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Assignment 7 Answers

1. How is the graph stored in the provided code? Is it represented as an adjacency matrix or list?

The graph in the provided code is stored as a list.

2. Which of the 3 graphs are connected? How can you tell?

Graph 1 is not connected
Graph 2 is connected
Graph 3 is connected

You can tell by drawing out the graph and assuring that no vertex is unreachable by any other vertex. Graph 3 is a special case of a connected graph, where each vertex is directly connected to every other vertex.

3. Imagine that we ran each depth-first and breadth-first searches in the other direction (from destination to source). Would the output change at all? Would the output change if the graphs were directed graphs?

The output wouldn't change in an undirected graph, it would just use the destination as the source and vice versa. It would change in a directed graph, because it may be impossible to travel the path from source to destination in reverse.

4. What are some pros and cons of DFS vs. BFS? When would you use one over the other?

A DFS can be faster and uses less memory than a BFS, but isn't guaranteed to find the shortest path between two points. A BFS uses more memory and may take longer to find a solution, but if you're interested in finding the shortest path between two points you would choose BFS over DFS.

5. What is the Big O execution time to determine if a vertex is reachable from another vertex?

The Big O execution time should be $O(n)$, where n would represent the number of vertices and the number of edges in the graph.