MA/CSSE 473 Day 33 Announcements and Summary

Announcements:

1. **Exam 2** tomorrow in class. Exam specification is linked from Day 34 in the schedule page.
   - You can bring a calculator and an 8.5" x 11" page with anything you want handwritten on one side.
   - **A previous Exam 2** is also linked from the schedule page.
2. **HW 13** due Friday, Nov 7, I removed one problem (#7) and renumbered the Huffman problems to be 7 and 8.
3. **HW 14** due Tuesday, Nov 11. **No late days allowed for this assignment.**
4. **HW 15 and 16.** You should do them, but it is not feasible to get them graded before the exam, so you do not have to carefully write them up for submission.
5. **Final Exam** Monday Nov 17 at 6:00 PM.
6. **In my office today:** Hours 6, 8, 9.

Main ideas from today: Finding a minimal spanning tree for a connected graph G.

1. If G is a weighted connected graph (a graph whose edges are labeled by numbers), what is a minimal spanning tree (MST)?

2. Can a given weighted graph have more than one MST?

3. What is the approach of Kruskal's algorithm for finding a MST for connected graph G?

4. What is the approach of Prim's algorithm for finding a MST for connected graph G?

5. Te following lemma can be used to prove that Krushkal's algorithm produces a MST. Prove it.

Lemma: Let G be a weighted connected graph with a MST T; let G′ be any subgraph of T, and let C be any connected component of G′.
If we add to C an edge *e=(v,w)* that has minimum-weight among all of the edges that have one vertex in C and the other vertex not in C, then G has an MST that contains the union of G′ and *e*. [Let v be our name for the vertex of e that is in C, and w our name for the vertex of e that is not in C].

6. Use the above lemma to prove that Kruskal's algorithm is correct:
   Claim: After every step of Kruskal's algorithm, we have a set of edges that is part of an MST of G
   Proof of claim: Base case …

   Induction Assumption: before adding an edge we have a subgraph of an MST
   We must show that after adding the next edge we have a subgraph of an MST
   Details:

7. Data Structures for Prim's algorithm.