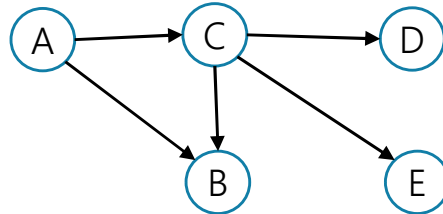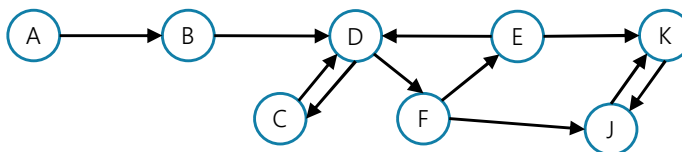# Ordering a DAG

Does this graph have a topological ordering? If so find one.

10

Problem 2: Find Strongly Connected Components

Strongly Connected Component
A subgraph C such that every pair of vertices in C is connected via some path **in both directions,** and there is no other vertex which is connected to every vertex of C in both directions.

59

1

P (stands for "Polynomial")

The set of all decision problems that have an algorithm that runs in time $O(n^k)$ for some constant k.

NP (stands for "nondeterministic polynomial")

The set of all decision problems such that if the answer is YES, there is a proof of that which can be verified in polynomial time.

NP-complete

Problem B is NP-complete if B is in NP and
for all problems A in NP, A reduces to B in polynomial time.

NP-hard

Problem B is NP-hard if
for all problems A in NP, A reduces to B in polynomial time.

60

Scenario #1

You've made a new social networking app, Convrs. Users on Convrs can have "asymmetric" following (I can follow you, without you following me). You decide to allow people to form multi-user direct messages, but only if people are probably in similar social circles (to avoid spamming).

What are the vertices?

You'll allow a messaging channel to form only if for every pair of users a,b in the channel: a must follow b or follow someone who follows b or follow someone who follows someone who follows b, or …
And the same for b to a.

What are the edges?

What are we looking for?

You'd like to be able to quickly check for any new proposed channel whether it meets this condition.

What do we run?

52