Congratulations! You passed!

TO PASS 1% or higher

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GRADE
100%

Interview Questions: Shortest Paths (ungraded)

TOTAL POINTS 3

1. **Monotonic shortest path.** Given an edge-weighted digraph G, design an $E \log E$ algorithm to find a *monotonic* shortest path from s to every other vertex. A path is *monotonic* if the sequence of edge weights along the path are either strictly increasing or strictly decreasing. **1 / 1 point**

   Monotonic shortest path.

   Correct

   Hint: relax edges in ascending order to find a best monotonically increasing path; relax edges in descending order to find a best monotonically decreasing path.

2. **Second shortest path.** Given an edge-weighted digraph and let P be a shortest path from vertex s to vertex t. Design an $E \log V$ algorithm to find a path (not necessarily simple) other than P from s to t that is as short as possible. Assume all of the edge weights are strictly positive. **1 / 1 point**

   Second shortest path.

   Correct

   Hint: compute the shortest path distances from s to every vertex and the shortest path distances from every vertex to t.

3. **Shortest path with one skippable edge.** Given an edge-weighted digraph, design an $E \log V$ algorithm to find a shortest path from s to t where you can change the weight of any one edge to zero. Assume the edge weights are nonnegative. **1 / 1 point**

   Shortest path with one skippable edge.

   Correct

   Hint: compute the shortest path from s to every vertex; compute the shortest path from every vertex to t; combine.