

CSC 323 Algorithm Design and Analysis, Spring 2016

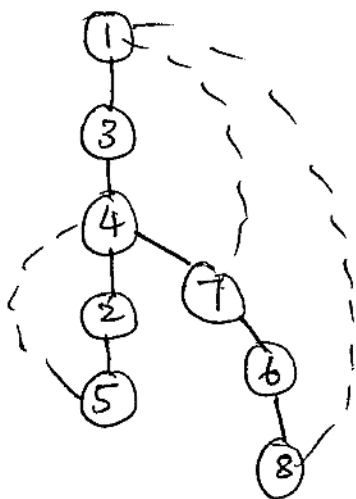
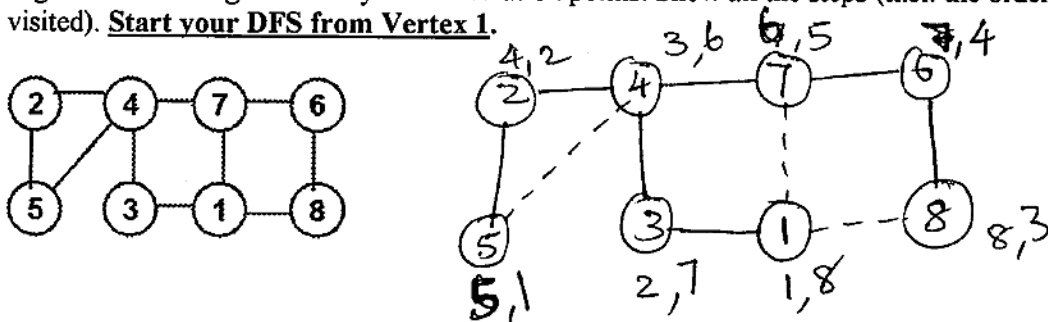
Instructor: Dr. Natarajan Meghanathan

Quiz 7 (April 5, 2016)

Max. Points: 25

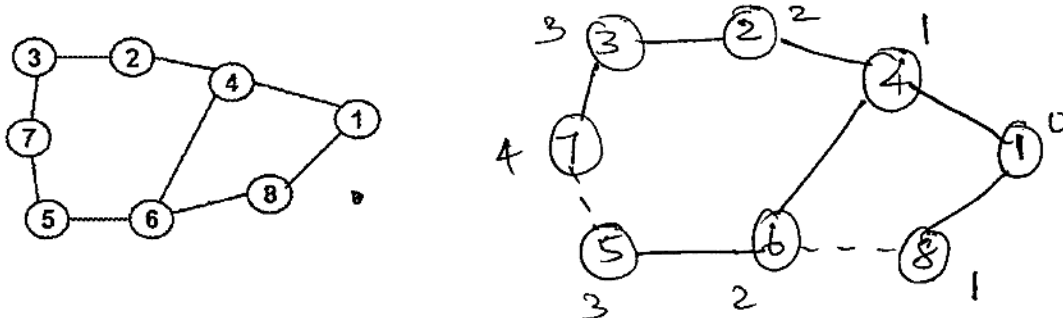
Max. Time: 20 min.

1) (8 pts) Conduct a **Depth First Search (DFS)** on the graph assigned to you. Clearly indicate the Tree edges and Back edges. Identify the articulation points. Show all the steps (incl. the order the vertices are visited). **Start your DFS from Vertex 1.**

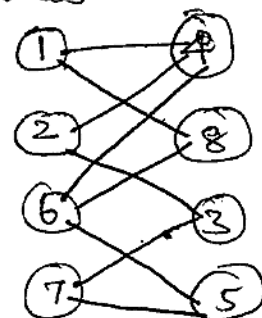


(4) has a sub tree (2, 5) from which there is no back edge above (4). Hence (4) is an articulation point. None of the other vertices are articulation points.

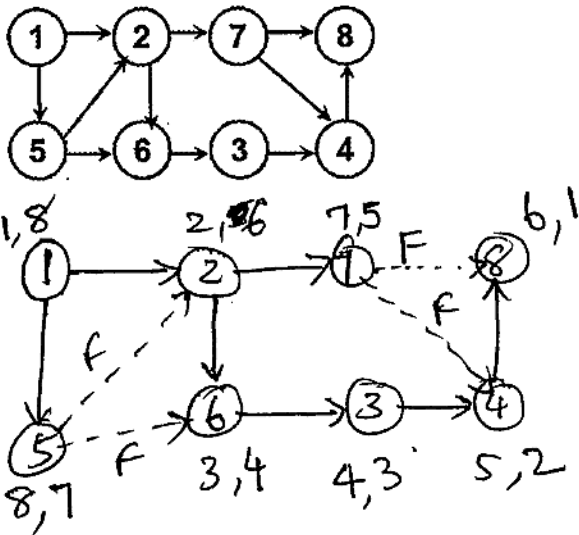
2) (8 pts) Run the Breadth First Search algorithm on the following graph and determine whether it is bi-partite or not? If it is bi-partite, identify the two partitions of vertices. Use space in the back if needed.



Both the cross edges are between vertices at different levels. Hence, the graph is bipartite.



- 3) (9 pts) Run the Depth First Search (DFS) algorithm on the directed graph given below.
- (a) Identify the different types of edges you encounter as part of the DFS traversal.
  - (b) Determine whether or not the graph is a DAG (Directed Acyclic Graph)? Justify your answer.
  - (c) Write a topological sort of the vertices, if one exists.



There are no back edges.  
Hence the graph is a DAG.

1, 5, 2, 7, 6, 3, 4, 8

Topological sort.