Z. Trick or Treap

time limit per test: 8 seconds
memory limit per test: 1024 megabytes

Halloween is almost here! Here in the United States, it is a tradition for young children to dress up as demons and super heros wonder around in the dark very late at night, visit random strangers in their houses, and ask for candy.

Alice and Bob just solved a problem that required them to eat about 10^9 candies and are very full now, so instead, they will ask their neighbors to either show them a trick, or give them a brand new treap ("trick or treap")! q times, one of the following will happen:

- 1. This neighbor will given them a new treap node i, with value y. Here, i is the query number.

- 2. This neighbor will perform a trick: if the nodes y and z are not in the same group, he will merge them into the same group, with y's group to the left of z's group. Otherwise, he will teach them how to juggle.

- 3. This neighbor will perform a different trick: If the group containing node y contains more than z nodes, he will split the first z nodes from the rest of them. Otherwise, he will teach them Kotlin.

- 4. Alice's and Bob's overprotective mother will call and ask them about the sum of values in the group that y is in.

Can you write a bot to pretend to answer the queries for Alice so that she can continue to bother her neighbors in the middle of the night without interruption?

Input

The first line will contain a single integer q. $1 \leq q \leq 5 * 10^5$ q lines follow. They will look like one of the following:

- 1 y. In this case $0 \leq y \leq 10^5$.

- 2 y z. Nodes y and z will already exist.

- 3 y z. Node y will already exist. $0 < z$.

- 4 y. Node y will already exist.

Output

For each query of type 4, print the sum of the values in the queried group.

Examples

input Copy

```
10
1 38788
3 1 1
3 1 2
1 56200
3 1 2
3 1 2
4 4
3 4 4
4 1
3 4 6
```

output Copy

```
56200
38788
```

input Copy

```
8
1 60420
3 1 1
3 1 1
1 49164
2 1 1
2 4 1
2 1 4
1 24036
```

output Copy

Algorithms Thread Treaps Contest

Finished

Practice

→ About Contest

Algorithms Thread Treap Contest, written by SecondThread.

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: GNU G++20 13.2 (64 bit, win

Choose file: Choose File No file chosen

Submit

→ Last submissions

Submission	Time	Verdict
304498701	Feb/05/2025 07:37	Accepted
304498614	Feb/05/2025 07:36	Accepted

→ Contest materials

- Announcement (en)