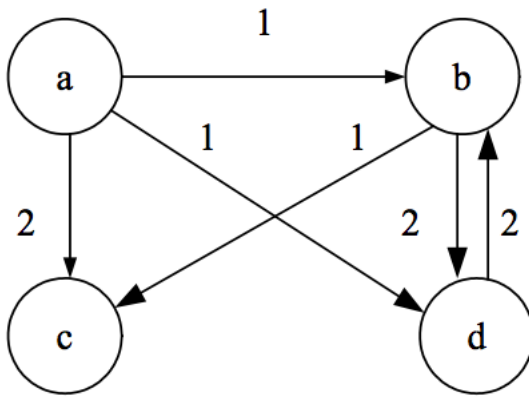
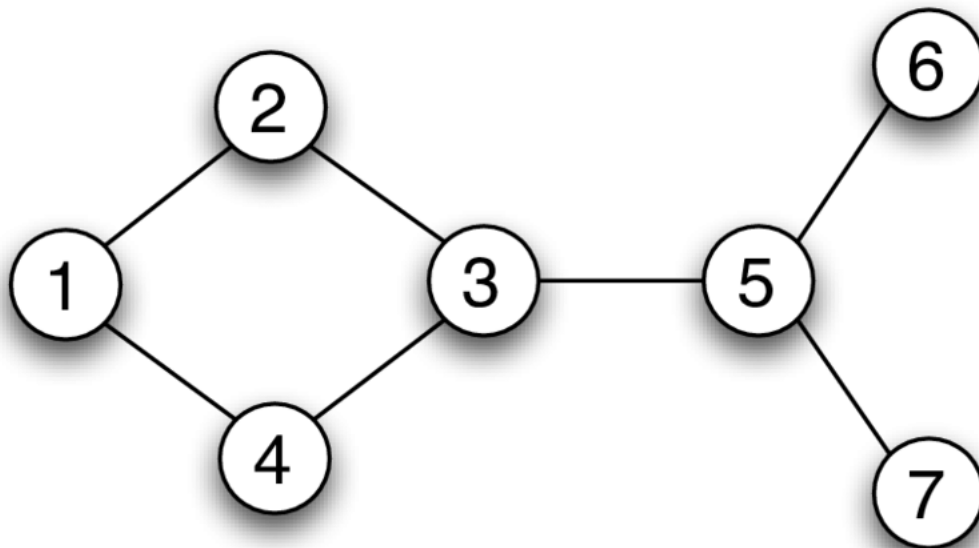


CS 5300 Advanced Algorithms
HW #6

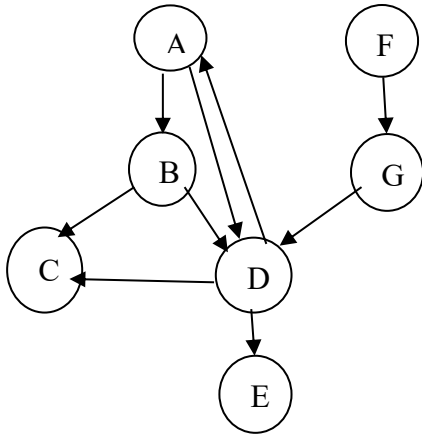
1. Give an adjacency-list representation for a complete binary tree on 8 vertices. Give an equivalent adjacency-matrix representation. Assume that vertices are numbered from 1 to 8 as in a binary heap.
2. Give an adjacency-list and matrix representation of the following graph



3. Show the d and π values that result from running breadth-first search on the graph below using vertex 1 as the source. Show the final graph produced by the breadth-first search algorithm

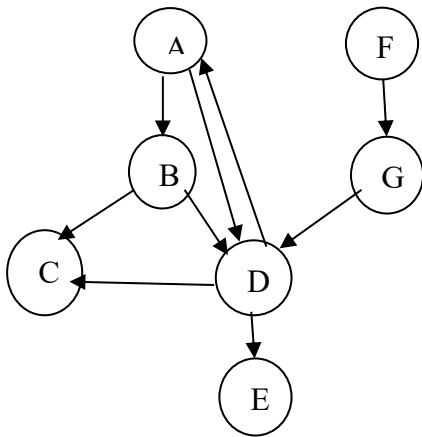


4. Consider the following graph



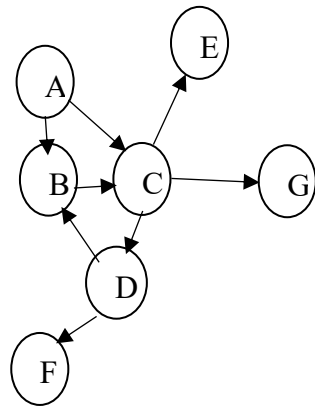
Show the d and π values that result from running breadth-first search on the above graph using vertex A as the source. Show the final graph produced by the breadth-first search algorithm. What is the time complexity of breadth-first search algorithm?

5. Consider the following graph



Show how depth-first search works on the above graph. Assume that the **for** loop of lines 5-7 of the DFS procedure considers the vertices in alphabetical order, and assume that each adjacency list is ordered alphabetically. Show the discovery and finishing times for each vertex, and show the classification of each edge. What is the time complexity of depth-first search algorithm?

6. List one topological ordering of the following graph. If no ordering exists, briefly explain why.



7. For the following graph. Find the strongly connected components:

