Question 17 Max. score 30.00

The maximum distance

You are provided Q queries of the following three types:

1. $1\ x$: Plot point x on the X-axis.
2. $2\ p$: Delete the point from the X-axis that was plotted at the p^{th} time.
3. $3\ x$: Find the maximum Manhattan distance between point x and any point that is present on the X-axis.

Note

- Here, x is distinct, therefore, no points are repeated.
- For queries of Type 2, points plotted at the p^{th} time can be deleted.
- Queries of Type 2 are distinct, that is, p will be distinct.
- Queries of Type 3 are not plotted on the X-axis.
- The X-axis is not empty during any queries of type 3.
- **Manhattan distance**: The distance between two points measured along axes at right angles. In a plane with p_1 at $(x_1,\ y_1)$ and p_2 at $(x_2,\ y_2)$, it is $|x1 - x2| + |y1 - y2|$.

Input format

- The first line contains an integer Q denoting the number of queries.
- Next Q lines contain queries of 3 types.

Output format

Print the answer for the third query in a new line.

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Print the answer for the third query in a new line.

Constraints

$1 \leq Q \leq 10^5$
$-10^9 \leq x \leq 10^9$
$1 \leq p \leq Q$

Sample input 1 Copy

```
6
1 -3
1 4
3 5
2 1
3 5
1 11
```

Sample output 1 Copy

```
8
1
```

Explanation

After the 1^{st} query, point -3 will be plotted on X-axis at time 1.
After the 2^{nd} query, point 4 will be plotted on X-axis at time 2.
After the 3^{rd} query, the maximum distance will be |-3-5| = 8
After the 4^{th} query, the point which came 1st time i.e -3 will be removed.
After the 5^{th} query, the maximum distance will be |4-5| = 1
After the 6^{th} query, the point 11 will be plotted on X-axis at time 3.