

Week -- 6 – 01:

ROLL NO.:240801030

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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:

Status	Finished
Started	Monday, 13 January 2025, 11:35 PM
Completed	Tuesday, 14 January 2025, 12:21 AM
Duration	45 mins 35 secs

```

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

```

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 n;
4      scanf("%d",&n);
5      int arr[n],ans[n];
6      for(int i=0;i<n;i++){
7          int sum=0;
8          int temp;
9          scanf("%d",&arr[i]);
10         temp=arr[i];
11         while(temp!=0){
12             if(temp%2==1){
13                 sum=sum+temp;
14             }
15             temp--;
16         }
17         ans[i]=sum;
18     }
19     for(int i=0;i<n;i++){
20         printf("%d\n",ans[i]);
21     }
22 }
23

```

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! ✓

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 $\text{maxes}[i]$ 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 std in 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:

```
1 #include <stdio.h>
2 int main(){
3     int n1,n2;
4     scanf("%d",&n1);
5     int arr1[n1];
6     for(int i=0;i<n1;i++){
7         scanf("%d",&arr1[i]);
8     }
9     scanf("%d",&n2);
10    int arr2[n2];
11    for(int i=0;i<n2;i++){
12        scanf("%d",&arr2[i]);
13    }
14    for(int i=0;i<n2;i++){
15        int count=0;
16        for(int j=0;j<n1;j++){
17            if(arr2[i]>=arr1[j])
18                count++;
19        }
20        printf("%d\n",count);
21    }
22 }
```

OUTPUT:

	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! ✓