Problem D: Running Errands

Filename: `errands`

Time Limit: `3 seconds`

Due to his other camp and family responsibilities, Arup has fallen behind making problems for this year's upcoming competitive programming camp. He had just sat down to start making some problems when his wife and others added several errands to his to do list.

Obviously, Arup prefers making competitive programming problems to running errands, so he'd like to minimize the amount of time he spends on his errands so that he can return home and make some problems to torment, uhhh, "challenge" students.

Arup starts at home, which is location 0. His errands are at locations 1 through, ***n***. He must visit each one exactly once and return home. He is not allowed to visit a location for one of his errands (1 - ***n***) more than once, even if it would save him time. (No one at the DMV wants to see you twice…) You will be given the travel times between all ordered pairs of locations, 0 through ***n***, inclusive. For the purposes of this problem, assume that each errand takes 5 minutes. One final twist: some of the errands are related to another. For example, Arup must get money from the bank before he buys groceries. Thus, you'll be given some ordered pairs of locations (***x***, ***y***), indicating that location ***x*** must be visited sometime before visiting location ***y*****.** This does not mean that ***x*** must be visited right before ***y***, just sometime before. (For example, if 3 has to be visited before 1, then the following travel path would be valid: 0 → 2 → 3 → 4 → 1 → 0, if ***n*** = 4.) It is guaranteed that the set of prerequisites will not be contradictory. Even with these restrictions, there will always be at least one way for Arup to complete all of the errands and return home.

Problem

Given the number of errands to run, the travel times between all ordered pairs of locations (home and each errand location), as well as a list of requirements of the form (***x***, ***y***), indicating that location ***x*** must be visited sometime before visiting location ***y***, determine the shortest amount of time Arup can start from home, complete all of his errands and return home. Remember that each errand itself takes 5 minutes.

Input

The first line of input contains a single positive integer, **c**, representing the number of input cases. The input cases follow. The first line of input for each case contains two positive integers, ***n*** and ***m***, indicating that there are ***n*** errands to run and ***m*** ordered pairs of pre-requisite information. The next ***n***+1 lines will each contain ***n***+1 non-negative integers. The j^{th} value on the i^{th} line indicates the number of minutes it takes to travel from location ***i*** to location ***j***, (0 ≤ ***i***, ***j*** ≤ ***n***) This may not be the same as the i^{th} value on the j^{th} line. The final ***m*** lines of each input case will contain two space separated integers, ***x*** and ***y***, respectively, indicating that location ***x*** must be visited before location ***y*** (0 < ***x***, ***y*** ≤ ***n***, ***x*** **≠** ***y***)

Output

For each input case, output a single positive integer, representing the minimum total time for Arup to start from home, complete his errands and return home.

Input Bounds and Corresponding Credit

20 Points	80 Points
• $1 \le \mathbf{c} \le 10$ • $1 \le \mathbf{n} \le 3$ • $0 \le \mathbf{m} \le 3$ • All travel times are integers in between 0 and 10^6. 0 will only be listed as the travel time between a location and itself.	• $1 \le \mathbf{c} \le 20$ • $1 \le \mathbf{n} \le 10$ • $0 \le \mathbf{m} \le 20$ • All travel times are integers in between 0 and 10^6. 0 will only be listed as the travel time between a location and itself.

Samples

Input	Output
2 2 0 0 10 40 13 0 29 26 22 0 2 1 0 10 40 13 0 29 26 22 0 2 1	75 85

Sample Explanation: In the first sample, we can travel 0 → 1 → 2 → 0. We take 10 minutes to arrive at location 1, followed by 5 minutes to run the errand there. Then we travel from location 1 to location 2 in 29 minutes, followed by another 5 minutes to do the errand there. Finally, we come back home from location 2 to location 0 in 26 minutes. The total time for this excursion is 10 + 5 + 29 + 5 + 26 = 75 minutes. For the second sample, we have the same travel times but are forced to travel 0 → 2 → 1 → 0, which takes us 40 + 5 + 22 + 5 + 13 = 85 minutes.