CS 330 – Spring 2016, Assignment 2

Problems due by 7PM, Thursday February 11

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. Hannah and Sridevi will also talk about this problem in lab on Monday, February 1. 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 ∞ 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.*

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.*