Time Series Queries

Time series are very important series of data points indexed in time order. They are commonly used in fields like finance, statistics and machine learning.

For a given n historical records (t_i, p_i) meaning that the stock at time t_i had a price p_i, there are q queries to answer, each of one of the following types:

1. For given y_i, what's the minimum time for which the price of the stock was at least y_i.
2. For given x_i, what's the maximum price of the stock at a time greater or equal to x_i.

If for any of these queries the answer is not defined, i.e. there are no historical records matching the query, the answer is -1.

Input Format

In the first line, there are two space-separated integers n and q denoting respectively the number of historical records and the number of queries. After that, n lines follow. In the i-th of them, there are two space-separated integers t_i and p_i denoting respectively the time and the price of the i-th history record. Next, q lines follow and each of them describes a single query. Each query is given as two space-separated integers. The first of them is either 1 or 2 and denotes the type of the query. If the type is 1 then it is followed by a single integer y_i. Otherwise, if the type is 2, then it is followed by a single integer x_i.

Constraints

$1 \leq n \leq 10^5$
$1 \leq q \leq 10^5$
$1 \leq t_i \leq 10^9$
$1 \leq p_i \leq 10^9$
$1 \leq x_i \leq 10^9$
$1 \leq y_i \leq 10^9$
$t_i < t_{i+1}$ for $0 \leq i < n-1$

Output Format

Print exactly q lines. In the i-th of these line print the answer to the i-th query. If the answer is not defined, print -1.

Sample Input 0

```
5 5
1 5
2 3
4 12
8 1
10 10
1 10
1 4
2 8
2 3
1 13
```

Sample Output 0

```
4
1
10
12
```

```
-1
```

Explanation 0

In the sample, there are 5 data records and 5 queries to answer. At time 1 the price was 3, at time 2 the price was 3, at time 4 the price was 12, at time 8 the price was 1, and finally, at time 10 the price was 10.

In the first query, we are asked for the minimum time at which the price was at least 10. The answer is 4 because at this time the price was 12 and there is no earlier time with a price at least 10.

In the second query, we are asked for the minimum time at which the price was at least 4. The answer is 1 because the price at this time was 5 which is greater than 4.

In the third query, we are asked for the maximum price at time 8 or greater. The answer is 10 because there are two data records with time at least 8 and the highest price among them is 10.

In the fourth query, we are asked for the maximum price at time 3 or greater. The answer here is 12.

In the last query, we are asked for the minimum time at which the price was at least 13. Since there is no data record with price 13 or greater, the answer is -1.