CSE 101: Homework 1

Due: Day 8

When presenting an algorithm, make sure you have:

- A clear (pseudo-code) description of the algorithm
- A proof that it is correct (loop invariants may help)
- An analysis of its runtime (stating the runtime isn’t sufficient, provide a proof or justification).

For full credit, you need all three pieces.

Exercises

*Kleinberg* refers to the class textbook *Algorithm Design* by Kleinberg and Tardos.

1. For the following graph, use Dykstra’s algorithm to determine the distances from node 1 to each other node. Show the distances in the order that Dykstra’s algorithm determines them. 10 pts.
2. For the previous graph, provide the edges added to the MST in order using Prim’s algorithm (starting with node 1) and Kruskal’s algorithm. 10 pts.

3. Kleinberg Chapter 4, Exercise 2. 10 pts.

4. Kleinberg Chapter 4, Exercise 3. 10 pts.

5. Kleinberg Chapter 4, Exercise 12. 20 pts.

6. Kleinberg Chapter 4, Exercise 19. 20 pts.

7. Kleinberg Chapter 4, Exercise 21. 20 pts.

8. Kleinberg Chapter 4, Exercise 29. Extra credit, 20 points