Freedom Dive

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	1024 megabytes

On a scenic coastline, there are N skyscrapers arranged in a line. For each building i (from 1 to N), we know its distance from the sea, L_i, and its height, H_i. We can model the top of each building as a point in a 2D plane at coordinates (L_i, H_i). The buildings are sorted by their distance from the sea, so it's guaranteed that $L_i < L_{i+1}$ for all $1 \le i < N$.

You are a professional skydiver and have planned a spectacular dive for Q different days. On the i-th day ($1 \le i \le Q$), you are given a planned dive location, which is a horizontal coordinate d_i. It is guaranteed that no building is located exactly at d_i.

To prepare for the i-th day's dive, you must perform the following setup:

- First, choose two buildings: one building l located to the left of your dive location (where $L_l < d_i$) and one building r located to the right (where $L_r > d_i$). It is guaranteed that such a pair of buildings always exists.
- Next, connect the tops of these two buildings, i.e., points (L_l, H_l) and (L_r, H_r), with a straight rope.
- Finally, you will make your jump from the point on this rope that is precisely at the horizontal coordinate d_i.

Being a cautious professional, you want to minimize the risk associated with high altitudes. Therefore, for each dive, you must choose the pair of buildings (l, r) that results in the **lowest possible altitude** for the rope at your jump-off coordinate d_i.

Note that the rope is an idealized line segment. It is allowed to pass through or intersect with other buildings; its path is determined only by the two chosen endpoints.

For each of the Q planned dives, find this minimum possible altitude.

Input

The first line contains a single integer N — the number of buildings.

The next N lines describe the buildings. The i-th of these lines contains two integers, L_i and H_i — the distance from the sea and the height of the i-th building. It is guaranteed that $L_1 < L_2 < \cdots < L_N$.

The next line contains a single integer Q — the number of planned diving days.

The next Q lines describe the planned dives. The i-th of these lines contains a single integer d_i — the horizontal coordinate for that day's dive. It is guaranteed that d will not be equal to any L_i.

Output

For each of the Q dives, output a single line containing two space-separated integers, s and t. These two integers must represent the minimum possible starting altitude as an **irreducible fraction** s/t. If the denominator is 1, you should still print it.

Scoring

- $2 \le N \le 2 \cdot 10^5$
- $1 \le Q \le 2 \cdot 10^5$
- $1 \le L_i, H_i \le 10^9$

- $L_1 < d_i < L_N$ $(1 \leq i \leq Q)$

Examples

standard input	standard output
4 1 4 4 3 7 5 11 2 7 2 3 5 6 8 9 10	11 3 10 3 20 7 19 7 17 7 16 7 15 7
4 1 1 3 3 5 5 7 7 3 2 4 6	2 1 4 1 6 1