

Due at the start of class Friday, July 9, 2010.

Problem 1. Give a simple example of a directed graph with negative weight edges, but no negative weight cycles, for which Dijkstra's algorithm produces incorrect answers.

Problem 2. Let $G = (V, E, p)$ be a directed graph representing a network of roads between cities. The weight $p(e)$ is the probability that road e will be open, so that $0 \leq p(e) \leq 1$. (The probabilities are assumed to be independent.) You want to take a trip from city a to city b . Give an algorithm to find the route that has the most chance of being open.

Problem 3. Let $G = (V, E, W)$ be a weighted, directed graph.

- (a) What is the (optimization version of the) *Longest Acyclic Path Problem*?
- (b) What is the decision version of the *Longest Acyclic Path Problem*?
- (c) Show that the decision version of the Longest Acyclic Path Problem is in NP.