

✓ **Congratulations! You passed!**
TO PASS 1% or higher

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GRADE
100%

Interview Questions: Directed Graphs (ungraded)

TOTAL POINTS 3

1. **Shortest directed cycle.** Given a digraph G , design an efficient algorithm to find a directed cycle with the minimum number of edges (or report that the graph is acyclic). The running time of your algorithm should be at most proportional to $V(E + V)$ and use space proportional to $E + V$, where V is the number of vertices and E is the number of edges. 1 / 1 point

Find a directed cycle with the minimum number of edges or report graph is acyclic.

✓ **Correct**
Hint: run BFS from each vertex.

2. **Hamiltonian path in a DAG.** Given a directed acyclic graph, design a linear-time algorithm to determine whether it has a *Hamiltonian path* (a simple path that visits every vertex), and if so, find one. 1 / 1 point

Determine it has a Hamiltonian path.

✓ **Correct**
Hint: topological sort.

3. **Reachable vertex.** 1 / 1 point
- *DAG:* Design a linear-time algorithm to determine whether a DAG has a vertex that is reachable from every other vertex, and if so, find one.
 - *Digraph:* Design a linear-time algorithm to determine whether a digraph has a vertex that is reachable from every other vertex, and if so, find one.

* Find a vertex that is reachable from every other vertex.(DAG)
* Find a vertex from every (digraph)

✓ **Correct**
Hint (DAG): compute the outdegree of each vertex.

Hint (digraph): compute the strong components and look at the kernel DAG (the digraph that results when you contract each strong component to a single vertex).