Problem B. Taking Metro

This contest is open for practice. You can try every problem as many times as you like, though we won't keep track of which problems you solve. Read the Quick-Start Guide to get started.

Small input 9 points	Solve B-small
Large input 15 points	Solve B-large

Problem

Tom is taking metros in the city to go from station to station.

The metro system in the city works like this:

- There are **N** metro lines in the city: line 1, line 2, ..., line **N**.
- For each metro **i**, there are $\mathbf{SN_i}$ stations. Let's assume they are $\mathbf{S_{i,1}}$,$\mathbf{S_{i,2}}$, ... , $\mathbf{S_{i,SN_i}}$. These stations are ordered from one end point to the other end point. The metro is running in both directions. In other words, the metro is going from $\mathbf{S_{i,1}}$ -> $\mathbf{S_{i,2}}$ -> ... -> $\mathbf{S_{i,SN_i}}$, and $\mathbf{S_{i,SN_i}}$ -> $\mathbf{S_{i,SN_i-1}}$ -> ... -> $\mathbf{S_{i,1}}$. You can take the metro from any station and get off at any station. It takes a certain time to travel from one station to the next station. It takes $\mathbf{Time_{i,1}}$ minutes to travel from $\mathbf{S_{i,1}}$ to $\mathbf{S_{i,2}}$, $\mathbf{Time_{i,2}}$ minutes to travel from $\mathbf{S_{i,2}}$ to $\mathbf{S_{i,3}}$, etc. It takes the same time in the other direction.
- There are **M** transfer tunnels. Each transfer tunnel connects two stations of different metro lines. It takes a certain amount of time to travel through a tunnel in either direction. You can get off the metro at one end of the tunnel and walk through the tunnel to the station at the another end.
- When you arrive at a metro station of line **i**, you need to wait $\mathbf{W_i}$ minutes for the next metro.

Now, you are going to travel from one station to another. Find out the shortest time you need.

Input

The first line of the input gives the number of test cases, **T**. **T** test cases follow.

Each test case starts with an integer **N**, the number of metro lines. **N** metros descriptions follow. Each metro description starts with two integers $\mathbf{SN_i}$ and $\mathbf{W_i}$, the number of stations and the expected waiting time in minutes. The next line consists of $\mathbf{SN_i}$**-1** integers, $\mathbf{Time_{i,1}}$, $\mathbf{Time_{i,2}}$, ..., $\mathbf{Time_{i,SN_i-1}}$, describing the travel time between stations.

After the metro descriptions, there is an integer **M**, the number of tunnels. **M** lines follow to describe the tunnels. Each tunnel description consists of 5 integers, $\mathbf{m1_i}$, $\mathbf{s1_i}$, $\mathbf{m2_i}$, $\mathbf{s2_i}$, $\mathbf{t_i}$ which means the tunnel is connecting stations $\mathbf{S_{m1_i,s1_i}}$ and station $\mathbf{S_{m2_i,s2_i}}$. The walking time of the tunnel is $\mathbf{t_i}$.

The next line contains an integer **Q**, the number of queries. Each of the next **Q** lines consists of 4 integers, **x1**, **y1**, **x2**, **y2**, which mean you are going to travel from station $\mathbf{S_{x1,y1}}$ to station $\mathbf{S_{x2,y2}}$.

Output

For each test case, output one line containing "Case #x:", where x is the test case number (starting from 1), then followed by **Q** lines, each line containing an integer y which is the shortest time you need for that query. If it's impossible, output -1 for that query instead.

Limits

1 ≤ **T** ≤ 100.
1 ≤ $\mathbf{W_i}$ ≤ 100.
1 ≤ $\mathbf{Time_{i,j}}$ ≤ 100.
1 ≤ $\mathbf{m1_i}$ ≤ **N**.
1 ≤ $\mathbf{s1_i}$ ≤ $\mathbf{SN_{m1_i}}$.
1 ≤ $\mathbf{m2_i}$ ≤ **N**.
1 ≤ $\mathbf{s2_i}$ ≤ $\mathbf{SN_{m2_i}}$.
$\mathbf{m1_i}$ and $\mathbf{m2_i}$ will be different.
1 ≤ $\mathbf{t_i}$ ≤ 100.
1 ≤ **Q** ≤ 10.
1 ≤ **x1** ≤ **N**.
1 ≤ **y1** ≤ $\mathbf{SN_{x1}}$.

Submissions

Minesweeper

8pt	Not attempted 748/1510 users correct (50%)
14pt	Not attempted 703/741 users correct (95%)

Taking Metro

9pt	Not attempted 64/319 users correct (20%)
15pt	Not attempted 56/62 users correct (90%)

Broken Calculator

10pt	Not attempted 570/1000 users correct (57%)
16pt	Not attempted 385/544 users correct (71%)

Tetris

11pt	Not attempted 29/163 users correct (18%)
17pt	Not attempted 27/29 users correct (93%)

Top Scores

cebrusfs	100
LXZ	100
Kriiii	100
drazil	100
xing89qs	100
xhae	100
culaucon	100
whsb	100
jki14	100
zck921031	100

$1 \le \mathbf{x2} \le \mathbf{N}$.
$1 \le \mathbf{y2} \le \mathbf{SN_{y2}}$.
Station $\mathbf{S_{x1,y1}}$ and station $\mathbf{S_{x2,y2}}$ will be different.

Small dataset

$1 \le \mathbf{N} \le 10$.
$0 \le \mathbf{M} \le 10$.
$2 \le \mathbf{SN_i} \le 100$.
The total number of stations in each case is at most 100.

Large dataset

$1 \le \mathbf{N} \le 100$.
$0 \le \mathbf{M} \le 100$.
$2 \le \mathbf{SN_i} \le 1000$.
The total number of stations in each case is at most 1000.

Sample

Input	Output

`2`
 	
`2`
`5 3`
`3 5 7 3`
`4 2`
`1 1 1`
`1`
`1 2 2 2 1`
`1`
`1 1 2 4`
 	
`2`
`5 3`
`3 5 7 3`
`4 2`
`1 1 1`
`2`
`1 2 2 2 1`
`2 4 1 4 1`
`1`
`1 1 1 5`
	`Case #1:`
	`11`
	`Case #2:`
	`18`

In the first case, you are going to travel from station 1 of metro line 1 to station 4 of metro line 2. The best way is:

- wait 3 minutes for line 1 and get on it.
- take it for 3 minutes and get off at station 2.
- take the tunnel and walk for 1 minute to station 2 of line 2.
- wait 2 minutes for line 2 and get on it.
- take it for 2 minutes and get off at station 4.

The total time is: 3+3+1+2+2=11.