

Lecture Section:

Monday, Oct 06, 2025

Student Name:

PSU Email ID:

1. (2 pts.) Suppose in a directed graph, A and B are strongly connected components, and there is an edge from a vertex in A to a vertex in B . Then:
 - (a) $\max_{w \in A} \text{post}(w) > \max_{v \in B} \text{post}(v)$
 - (b) $\max_{w \in A} \text{pre}(w) < \max_{v \in B} \text{pre}(v)$
 - (c) $\max_{w \in A} \text{post}(w) < \max_{v \in B} \text{post}(v)$
 - (d) None of the above
2. (2 pts.) In an unweighted, connected, undirected graph, which of the following is true about using BFS to find the shortest path from a source node S ?
 - (a) BFS may fail if the graph has cycles.
 - (b) BFS works only on trees.
 - (c) BFS always finds the shortest path.
 - (d) BFS doesn't work on undirected graphs.
3. (2 pts.) Dijkstra's Algorithm **does not work correctly** on:
 - (a) Directed weighted graphs
 - (b) Graphs with negative-weight edges
 - (c) Undirected unweighted graphs
4. (2 pts.) In a weighted graph where the weights of all edges are unique, there is always a unique shortest path from a source to a destination.
 - (a) True
 - (b) False
5. (2 pts.) In Dijkstra's algorithm, after a vertex u is added to the visited set R , which of the following is always true?
 - (a) $\text{dist}(u)$ may still decrease later due to a shorter path.
 - (b) $\text{dist}(u)$ is equal to the true shortest-path distance from the source.
 - (c) $\text{dist}(u)$ is the minimum among all vertices in the graph.
 - (d) u has no outgoing edges.