# ICS 163 – Spring 2011– Midterm

Name:

Student ID:

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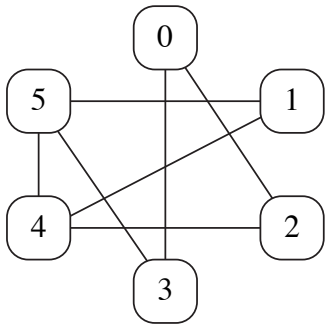
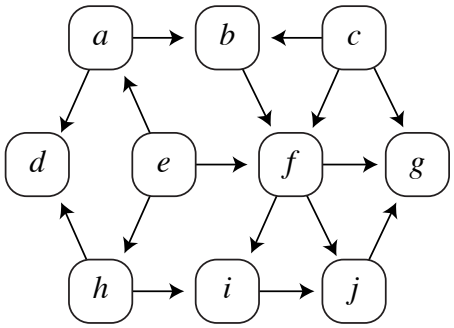
Total:

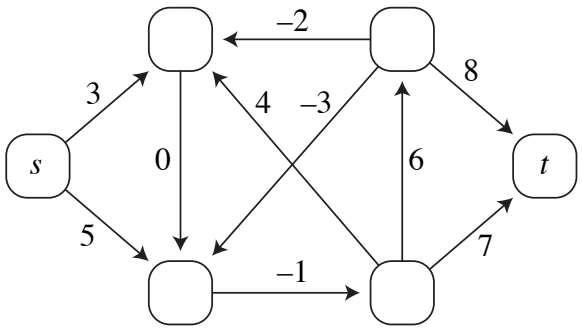
1. (30 points) Draw an adjacency matrix for the following undirected graph.



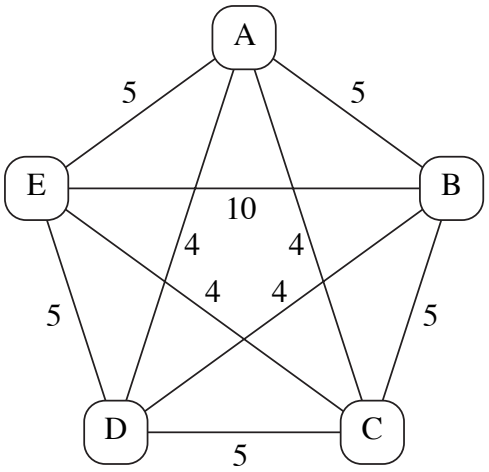
2. (30 points) Write out a topological ordering for the following directed acyclic graph.



3. (30 points) Four of the algorithms described in class—Dijkstra's algorithm, the Bellman–Ford algorithm, topological order relaxation, and Johnson's algorithm—can all be used to find shortest paths in graphs. Which of these four algorithms would be the best choice for finding shortest paths from $s$ to $t$ in graphs like the one below? Explain why this algorithm would be a good choice and why the other three algorithms would not be as good.



4. (30 points) Show an approximate traveling salesman tour that the tree-doubling heuristic could generate for the following graph. In your answer, show (a) the tree to be doubled, (b) the tour generated from the tree, before shortcutting repeated vertices, and (c) the final tour after shortcutting repeated vertices.



You may use this page (or the back of the other pages) as scratch paper.