Coding Area

Graph

Problem Description

Given a graph with N nodes, M edges and N independent, assignable weights, maximize the sum of weights across all edges.

The following conditions hold true about the graph

- The graph is an undirected graph i.e., value of edge between N1 and N2 is same as value of edge between N2 and N1.
- The graph cannot have loops.
- There can be nodes which are not connected to any other node(s).
- For the weight of a node to get counted, it needs to have at least one edge with some other node.
- If two nodes are assigned weights *a* and *b*, and if there is an edge between these two nodes, then the value of that edge is a + b.

Your task is to assign the weights to the nodes such that the summation of values of the edges is maximum.

For better understanding, refer the *Examples* section.

Constraints

$0 < N < 15$

$1 < M <= [(N * (N -1))/ 2]$

$0 < W_i < 100$

Input

First line contains an integer N, which denotes the number of nodes.

Second line contains an integer M, which denotes the number of edges.

Next M lines consist of two space separated integers depicting the two nodes which are connected to each other and thus form an edge.

Last line consists of N space separated integers denoting the available weights (W_i).

Output

Print the maximum sum of values of the edges made possible by assigning the right weight to the right node.

Time Limit (secs)

1

Examples

Example 1

Input

5

4

2 1

2 3

1 4

2 4

1 2 3 4 5

Output

31

Explanation:

Given that N = 5, M = 4

There are 5 nodes and 4 edges in the graph. We need to assign one weight to one node, such that the overall sum of all the edges will be maximum.

Hence, we assign the following weights to the nodes:

Node: Weight

Node: Weight

1 3

2 5

3 2

4 4

5 1

By assigning this way, we get the following as the values of the respective edges:

From edge 2 - 1: weight of node (2) + weight of node (1) = 5 + 3 = 8

From edge 2 - 3: weight of node (2) + weight of node (3) = 5 + 2 = 7

From edge 1 - 4: weight of node (1) + weight of node (4) = 3 + 4 = 7

From edge 2 - 4: weight of node (2) + weight of node (4) = 5 + 4 = 9

Total sum from all edges = 8 + 7 + 7 + 9 = 31. Any other way of weight assignment will not yield a maximum sum beyond 31. So, the output will be 31.

Example 2

Input

4

2

1 2

3 4

9 3 6 7

Output

25

Explanation

Given that N = 4, M = 2

There are 4 nodes and 2 edges in the graph. We need to assign one weight to one node, such that the overall sum from all the edges will be maximum.

Hence, we assign the following weights to the nodes:

Node: Weight

1 9

2 3

3 6

4 7

By assigning this way, we get the following as the values of the respective edges:

From edge 1 - 2: weight of node (1) + weight of node (2) = 9 + 3 = 12

From edge 3 - 4: weight of node (3) + weight of node (4) = 6 + 7 = 13

Total sum from all edges = 12 + 13 = 25. Any other way of weight assignment will not yield a maximum sum beyond 25. So, the output will be 25.

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☐ I, **Soumyadeep** confirm that the answer submitted is my own. ☐ Took help from online sources (attributions)

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