# Walking (prob12)

April and Chip, now married for quite some time, have realized that their routine walks are pretty boring. So, April, being the smarter of the two, devises a way to make their walks more interesting: Given two locations that they want to visit, minimize the work required to get from one to another. Since April and Chip don't really like climbing hills, they decided to allow work to be the change in elevation. So, if they walked up a hill with a 10 foot elevation change, and then back down, the amount of work they would have done would be 20.

Consider the world below:
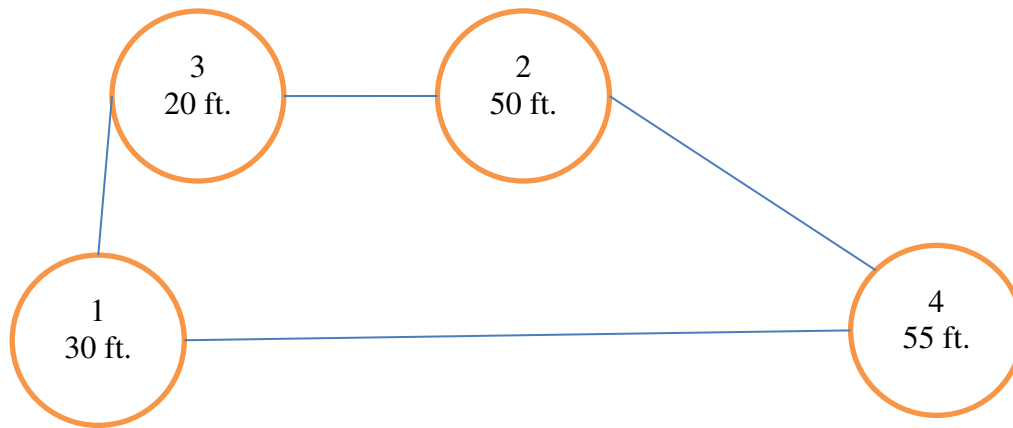
To go from 1 to 2, Chip and April could go to 3 first, giving a total work of 40 (10 from 1 to 3, 30 from 3 to 2) or go to 4 first for a total work of 30 (25 from 1 to 4, 5 from 4 to 2). They'll pick the path from 1 to 4 to 2, since that's the smaller value.

Your task is to determine the path that requires the minimum amount of work, given a set of nodes with elevation and the paths between them.

Input

The input will consist of a number of lines, the first having a single integer C, telling how many cases to follow. The next C cases will be formatted as follows. There will first be a line with a number N, telling how many locations are in the neighborhood, where the first location is location 1, the second location 2, and so on until the last, which is location N. The next N lines will contain a single integer each, where the ith of these lines represents the integer elevation for location i. Following this is an integer M, telling how many paths there are between locations. There will then be M lines with pairs of integers representing locations in parentheses indicating there is a path between the locations. A comma followed by a space separates the integers. Paths go both ways, so a path from 1 to 2 is also a path from 2 to 1. After those lines follows another integer K, indicating how many locations will be visited. There will then be K lines, each containing the locations that Chip and April want to visit in the order that they should be visited. You should assume that they start on the first location in this set, and stop on the last location in this set.

Output

For each case, you should print: "The least amount of work on trip n is: A", where n is the trip number (starting at 1) and A is the least cost. You may assume that all locations that are on April and Chip's walk are in fact reachable.

Sample Input

```
1
4
30
45
20
55
4
(1, 3)
(2, 4)
(4, 1)
(3, 2)
4
1
2
3
4
```

Sample Output

```
The least amount of work on trip 1 is: 95
```