Question 1. Chapter 3, Exercise 9, on p. 110.

Question 2. Chapter 3, Exercise 11, on pp. 111-112. One of the keys to this problem is to identify how to build an appropriate graph out of the input trace data provided. I recommend focusing on this aspect first. Sanaz will also talk about this problem in lab on Monday, February 4. Please do not make the simplifying assumption that a pair of computers only communicate once (as stated in the text).

Question 3. Here you will develop an efficient algorithm to find the length of the longest path in a directed graph.

1. First, observe that if the graph $G$ has a directed cycle, then the maximum path length is infinite, since you can construct a path that keeps going around this cycle forever. Therefore, first devise an algorithm to test whether $G$ contains a directed cycle (and output $\infty$ if it does). Prove the correctness of your algorithm for this step.

2. If $G$ contains no cycles, it must be a DAG. Provide an algorithm to output the maximum path length in a DAG. Prove the correctness of your algorithm for this step.

3. Analyze the overall running time of your algorithm.

[Interesting note: no polynomial-time algorithm is known for finding the longest simple path in a directed graph!]

Question 4. Chapter 4, Exercise 5, on p. 190. As always, prove the correctness of your algorithm and demonstrate that your algorithm is efficient by analyzing its running time.

Question 5. Chapter 4, Exercise 6, on p. 191. As always, prove the correctness of your algorithm and demonstrate that your algorithm is efficient by analyzing its running time.