Assignment 4

Q1) In the previous DSA class on SSSP , Sir told the class "If some of the edge weights are negative, then in most cases,Dijkstra's algorithm may not work"
On looking at Dijkstra algorithm , Harry thought the Dijkstra should work in cases where some particular edges are negative .He claimed that if the edges from the sources were negative , then Dijkstra algorithm would not fail. (assuming source don't have any incoming edge).

Do you think Harry's claim is right or wrong ? Justify.

Input:
n, m
(n = no. of vertices, m = no. of edges)
Next m lines have x,y w -> ans edge from x to y having weight w

7 8
0 1 -7
0 2 -1
1 3 5
2 3 3
2 4 5
3 5 3
4 5 3
5 6 2.

Output:
Return the array containing shortest path from source for each node if you think it is possible Else return -1 .

Q2) You have recently started playing a brand new computer game called "Mr. President". The game is about ruling a country, building infrastructures and developing it.

Your country consists of N cities and M bidirectional roads connecting them. Each road has assigned a cost of its maintenance. The greatest achievement in the game is called "Great administrator" and it is given to a player who manage to have all cities in the country connected by roads in such a way that it is possible to travel between any two cities and that the sum of maintenance costs of these roads is not greater than K.

This is very hard to accomplish, but you are very close to do it. More precisely, you have just discovered a new method of transforming standard roads into super roads, with cost of maintenance just 1, due to their extreme durability.

The bad news is that it is very expensive to transform a standard road into a super road, but you are so excited that you are going to do it anyway.

In addition, because you have a lot of other expenses, you also want to first demolish as many roads as possible in order to safe some money on their maintenance first and then start working on getting the achievement. You can demolish any road in the country and that operation does not cost you anything.

Because you want to spend the absolutely minimum money in order to get the achievement, you are interested in the smallest number of transformations of standard roads into super roads in such a way that you can do that.

Input format:

In the first line there are 3 integers N, M and K denoting the number of cities in the country, the number of roads in it and the desired sum of costs of maintenance. M lines describing these roads follow. In each of them there are 3 integers A, B and C, where A and B denote the endpoints of the road while C denotes the cost of its maintenance.

Output:

In a single line, output the minimum number of roads which need to be transformed in order to get the achievement. If it is not possible return -1.

Constraints:
2 <= N, M <= 10^6
0 <= K <= 10^18
1 <= A, B <= N and A != B
1 <= C <= 10^6

Sample Input
3 3 25
1 2 10
2 3 20
3 1 30

Sample Output
1

Q3)
A class has n no. of students. S0, s1,s2, s3…sn-1.
Students got their DSA assignment . Inside information revealed that some students were

dependent on others for their assignment. For eg: s1 told he will do the assignment once s2 completes it , s3 told he will do the assignment once s1 completes it.
Determine whetherit is possible for all the students will be able to complete the assignment or not.

Input
N,m
N = no. of students
M = no. of dependencies
Next m lines have a,b (a is depending on b for the assignment)

5 4
0 1
2 3
3 4
4 5
Output:
1 (if possible)

Case 2:
5 5
1 2
 2 3
3 4
4 5
5 2

-1 (if not possible)