Competitive Programming SS24

Submit until end of contest

Problem: reception (1.0 second timelimit)

Note: This is a problem that is harder to solve than usual. Solve the other problems first before spending too much time on this one.

In order to increase Codeforces usage in Brandenburg, the government has decided to build new cell towers to be used for accessing the internet. But building such towers is expensive, and some villages without a tower might have to use a slow and unreliable connection from the nearest village that has such a tower. This is why the government has asked you for help!

Brandenburg contains n villages, which all lie on a single line. Thus, we can describe the position of some village i with p_i, and the distance between villages i and j is exactly $|p_i - p_j|$. You can build such a cell tower in every village, but the costs differ, so it costs c_i to build a tower in village i. The villagers connect to the closest cell tower, and the reception is inversely proportional to the distance. In total, you want to minimize the sum of the building costs and the distances to the nearest tower for all villages, i.e., choose villages V such that

$$\sum_{v \in V} c_v + \sum_{i=1}^{n} \min_{v \in V} |p_i - p_v|$$

is minimized. The government won't need the actual list of villages, but only the minimal costs, for budgeting. Obviously, you should build at least one tower!

Input The first line contains a single number n ($1 \leq n \leq 3000$), the number of villages. The second line contains n numbers p_i ($0 \leq p_i \leq 10^5$), the positions of the villages. It is guaranteed they are ordered and unique, i.e., for all $i < j$, $p_i < p_j$. The third line contains n numbers c_i ($1 \leq c_i \leq 10^5$), the costs of building a tower in the villages.

Output Output one single integer, the minimum achievable score as described above.

Sample input

```
2
0 3
6 2
```

Sample output

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5
```

```
5
0 2 3 4 5
4 1 5 7 2
```

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7
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