

PROGRAMMING USING C

Week 6 – Practice Session Coding

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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
3 int main()
4 {
5     int t;
6     scanf("%d",&t);
7     while(t-->0)
8     {
9         int n;
10        scanf("%d",&n);
11        int a[n];
12        for (int i=0; i<n; i++)
13        {
14            scanf("%d",&a[i]);
15        }
16        int k;
17        scanf("%d",&k);
18        int flag=0;
19        for(int i=0; i<n; i++)
20        {
21            for(int j=i+1; j<n; j++)
22            {
23                if(a[i]-a[j]==k || a[j]-a[i]==k)
24                {
25                    flag=1;
26                    break;
27                }
28            }
29            if(flag)
30                break;
31        }
32        printf("%d\n",flag);
33    }
34    return (0);
35 }
```

	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
```

Explanation

Test Case 0: N = 1

Sam buys 1 chocolate on day 1, giving us a total of 1 chocolate. Thus, we print 1 on a new line.

Test Case 1: N = 2

Sam buys 1 chocolate on day 1 and 0 on day 2. This gives us a total of 1 chocolate. Thus, we print 1 on a new line.

Test Case 2: N = 3

Sam buys 1 chocolate on day 1, 0 on day 2, and 3 on day 3. This gives us a total of 4 chocolates. Thus, we print 4 on a new line.

Answer: (penalty regime: 0 %)

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

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 $maxes[i]$ 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],...nums[n-1]]`: first array of positive integers

`maxes[maxes[0],...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 0

```
4
1
4
2
4
2
3
5
```

Sample Output 0

```
2
4
```

Explanation 0

We are given $n = 4$, `nums` = [1, 4, 2, 4], $m = 2$, and `maxes` = [3, 5].

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

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

Sample Input 1

5
2
10
5
4
8
4
3
1
7
8

Sample Output 1

1
0
3
4

Explanation 1

We are given, $n = 5$, $\text{nums} = [2, 10, 5, 4, 8]$, $m = 4$, and $\text{maxes} = [3, 1, 7, 8]$.

1. For $\text{maxes}[0] = 3$, we have 1 element in nums ($\text{nums}[0] = 2$) that is $\leq \text{maxes}[0]$.
2. For $\text{maxes}[1] = 1$, there are 0 elements in nums that are $\leq \text{maxes}[1]$.
3. For $\text{maxes}[2] = 7$, we have 3 elements in nums ($\text{nums}[0] = 2$, $\text{nums}[2] = 5$, and $\text{nums}[3] = 4$) that are $\leq \text{maxes}[2]$.
4. For $\text{maxes}[3] = 8$, we have 4 elements in nums ($\text{nums}[0] = 2$, $\text{nums}[2] = 5$, $\text{nums}[3] = 4$, and $\text{nums}[4] = 8$) that are $\leq \text{maxes}[3]$.

Thus, the function returns the array $[1, 0, 3, 4]$ as the answer.

Answer: (penalty regime: 0 %)

```
1 #include <stdio.h>
2
3 int main()
4 {
5     int s1,s2,ans;
6     scanf("%d",&s1);
7     int ta[s1];
8     for(int i=0; i<s1; i++)
9         scanf("%d",&ta[i]);
10    scanf("%d",&s2);
11
12    int tb[s2];
13    for(int i=0; i<s2; i++)
14        scanf("%d",&tb[i]);
15    for(int j=0; j<s2; j++)
16    {
17        ans=0;
18        for(int i=0; i<s1; i++)
19        {
20            {
21                if(tb[j]>=ta[i])
22                    ans++;
23            }
24        }
25        printf("%d\n",ans);
26    }
27    return (0);
28 }
29
```

	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! ✓