PDS 2710: Home Assignment #10

Due on Sunday, October 30, 2016

Problem 1

Is it a forest

A forest is an undirected graph, all of whose connected components are trees; in other words, the graph consists of a disjoint union of trees. You are given an undirected graph. Write a program to check if it's a forest.

Input Description

The first line of the input has two integers N (Number of vertices) and M (number of edges) . Next M lines contain M edges of that graph, Each line contains a pair (u, v) means there is an edge between node u and node v (1 ¡= u,v ¡= N).

output Description

Print YES if the given graph is a forest, otherwise print NO.

Example1:

Input:
4 2
1 2
3 4

Output:
YES

Example2:

Input:
5 4
1 2
3 4
4 5
3 5

Output:
NO

Problem 2

Find all possible words in a board of characters

Given a dictionary and a M x N board where every cell has one character. Find all possible words that can be formed by a sequence of adjacent characters. Note that we can move to any characters on a board, but a word should not have multiple instances of same cell.

Input Description

The first line of the input is a string (dictionary). Next line contains two integers N(number of rows) and M(number of columns). Next N line represents NxM board of characters.

Output Description

Print all the words of a dictionary which are present in the board.

Example:

Input:
GEEKS FOR QUIZ GO
3 3
G I Z
U E K
Q S E

Output:
GEEKS QUIZ

Problem 3

Longest Path in a Directed Acyclic Graph

Given a Weighted DAG and a source vertex s in it, find the longest distances from s to all other vertices in the given graph.

Input Description:

In the first line you are given an integer N (vertices labeled from 0 to N-1), M and S (starting point). On the next M lines there are three distinct integers a,b and c, describing that there is an edge between a and b and can travel from a to b only and distance between a and b is c.

Output Description:

the longest distances from S to all other vertices in the given graph. If there does not exist path from S to v then print INF.

Example Input

6 10 1
2 4 4
2 5 2
2 3 7
0 1 5
0 2 3
1 3 6
1 2 2
3 5 1
3 4 -1
4 5 -2

Output:
INF 0 2 9 8 10