

Week 6

One-Dimensional Arrays

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Attempt 2	
Status	Finished
Started	Monday, 23 December 2024, 5:33 PM
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Duration	16 days 3 hours

Problem 1: 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

Code:

Answer: (penalty regime: 0 %)

```
1 #include <stdio.h>
2 int main()
3 {
4     int t;
5     scanf("%d",&t);
6
7     while(t--)
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) break;
30        }
31        printf("%d\n", flag);
32    }
33    return 0;
34 }
```

OUTPUT:

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

Passed all tests! ✓

Problem 2:

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

Code:

Answer: (penalty regime: 0 %)

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

OUTPUT:

	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! ✓

Problem 3:

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[n-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 $\text{nums}[j]$ 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 Input

4

1

4

2

4

2

3

5

Sample Output

2

4

Code:

Answer: (penalty regime: 0 %)

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

OUTPUT:

	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! ✓