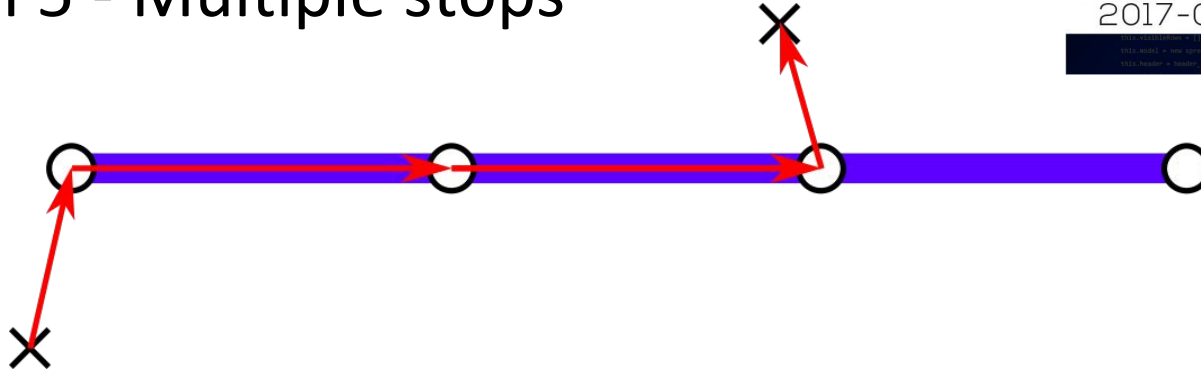


Level 5 - Multiple stops



We can also design hyperloop routes with multiple stops. Your task is to estimate the total duration of a journey which uses such a hyperloop route.

The input is similar to Level 2, except that the hyperloop may have many stops.

Travellers use the hyperloop as described in Level 2. They are lazy and use the closest stops to their start and end locations even if using other stops would lead to a faster journey.

You should output the duration of the journey (in seconds), rounded to the nearest integer.

Data format



Input

A text file consisting of the following lines:

Single line: <NumberOfLocations>

NumberOfLocations lines: <LocationName> <LocationX> <LocationY>

Single line: <JourneyStartLocationName> <JourneyEndLocationName>

***Single line:* <NumberOfHyperloopLocations> <HyperloopLocationName> ... <HyperloopLocationName>**

<NumberOfHyperloopLocations> gives the number of <HyperloopLocationName> entries.

The hyperloop locations represent the stops of a route connected in the order given.

Output

Single line: <JourneyTime>

Example



Input

```
5
Prague 0 286100
Brno 152440 194430
Vienna 126350 78010
Bratislava 183680 71710
Budapest 318860 0
Vienna Prague
4 Prague Brno Bratislava Budapest
```

Output

```
5463
```

Explanation

closest hyperloop stop to start = Bratislava

closest hyperloop stop to end = Prague

drivingTime(Vienna Bratislava) = 3845.0

```
hyperloopTime(Bratislava Prague) =
  = distance(Bratislava Brno) / 250.0 + 200.0 +
    distance(Brno Prague) / 250.0 + 200.0
  = 126633.9 / 250.0 + 200.0 + 177880.1 / 250.0 + 200.0
  = 1618.1
```

drivingTime(Prague Prague) = 0.0

journeyTime = 3845.0 + 1618.1 + 0.0 = 5463.1