Computer Science 2300: Homework 8

Due: April 29, 2008

Note: Please use rigorous, formal arguments. If you are asked to provide an algorithm then you may either write pseudocode similar to the pseudocode in the DPV text, or provide a clear description in English. You **must** also provide an argument for why the algorithm is correct, and an analysis of the running time. We encourage you to collaborate with other students, while respecting the collaboration policy. Please write the names of all the other students you collaborated with on the homework. **Hardcopies are required by submission time. E-mailed versions will not be accepted.**

1. (5 points) DPV Problem 7.18 parts (a) and (b) (page 226).
2. (5 points) DPV Problem 7.19 (page 227).
3. (10 points) Consider a set of n laptops that need to be connected to a set of k wireless routers. Assume that the locations of both laptops and routers are specified entirely by (x, y) coordinates. A laptop can connect to a router if any only if it is within distance r of the router. Each router can handle up to a maximum of L laptop connections. Give a polynomial time algorithm to determine whether or not each laptop can be connected to a router.
4. (10 points) DPV Problem 8.4 (pages 264-65).
5. (10 points) Give a simple reduction from RUDRATA-CYCLE to SAT (this is part of DPV problem 8.5, on page 265).
6. (15 points) DPV Problem 8.10 (page 266).
7. (10 points) DPV Problem 8.16 (pages 267-68).
8. (15 points) DPV Problem 8.22 (page 269).