BBST

Description

You are required to maintain a multiset S, which supports the following operations:

1. Insert a number x to S;
2. Erase a number equal to x from S if exists;
3. Find the order of x in S, i.e., $1 + \sum_{v \in S} [v < x]$;
4. Find the x-th smallest number in S;
5. Find the precursor of a number x in S, i.e., $\max_{v \in S, v < x} \{v\}$ if exists;
6. Find the successor of a number x in S, i.e., $\min_{v \in S, v > x} \{v\}$ if exists.

Input

The first line of the contains an integer n, indicating the number of operations followed.

In the next n lines, each line contains two integers opt and x, representing an operation, where opt stands for the type of the operation.

Output

For each type 3, 4, 5, 6 operation, output a number in one line, representing the answer.

Sample

Sample 1 Input

```
10
1 106465
4 1
1 317721
1 460929
1 644985
1 84185
1 89851
6 81968
1 492737
5 493598
```

Sample 1 output

```
106465
84185
492737
```

Constraints

$1 \leq n \leq 10^5, 1 \leq \text{opt} \leq 6, -10^7 \leq x \leq 10^7$.

It is guaranteed that the precursor or successor exists for each type 5 or 6 operation.