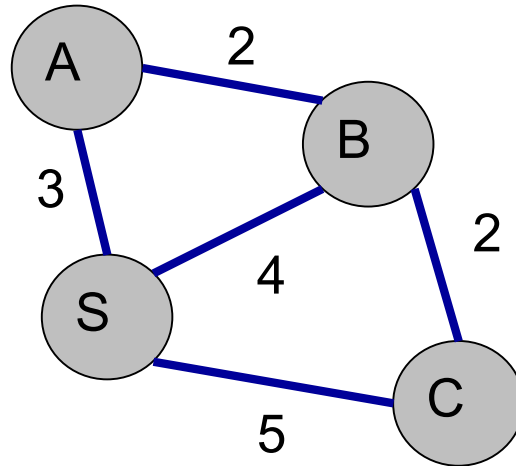


CS200 Fall 2015 written homework 3

name:

id:

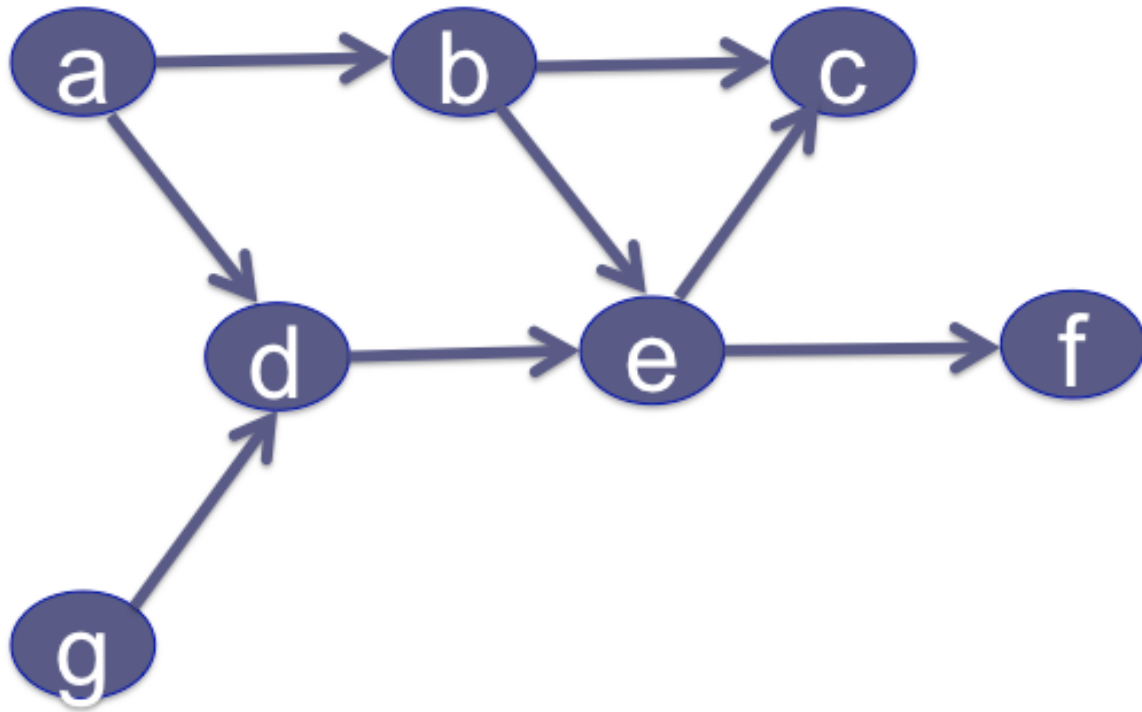
1. Given the following graph



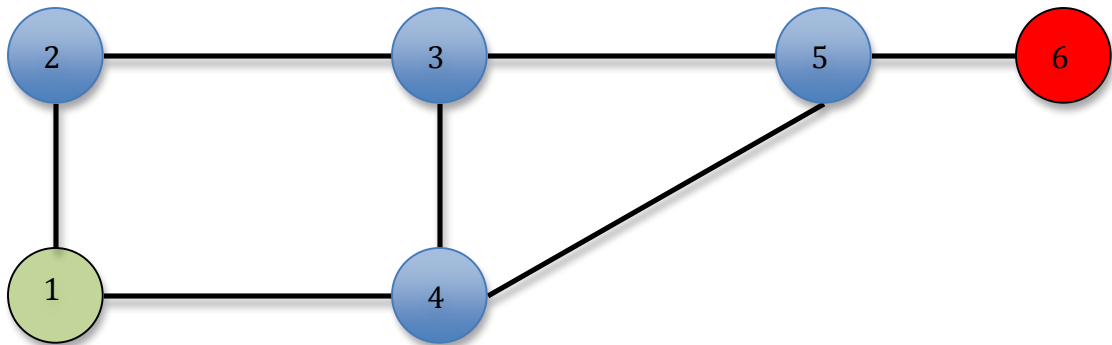
(a) Show the shortest paths starting at S

(b) Show the Minimum Spanning Tree

2. Enumerate all distinct topological sortings of the following DAG:



3. Given the following graph

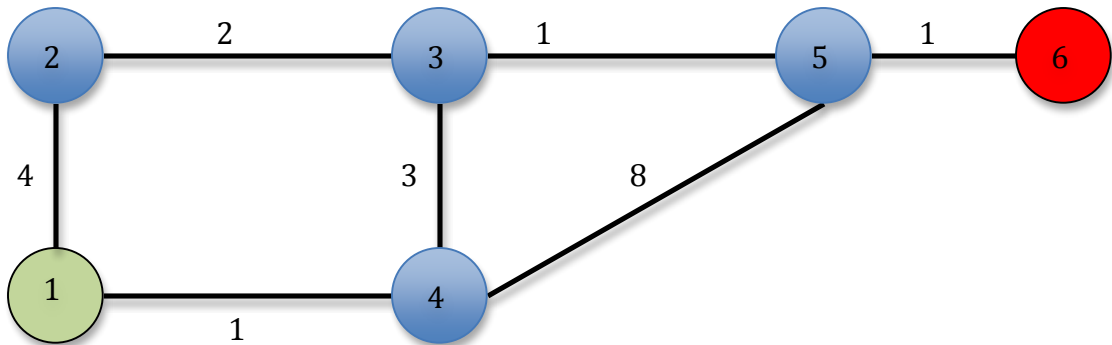


(a) Write the sequence of nodes traversed by the DFS algorithm starting at node 1. The DFS priorities are the inverse of node labels, i.e. the smaller the label, the higher the priority. How many steps does it take to reach the goal node 6?

(b) Compute the shortest distances to node 6. Denote the computed shortest distance by $h(j)$ for node j .

$h(1) =$
 $h(2) =$
 $h(3) =$
 $h(4) =$
 $h(5) =$
 $h(6) = 0$

(c) Now suppose edges are given the following weights



Compute shortest distances from node 1, until the Dijkstra's algorithm finishes node 6. Stop once the correct shortest distance from node 1 to node 6 is computed. Show the priority queues in each step of the algorithm. How many node-visits (including checking for potential distance update) did the Dijkstra's algorithm perform?