

Week 6 – 1:

ROLL NO.:240801190

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Attempt 1	
Status	Finished
Started	Monday, 23 December 2024, 5:33 PM
Completed	Saturday, 7 December 2024, 2:29 PM
Duration	16 days 3 hours

Q1) 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:

```
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 if(flag) break;
25 }
26 printf("%d\n",flag);
27 }
28 }
```

OUTPUT:

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

Passed all tests! ✓

Q2) 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:

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

OUTPUT:

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

Passed all tests! ✓

Q3) 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:

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

maxes[maxes[0],...maxes[n-1]]: second array of positive integers

Constraints:

$2 \leq n, m \leq 105$, $1 \leq \text{nums}[j] \leq 109$, 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 `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

Code:

```
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 j=0;j<s2;j++)
12 scanf("%d",&tb[j]);
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 }
23
24
```

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! ✓