A2- Online 4:

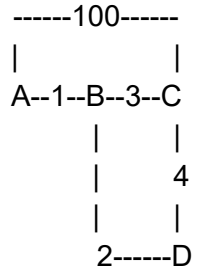
Minimum spanning Tree (MST):

Description:

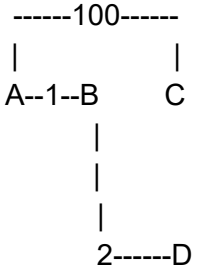
You are given a weighted graph G(V, E) Where V represents vertices & E represents edges. Now you are given some edges as constraints. Now considering those constraints find the minimum spanning tree.
Constraints can be of two types,

1. Edges those have to be in minimum spanning tree
2. Edges those cannot be present in minimum spanning tree.

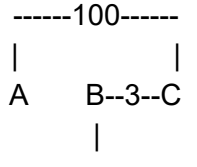
Suppose, in the following Graph Trivial MST is A-B-D-C of cost 6

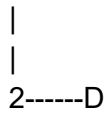


Now, You are asked to find minimum spanning tree where, edge A-C edge must be present, Therefore the new minimum spanning tree with constraints will be like following with cost, 103

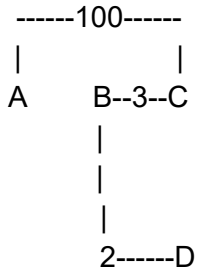


If we add constraints, A-C and B-C both must be present, the the minimum spanning tree would be following with cost 105





And if constraints are like, A-C must be in MST and A-B cannot be in MST then, result will be like following with cost 105



Rest assured that no invalid constraint will be given as input.

Sample input format:

1. Test case T
2. For each case, first line specifying the number of vertices and edges n, m
3. m following edge description
4. X specify number of given edges that must be included
5. Input X edges
6. Y specify number of given edges that must be excluded
7. Input Y edges

Sample output format:

1. Value of the spanning tree

Instructions : Use Kruscal or Prim's algorithm for finding minimum spanning tree.

Mark distribution:

1. MST of Graph - 4
2. MST with edge constraints -6

Sample Input	Sample Output
3	
4 5	Case 1#

0 1 1 0 2 100 1 2 3 1 3 2 2 3 3 1 0 2 0	MST: 6 With Constraint: 103
4 5 0 1 1 0 2 100 1 2 3 1 3 2 2 3 3 2 0 2 1 2 0	Case 1# MST: 6 With Constraint: 105
4 5 0 1 1 0 2 100 1 2 3 1 3 2 2 3 3 1 0 2 1 0 1	Case 1# MST: 6 With Constraint: 105