Count on a treap

131229:出好快一年半的 目了..一直忘 解除 藏= =

In computer science, a treap is a binary search tree according to the keys and meanwhile a heap according to the weights.

Your task is to maintain a **max-treap** supporting the following operations:

- 0 **k w**: Insert a new node, whose key and weight are **k** and **w**.
- 1 **k**: Delete a node in the treap with key **k**.
- 2 **ku kv**: Return the distance between node **u** whose key is **ku** and node **v** whose key is **kv**.

No two nodes share a same key or same weight, and we guarantee the node is indeed in the treap before a delete operation takes place.

Input

The first line contains an integer **N**(1 ≤ **N** ≤ 200000), the number of operations. The next **N** lines each contains two or there integers "0 **k w**" "1 **k**" or "2 **ku kv**"(0 < **k**, **w**, **ku**, **kv** ≤ maxlongint).

Output

For each query operation, print the distance between **u** and **v**.

Example

Input:
12
0 4 17535
0 10 38964
0 2 21626
0 1 61321
2 1 10
2 10 4
1 10
1 1
0 8 42634
2 8 4
2 8 2
2 4 2

Output:
1
2
2
1
1