MA/CSSE 473 – Design and Analysis of Algorithms

Homework 13 (70 points total) Updated for Summer, 2013

When a problem is given by number, it is from the textbook. 1.1.2 means "problem 2 from section 1.1" .

Problems for enlightenment/practice/review (not to turn in, but you should think about them):

How many of them you need to do serious work on depends on you and your background. I do not want to make everyone do one of them for the sake of the (possibly) few who need it. You can hopefully figure out which ones you need to do.

Not in 3rd ed [9.1.1] (Greedy change-making not optimal) Give an instance of the change-making problem for which the greedy algorithm does not yield an optimal solution

9.1.5 (greedy bridge crossing)

Problems to write up and turn in:

1. (10) 9.1.3 (Greedy job scheduling)

2. (6) 9.1.9b [9.1.7b] (Prim example) Start with node a. Whenever you have a choice because edge weights are equal, choose the vertex that is closest to the beginning of the alphabet. Then everyone should get the same answer, making it easier for us to check your work.

3. (5) 9.1.10 [9.1.8] (Prim prior connectivity check?)

4. (10) 9.1.15 [9.1.11] (change value of an item in a min-heap)

5. (6) 9.2.1b (Kruskal example) Whenever you have a choice because edge weights are equal, choose the edge whose vertices are closest to the beginning of the alphabet. Then everyone should get the same answer, making it easier for us to check your work.

6. (8) 9.2.2 (Kruskal TF questions) Briefly explain your answers.

7. (5) 9.2.8 (efficiency of *find* in union-by-size)

8. (8) 9.4.1 (Huffman codes) (a) 4 points. When there is a choice due to a tie, place the one that appears first in the problem statement's character list "on the left" in the tree. (b) 2 points. (c) 2 points.

9. (12) 9.4.3 (Huffman TF) (a) 5 points (b) 7 points Explain your answers.