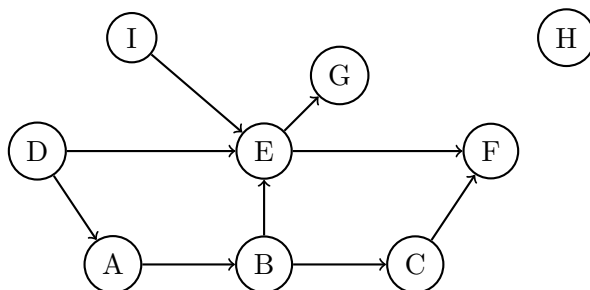


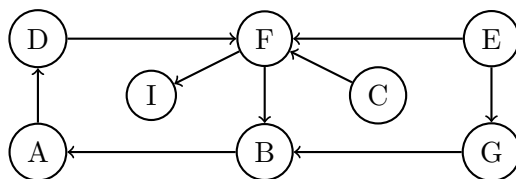
CSC-361: Graphs Part I: BFS, DFS, Topological Sort

Please work in a pair. Only one group members needs to submit; however, make sure all names are listed.

1. For directed graph G with edges $\{2 \rightarrow 1, 3 \rightarrow 2, 3 \rightarrow 1, 0 \rightarrow 3, 0 \rightarrow 2, 1 \rightarrow 2\}$, show an adjacency matrix representation of these edges. Repeat this problem showing adjacency lists.
2. What is the minimum number of edges, $|E|$, in a connected, undirected graph with V vertices, no self loops, and no parallel edges?
3. What is the maximum number of edges, $|E|$, in a connected, undirected graph with V vertices, no self loops, and no parallel edges, and all vertices have degree greater than zero?
4. Topologically sort the following graph to identify a linearization. *Start with node A and always choose the 'lesser' node in alphabetic order.*



5. Topologically sort the following graph to identify a linearization. *Start with node A and always choose the 'lesser' node in alphabetic order.*



6. Consider a topological sort of a DAG with n nodes and no edges. What is the maximum number of possible topological sorts of the n nodes?
7. Give a high-level description (not detailed pseudocode) of an algorithm to identify if a directed graph contains any cycles.
8. Give a high-level description (not detailed pseudocode) of an algorithm to identify if an undirected graph is connected.