DMOPC '21 Contest 7 P4 - Rocket Race

Time limit: 2.0s **Memory limit:** 256M

Tyler is a competitive rocket racer. Unlike in normal foot racing, rocket racers use their own collection of rockets to move instead of their feet. Tyler's collection consists of N single-use rockets. The i-th rocket propels him a_i meters forwards, but sends him b_i meters backwards immediately after. Of course, rocket technology is constantly evolving, and racers need to update their collection frequently to ensure optimal performance. As Tyler's coach, you must handle Q of the following events, each starting with a value t_j:

- If $t_j = 0$ then an integer r_j follows, and you must tell Tyler the minimum number of rockets he needs to complete an r_j meter race. Note that the race is completed if Tyler reaches or passes the finish line at the r_j meter mark at any point. Also, all rockets may only be used in the forward direction (i.e. initially towards the finish line).
- If $t_j > 0$ then two integers x_j and y_j follow, indicating that Tyler replaces the t_j-th rocket with one that propels him x_j meters forwards but sends him y_j meters backwards immediately after.

Constraints

$1 \leq N, Q \leq 2 \times 10^5$

$1 \leq a_i, b_i, r_j, x_j, y_j \leq 10^9$

$0 \leq t_j \leq N$

Subtask 1 [25%]

$1 \leq N, Q \leq 3 \times 10^3$

Subtask 2 [25%]

$t_j = 0$

Subtask 3 [50%]

No additional constraints.

Input Specification

The first line contains an integer N.

The next N lines each contain 2 integers a_i and b_i.

The next line contains an integer Q.

The next Q lines each contain the description of an event on a single line, as described in the statement.

Output Specification

For each event with $t_j = 0$ output the answer on its own line, or -1 if it is impossible to complete that race.

Sample Input

```
10
2 1
5 7
4 1
5 4
7 3
9 4
1 6
6 4
5 2
4 5
6
0 15
0 8
6 7 5
0 11
0 8
0 100
```

Sample Output

```
3
1
2
2
-1
```

Explanation

For the first event, Tyler should use his 5-th, 6-th, and 8-th rockets in that order. This reaches a maximum forward distance of 15 meters, which is just enough to complete the race.

For the fifth event, Tyler should use his 5-th rocket and then his 2-nd rocket. This reaches a maximum forward distance of 9 meters, enough to complete the race.

For the sixth event, it is impossible for Tyler to complete the race regardless of which rockets he chooses to use.