Can you learn from BFS, Dijkstra, or Bellman-Ford?

How will you do this?

Required Runtime: \( O(\text{VI} + \text{LE}) \)

Output: 
- dis: \( \text{dist} \) to shortest path distance from \( s \)
- g: is a DAG

Problem:

Shortest paths in DAGs
What did we learn?

- Why?
  - Where does it fail?
    - path for either example
      - Does Bellman-Ford find shortest
        - Bellman-Ford and Dijkstra and DFS

- Why does it fail?
  - Where does it fail?
    - path for either example
      - Does Dijkstra find shortest
        - DFS and BFS

Shortest paths in DFS
Look at propagation of correct paths from start node.

What do we like about Bellman-Ford for DAGs?

Why not use Bellman-Ford on DAGs?

Shortest Paths in DAGs
Runtime:

```
update (u,v, dist, prev)
for (u,v) in E:
    for u in V, in linear order:
        use DFS to linearize G
        dist[u] = 0
        prev[u] = nil
        dist[v] = \infty
        for u in V:
            if dag-shortest-paths(G, \nu, s):
                shortest paths in DAGs
```