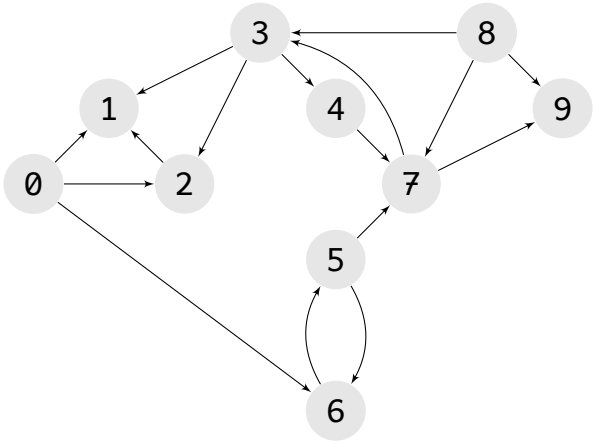
# Midterm 4 practice test

CS 133

December 9, 2019

## 1 Graphs

The next few problems will use the following directed graph:




► Is this graph

- Strongly connected?
- Weakly connected?
- Acyclic
- Has a sink? (if so, which node(s))
- Has a source? (if so, which node(s))

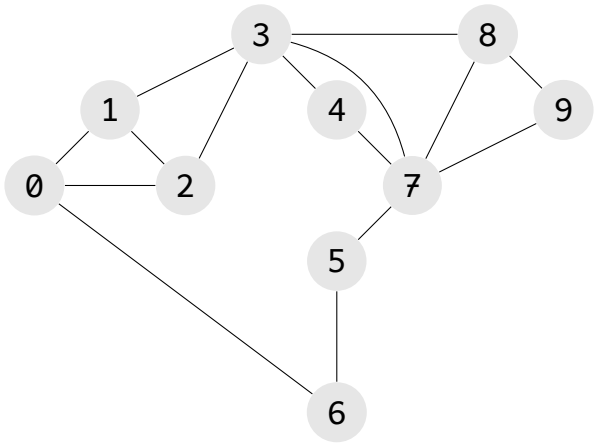
► Perform a *breadth-first traversal* of this graph, starting at node 0, and labeling each node with its distance from the starting node.

► Perform *a depth-first traversal* of this graph, starting at node 0, and labeling each node with its starting and ending times.

► Draw the adjacency list representation of this graph.

► Draw the adj. matrix representation of this graph.

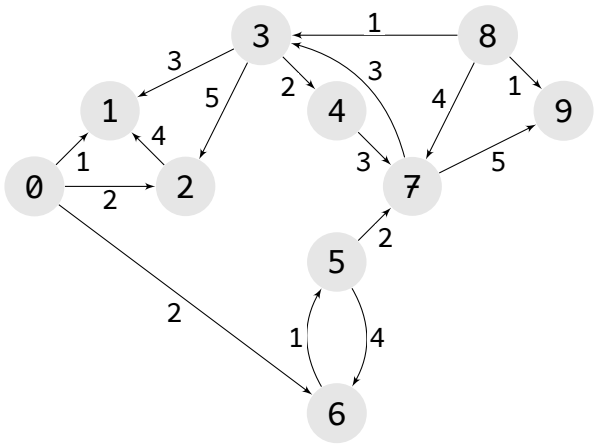
The following undirected graph will be used in the next two problems:



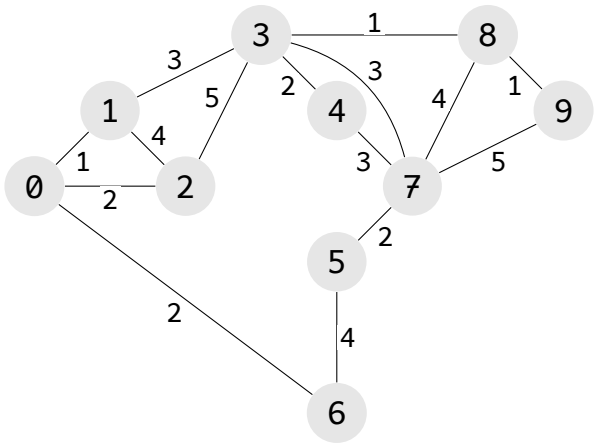

► Perform a breadth-first traversal, starting at node 3, labeling nodes with distances.

► Perform a depth-first traversal, starting at 3, labeling nodes with starting and ending times.

The following weighted, directed graph will be used for the next two problems.



- Use Dijkstra's algorithm to find the shortest-weight paths from a starting node of 3.
- Find a minimum spanning tree for the following graph:




Is the minimum spanning tree unique?