

Problem A: Missing Number

Given a sequence of n integers $\langle a_1, a_2, a_3, \dots, a_n \rangle$, we calculate the DSUM of those integers by summing the absolute differences between adjacent elements. The formula looks like this:

$$\text{DSUM} = |a_1 - a_2| + |a_2 - a_3| + |a_3 - a_4| + \dots + |a_{n-1} - a_n|$$

For example, the DSUM of the integers $\langle 1, 3, -2, 2, 6 \rangle = 2 + 5 + 4 + 4 = 15$.

In this problem, you will be given a list of n integers with some entries missing. The missing integers will be denoted by '?'. You have to determine the minimum possible value of DSUM if all the ? were replaced with integers. For example, if you have the following sequence:

1 ? 7 3 ? ?

and we replace the first ? with a 4 and the last two ? with 3, we get the sequence:

1 4 7 3 3 3

Which gives us a DSUM value of $3 + 3 + 4 + 0 + 0 = 10$. Of all the possible replacements of ? with integers, we won't get any DSUM whose value is less than 10. Thus 10 is our required answer

Input

Input starts with an integer t ($t < 50$) that indicates the number of test cases. Each case starts with a line containing an integer n ($1 < n < 20$) representing the number of entries in the test case. The next line gives the n entries. Each of these entries is either an integer in the range $[-30, 30]$ or a ?. You may assume that the input file is formatted correctly.

Output

For each case, output the case number followed by the minimum DSUM. Note that it is not necessary for your program to output the integers used to replace the ? in the sequence.

Sample input (available as file "A.in"):

```
4
6
1 ? 7 3 ? ?
5
? ? ? ? ?
3
0 ? -5
4
1 3 5 ?
```

Sample output (available as file "A.out"):

```
Case 1: 10
Case 2: 0
Case 3: 5
Case 4: 4
```