Interview Questions: Shortest Paths

3/3 points earned (100%)

Excellent!

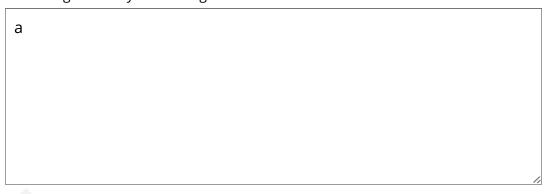Retake

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points

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.

> a

Thank you for your response.

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.

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1 / 1
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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 other than P from s to t that is as short as possible. Assume all of the edge weights are strictly positive.

a

Thank you for your response.

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

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          points

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.

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Thank you for your response.

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