CS Exam - Editorial

Difficulty:

Medium

Prerequisites:

Graph - (Tutorial)
Topological Sort - (Tutorial)
Breadth First Search - (Tutorial)

Problem in Brief:

Given a directed graph G and a target node K. Print the nodes that can reach K in topologically sorted order.

Editorial:

We can convert this problem to a directed graph problem where the subjects are nodes and there is a directed edge from prerequisite subject to current subject.

Now in order to find the prerequisites that we need to learn in order to learn subject K, we need to find all the nodes that can reach K using the directed edges that we built in the previous step.

To do this we will first find the Topological ordering of the Graph. Now we will start from K and do a BFS by traversing the edges in reverse direction and we will store all the nodes in a list. Now we will print all the nodes in

this list with respect to their position in the Topological order, breaking ties by giving preference to subject with smaller index.

It's easy to see that it works because any node that can reach K can also be reached by K by traversing in the reverse direction.

Time Complexity:

We can find the topological sort of the graph in linear time and do the breadth first search in linear time as well.
Hence the Time Complexity is

O(N)

Similar Problems:

First
Second