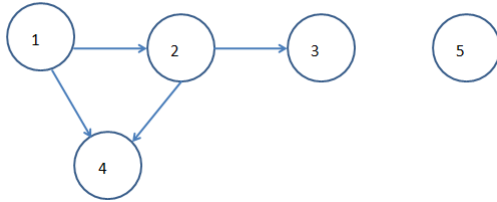


COS226 Week 7 Activity

1. Consider the simple directed graph below. Starting with vertex 1 give the DFS pre-order, DFS postorder, and DFS reverse postorder for it, assuming increasing order to break ties.



2. In a connected undirected graph, a cut vertex is a vertex whose removal will result in two disconnected graphs. Give an algorithm for identifying whether or not a given vertex is a cut vertex. Do not write Java code. See the back of this page for a hint.

3. An ancestral path between two vertices v and w in a digraph is a directed path from v to a common ancestor x , together with a directed path from w to the same ancestor x . A shortest ancestral path is an ancestral path of minimum total length. Give an algorithm which identifies the length of the shortest ancestral path between two vertices v and w . Do not write Java code.

As soon as you have an algorithm, even if you are not sure it is correct, let your preceptor know and we'll discuss correctness and efficiency of the algorithm together. Don't be shy! We hope to go through a few algorithms together before hitting the best one.

- Hint on identifying cut vertices: Imagine a version of DFS which is forbidden to cross the cut vertex. Consider the contents of `marked[]` if this modified DFS is called on any vertex in the graph.