University of Washington
Department of Computer Science and Engineering
May 8, 2001
CSE 521, Spring 2001

Homework 7, **Due Wednesday, May 16, 2001**

Problem 1. From the text:

CLR, Page 535, Exercise 25.3-3.

Problem 2. From the text:

CLR, Page 546. Problem 25-2.

Problem 3. Tramp steamer problem:

Minimum cost to time ratio cycle problem.
Let $G = (V, E)$ be a graph with edge costs $c(e)$ and edge times $t(e)$. For a cycle C, the cost/time ratio is

$$\mu(C) = \frac{\sum_{e \in C} c(e)}{\sum_{e \in C} t(e)}.$$

Suppose that we want to test if G has a cycle C with $\mu(C) < \hat{\mu}$. Define a new graph G' with edge costs $l(e) = c(e) - \hat{\mu}t(e)$. Prove that G has a cycle C with $\mu(C) < \hat{\mu}$ iff G' has a negative cost cycle.

Problem 4. From the text:

CLR, Page 587, Problem 27.1-9.

Problem 5. From the text:

CLR, Page 602, Exercise 27.3-5.