

# Level 6 - Route proposal



Now you have the chance to plan a hyperloop route.

This hyperloop route may have many stops. However, we can only afford to build  $D$  meters of hyperloop. The length of a hyperloop route is simply the sum of the distances between consecutive stops. The tubes are dead straight to avoid causing discomfort to the passengers.

The input is similar to Level 4, but you will also be provided a maximum route length  $D$ .

You should output a hyperloop route

- for which at least  $N$  journeys are faster with the hyperloop than currently; and
- which stays within the maximum route length  $D$ .

There may be multiple valid solutions, but you only need to find one.

# Notes

The hyperloop route may not include any location more than once.

The hyperloop route may have at most 100 stops.

Data visualizations are provided for convenience only. They do not affect the task.

## Hint

You may wish to consider a randomized algorithm.



# Data format



## Input

A text file consisting of the following lines:

*Single line:* <NumberOfLocations>

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

*Single line:* <NumberOfJourneys>

*NumberOfJourneys lines:* <LocationName> <LocationName> <CurrentTime>

*Single line:* <N>

***Single line:* <D>**

## Output

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

# Example

## Input

```
5
Prague 0 286100
Brno 152440 194430
Vienna 126350 78010
Bratislava 183680 71710
Budapest 318860 0
3
Prague Bratislava 14564
Bratislava Vienna 3290
Vienna Budapest 8654
2
230000
```

## Output

```
3 Budapest Bratislava Vienna
```

## Explanation

The second and third journeys are faster with this hyperloop route. This is sufficient, because we are required to make two journeys benefit from it. It has a length of 210697.8, which is less than the limit of 230000.

