C. Wilbur and Points

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Wilbur is playing with a set of n points on the coordinate plane. All points have non-negative integer coordinates. Moreover, if some point (x, y) belongs to the set, then all points (x', y'), such that $0 \le x' \le x$ and $0 \le y' \le y$ also belong to this set.

Now Wilbur wants to number the points in the set he has, that is assign them distinct integer numbers from 1 to n. In order to make the numbering *aesthetically pleasing*, Wilbur imposes the condition that if some point (x, y) gets number i, then all (x',y') from the set, such that $x' \ge x$ and $y' \ge y$ must be assigned a number not less than i. For example, for a set of four points $(0, 0)$, $(0, 1)$, $(1, 0)$ and $(1, 1)$, there are two aesthetically pleasing numberings. One is $1, 2, 3, 4$ and another one is $1, 3, 2, 4$.

Wilbur's friend comes along and challenges Wilbur. For any point he defines it's *special value* as $s(x, y) = y - x$. Now he gives Wilbur some $w_1, w_2, ..., w_n$, and asks him to find an aesthetically pleasing numbering of the points in the set, such that the point that gets number i has it's special value equal to w_i, that is $s(x_i, y_i) = y_i - x_i = w_i$.

Now Wilbur asks you to help him with this challenge.

Input

The first line of the input consists of a single integer n $(1 \le n \le 100\,000)$ — the number of points in the set Wilbur is playing with.

Next follow n lines with points descriptions. Each line contains two integers x and y $(0 \le x, y \le 100\,000)$, that give one point in Wilbur's set. It's guaranteed that all points are distinct. Also, it is guaranteed that if some point (x, y) is present in the input, then all points (x', y'), such that $0 \le x' \le x$ and $0 \le y' \le y$, are also present in the input.

The last line of the input contains n integers. The i-th of them is w_i $(-100\,000 \le w_i \le 100\,000)$ — the required special value of the point that gets number i in any aesthetically pleasing numbering.

Output

If there exists an aesthetically pleasant numbering of points in the set, such that $s(x_i, y_i) = y_i - x_i = w_i$, then print "`YES`" on the first line of the output. Otherwise, print "`NO`".

If a solution exists, proceed output with n lines. On the i-th of these lines print the point of the set that gets number i. If there are multiple solutions, print any of them.

Examples

input

```
5
2 0
0 0
1 0
1 1
0 1
0 -1 -2 1 0
```

output

```
YES
0 0
1 0
2 0
0 1
1 1
```

input

```
3
1 0
0 0
2 0
0 1 2
```

output

```
NO
```

Note

In the first sample, point $(2, 0)$ gets number 3, point $(0, 0)$ gets number one, point $(1, 0)$ gets number 2, point $(1, 1)$ gets number 5 and point $(0, 1)$ gets number 4. One can easily check that this numbering is aesthetically pleasing and $y_i - x_i = w_i$.

In the second sample, the special values of the points in the set are 0, -1, and -2 while the sequence that the friend gives to Wilbur is $0, 1, 2$. Therefore, the answer does not exist.