Illinois Institute of Technology
Department of Computer Science

Homework Assignment 7

CS 430 Introduction to Algorithms
Spring Semester, 2018

Due: Monday, April 9

1. Exercise 22.5-3 on page 620 of CLRS3.

2. Problem 22-1 (a) on page 621 of CLRS3.

3. Given a graph G with weighted edges and a minimum spanning tree T of G, give and analyze an algorithm to update the minimum spanning tree when the weight of an edge e is G decreased.

4. Given a directed graph G with positive-weight edges, a starting vertex s, and an ending vertex t, there may be more than one possible shortest path from s to t. The *best shortest path* is the path with the fewest edges.

   (a) Describe and analyze an algorithm to find the best shortest path from s to t.

   (b) Implement your algorithm (in whatever programming language you like) and submit the program, sample data (graphs with at least 15 vertices and 25 edges), and its output. The TAs will select students at random to demonstrate their programs.