

Power Grid

time limit per test: 2 seconds (5 seconds for Python)
memory limit per test: 500 megabytes
input: standard input
output: standard output
points: 100 · problem code: powergrid

Shichikui must supply electricity to n cities. City i sits at coordinates (x_i, y_i) .

A city has electricity if it has a power station, or if it is connected (directly or through other cities) to a city that does.

- Building a power station in city i costs c_i .
- Connecting cities i and j with a wire costs $(k_i + k_j) \cdot (|x_i - x_j| + |y_i - y_j|)$.

Wires run along cardinal directions, so their length is the Manhattan distance between the two cities. Find the minimum cost to give every city electricity.

Input

The first line contains an integer n .

The next n lines each contain two integers x_i and y_i .

The next line contains n integers $c_1, c_2, \dots, c_n$.

The last line contains n integers $k_1, k_2, \dots, k_n$.

Output

Output a single integer: the minimum cost.

Constraints

- $1 \leq n \leq 2000$
- $1 \leq x_i, y_i \leq 10^6$
- $1 \leq c_i, k_i \leq 10^9$

Example 1

Input

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

Output

```
8
```

Explanation

Building a station in every city costs $3 + 2 + 3 = 8$, which is optimal.

Example 2

Input

```
3
2 1
1 2
3 3
23 2 23
3 2 3
```

Output

```
27
```

Explanation

Build a station in city 2 (cost 2), connect 1--2 (cost 10), and connect 2--3 (cost 15), for a total of 27.