Sherlock and Cost

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Problem Submissions Leaderboard Discussions Editorial

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Array *A* contains the elements, $A_1,A_2...A_N$. And array *B* contains the elements, $B_1,B_2...B_N$. There is a relationship between A_i and B_i, $\forall\ 1 \le i \le N$, i.e., any element A_i lies between *1* and B_i.

Let the cost *S* of an array *A* be defined as:

$$S = \sum_{i=2}^{N} |A_i - A_{i-1}|$$

You have to print the largest possible value of *S*.

Input Format

The first line contains, *T*, the number of test cases. Each test case contains an integer, *N*, in first line. The second line of each test case contains *N* integers that denote the array *B*.

Constraints

$1 \le T \le 20$
$1 \le N \le 10^5$
$1 \le B_i \le 100$

Output Format

For each test case, print the required answer in one line.

Sample Input

```
1
5
10 1 10 1 10
```

Sample Output

```
36
```

Explanation

The maximum value occurs when $A_1=A_3=A_5=10$ and $A_2=A_4=1$.

* Optimal choice of A_i is 1 or B_i

Proof:

Suppose we choose $A_0, A_1 \dots, A_{n-1}$ s.t.

$$1 \le A_i \le B_i$$

We have:

$$S = |A_1 - A_n| + \dots + |A_{i+1} - A_i| + |A_{i+2} - A_{i+1}| + \dots + |A_{n-1} - A_{n-2}|$$

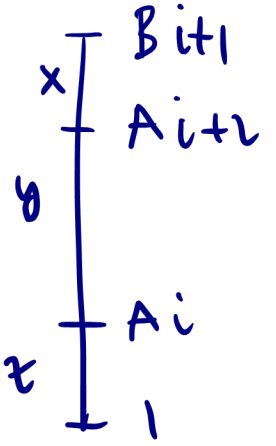
we will focus on how to increase S just by changing A_{i+1}:

$$S = S' + |A_i - A_{i+1}| + |A_{i+2} - A_{i+1}|$$

By changing A_{i+1} we don't change S'

Without loss of generality suppose:

$$1 < A_i < A_{i+2} < B_{i+1}$$



Suppose we choose:

$A_i < A_{i+1} < A_{i+2}$

Then $S' = A_{i+2} - A_{i+1} +$

$+ A_{i+1} - A_i = y$

Now let $A_{i+1} = B_{i+1}$

In that case:

$$S' = B_{i+1} - A_{i+2} + B_{i+1} - A_i =$$

$$= x + x + y = 2x + y > y$$

Now let $A_{i+1} = 1$

In that case:

$$S' = A_{i+2} - 1 + A_i - 1 =$$

$$= y + z + z = y + 2z > y$$

In both cases we increased S, so values B_i or 1 are always more optimal than any other value. ▨