1 Strongly Connected Components

Consider the directed graph below:



How many strongly connected components does this graph have?



Correct

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

| 1 | |
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Correct
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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?

 \bigcirc *u* and *v* can be in the same SCC.

O u and v can be in different SCCs.

O If u's DFS finish time is less than v's DFS finish time then u and v are in the same SCC.

 \bigcirc *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?

O There exists a DFS tree where u is in v's subtree (subtree rooted at v).

- O 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.
- O 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?



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?

