Problem E: Cycling Race

Advanced Algorithms for Programming Contests

Restrictions

Time: 2 seconds
Memory: 512 MB

Problem description

In a couple of days, a large cycling race is set to start in your town. You have been tasked with developing a tool for monitoring it. The tool needs to handle two kinds of queries:

- Take note of a cyclist changing its pace.

- Determine the position and index of the race leader at a given time.

As the race track leads almost exclusively downhill, the cyclists never slow down, i.e. queries of the first time will only ever inform your program about a speed increase. Initially (at time 0), each cyclist has covered 0m of the race track and is standing still (moving at speed 0m/s). You may also assume that all cyclists strictly follow the race track, so that their velocities throughout the race determine exactly how much of the race track they have covered. Naturally, the queries have timestamps and are given in the increasing order induced by them.

Input

The input consists of

- one line containing N ($2 \leq N \leq 5 \cdot 10^4$) – the number of cyclists participating in the race

- between 1 and $3 \cdot 10^5$ lines giving the queries in the following formats:

  - "t 1 c s" for the first type, where t is the timestamp ($0 \leq t \leq 10^9$), c the index of the cyclist in question ($1 \leq c \leq N$) and s its new speed in m/s ($1 \leq s \leq 10^9$)

  - "t 2" for the second type, where t is the timestamp (this query asks for the position and index of the race leader at time t, i.e. the largest distance covered by any individual cyclist up to this time and which cyclist this was).

It is guaranteed that queries of the first kind only ever report speed *increases* and that at any given time (indicated by the query timestamps) there are either

- no queries

- a single type 2 query, or

- at most one type 1 query for each cyclist.

Thus it is possible that all cyclists increase their speed at time 0, but any given cyclist cannot change its speed twice at the same point in time.

Output

For each type 2 query, print first the distance of the race leader from the start and then its index. If there are multiple possibilities for the latter, print any (see second sample).

Sample input and output

Input	Output
3 0 1 2 10 1 1 1 10 5 2 16 1 3 100 18 2 20 1 1 311 21 2	50 2 200 3 501 1
3 0 1 2 10 1 1 1 10 5 2 16 1 3 100 18 2 20 1 1 310 21 2	50 2 200 3 500 3