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CSD


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WEEK 6 – PRACTICE SESSION 1

Question **1**

Correct

Marked out of
3.00

 [Flag question](#)

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.

Example

Input:

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

Output:

```
1
input:
```

```
1
3 1 3 5
99
```

Output:

```
0
```

Answer: (penalty regime: 0 %)

```
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){ flag=1; break; }
23            }
24        }
25        if (flag) printf("%d\n", flag);
26    }
27 }
```

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

Passed all tests! ✓

Question 2

Correct

Marked out of
5.00

Flag question

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 N_i on a new line.

Sample Input 0

3
1
2
3

Sample Output 0

1
1
4

Answer: (penalty regime: 0 %)

```
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) c=c+i;
13        }
14        printf("%d\n",c);
15    }
```

| | 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! ✓

Question **3**

Correct

Marked out of
7.00[Flag question](#)

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 $\text{maxes}[i]$ representing the total number of elements $\text{nums}[j]$ satisfying $\text{nums}[j] \leq \text{maxes}[i]$ where $0 \leq j < n$ and $0 \leq i < m$, in the given order.

It has the following:

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

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

Constraints

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

Sample Case 0

Sample Input 0

4
1
4
2
4
2
3
5

Sample Output 0

2
4

Explanation 0

We are given $n = 4$, $\text{nums} = [1, 4, 2, 4]$, $m = 2$, and $\text{maxes} = [3, 5]$.

1. For $\text{maxes}[0] = 3$, we have 2 elements in nums ($\text{nums}[0] = 1$ and $\text{nums}[2] = 2$) that are $\leq \text{maxes}[0]$.
2. For $\text{maxes}[1] = 5$, we have 4 elements in nums ($\text{nums}[0] = 1$, $\text{nums}[1] = 4$, $\text{nums}[2] = 2$, and $\text{nums}[3] = 4$) that are $\leq \text{maxes}[1]$.

Thus, the function returns the array $[2, 4]$ as the answer.

Sample Case 1

Sample Input 1

5
2
10
5
4
8
4
3
1
7
8

Sample Output 1

1
0
3
4

Answer: (penalty regime: 0 %)

```
1 #include<stdio.h>
2 int main()
3 {
4     int s1,s2,ans;
5     scanf("%d",&s1);
6     int ta[s1];
7     for(int i=0;i<s1;i++)
8         scanf("%d",&ta[i]);
9     scanf("%d",&s2);
10    int tb[s2];
11    for(int i=0;i<s2;i++)
12        scanf("%d",&tb[i]);
13    for(int j=0;j<s2;j++)
14    {
15        ans=0;
16        for(int i=0; i<s1; i++){
17            if(tb[j]>=ta[i])
18                ans++;
19        }
20        printf("%d\n", ans);
21    }
22 }
```

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

Passed all tests! ✓