \leq 109$ , where  $0 \leq i < m$ .

### Input Format For Custom Testing

Input from stdin will be processed as follows and passed to the function.

The first line contains an integer  $n$ , the number of elements in  $nums$ .

The next  $n$  lines each contain an integer describing  $nums[j]$  where  $0 \leq j < n$ .

The next line contains an integer  $m$ , the number of elements in  $maxes$ .

The next  $m$  lines each contain an integer describing  $maxes[i]$  where  $0 \leq i < m$ .

### Sample Input

4

1

4

2

4

2

3

5

## Sample Output

2

4

```
1 #include<stdio.h>
2 int main()
3 {
4     int a,b,ans;
5     scanf("%d",&a);
6     int c[a];
7     for (int i =0;i<a;i++)
8     scanf("%d",&c[i]);
9     scanf("%d",&b);
10    int d[b];
11    for(int i=0;i<b;i++)
12    scanf("%d",&d[i]);
13    for(int j=0;j<b;j++)
14    {
15        ans = 0;
16        for(int i =0;i<a;i++)
17        {
18            if(d[j]>=c[i])
19                ans++;
20        }
21    }
22    printf("%d\n",ans);
23 }
24 }
```

	Input	Expected	Got	
✓	4	2	2	✓
	1	4	4	
	4			
	2			
	4			
	2			
	3			
	5			
✓	5	1	1	✓
	2	0	0	
	10	3	3	
	5	4	4	
	4			
	8			
	4			
	3			
	1			
	7			
	8			

Passed all tests! ✓