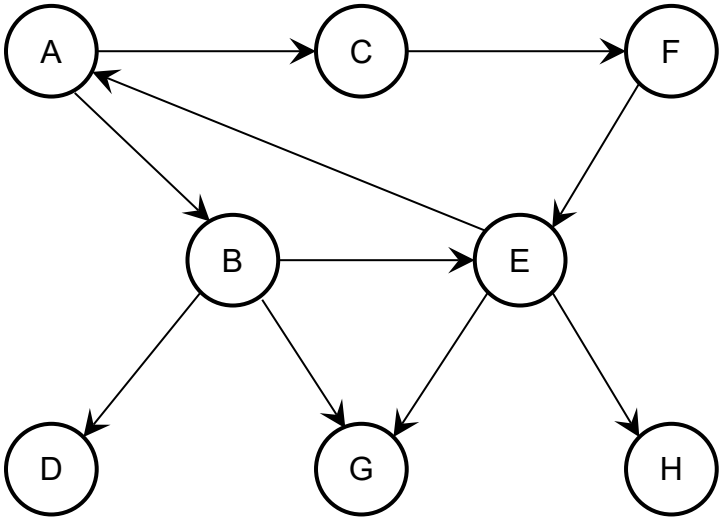
Example Edge Classification, Parentheses Theorem

Consider the following unweighted, directed graph:

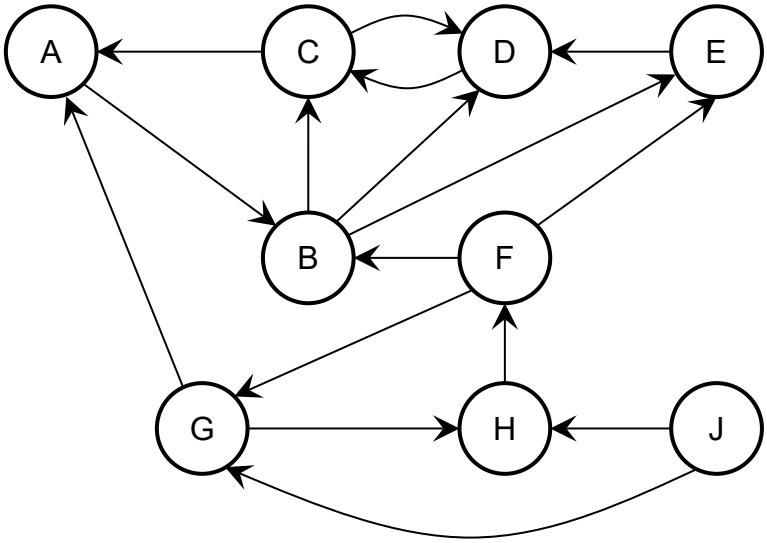


1. Perform a depth-first search on the given graph starting at node A and visiting nodes in alphabetical order when there are several options. Note down the start time and end time for each node.

2. Draw in a separate graph the spanning tree resulting from the DFS traversal. Then, add all other edges of the graph to the spanning tree using a different color or line type. Finally, classify all edges as tree edges, forward edges, back edges and cross edges.

3. Write down the order in which the nodes are first visited (made grey, pushed to stack) and finished (made black, popped from stack). Add an opening parenthesis whenever a node is first visited and a closing parenthesis when a node is finished.

4. Repeat the previous tasks using the following graph:



Resulting spanning tree / forest:

Visiting sequence and parentheses:

5. Elaborate on whether different results would be produced if nodes would be visited in another way than in alphabetically ascending order where there are multiple options.