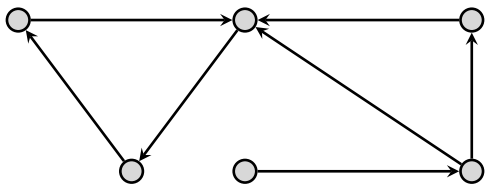
SCCs

Reset Progress Reveal Solutions

1 Strongly Connected Components

Consider the directed graph below:



How many strongly connected components does this graph have?

4

Correct

What is the minimum number of directed edges to add to this graph to make all the vertices strongly connected?

1

Correct

Assume you have two vertices u and v in a directed graph where there exists a path from u to v. Which one of the following is incorrect about u and v?

- ○ u and v can be in the same SCC.
- ○ u and v can be in different SCCs.
- ○ If u's DFS finish time is less than v's DFS finish time then u and v are in the same SCC.
- ● u's DFS finish time is always greater than v's DFS finish time.

Correct

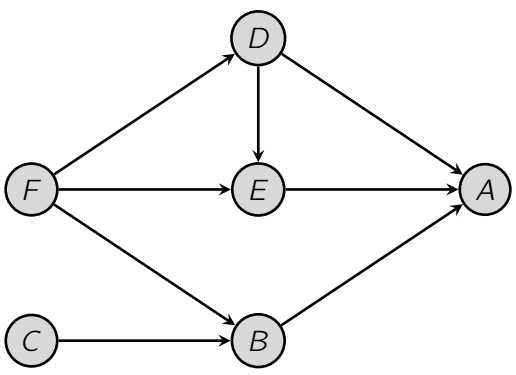
Assume you have two vertices u and v in a directed graph where u and v are in the same SCC. Which one of the following is incorrect about u and v?

- ○ There exists a DFS tree where u is in v's subtree (subtree rooted at v).
- ○ There exists a DFS tree where v is in u's subtree (subtree rooted at u).
- ● There exists a DFS tree where u is not in v's subtree and v is not in u's subtree.
- ○ There exists a BFS tree where u is not in v's subtree and v is not in u's subtree

Correct

2 Topological Sorting

Consider the DAG below:



How many different orderings of the vertices in the above graph (out of the 6! possible orderings) result in a topological sort? For instance $ABCDEF$ is an ordering that's not topologically sorted, but $FDCEBA$ is an ordering that's topologically sorted.

9

Correct

What is the lexicographically smallest topological ordering of the vertices?

CFBDEA

Correct

If we use a DFS algorithm that breaks ties lexicographically (always picks the node with lexicographically smallest letter possible to start or proceed), what is the resulting topological ordering of the nodes?

FDECBA

Correct