MA/CSSE 473   Day 31 Announcements and Summary

Announcements:

1. **HW 12** due tomorrow.
2. **No class meeting** tomorrow. I will be off-campus this afternoon and almost all day Oct 31 for IVIG infusions. I hope to be here hours 9-10, but I cannot promise.
3. **Exam 2** Tuesday Nov 4 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.
4. **HW** 13 due Thursday, Nov 6,
5. **HW 14** Monday Nov 10.
6. **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.
7. **Final Exam** Monday Nov 17 at 6:00 PM.

Main ideas from today: Optimal Binary Search trees.

1. In a greedy algorithm, we make a choice that seems optimal for the next step, then move on. Once the choice is made, it is irrevocable.

YOU SAY GOODBYE. I SAY HELLO. HELLO, HELLO. I DON'T KNOW WHY YOU SAY GOODBYE, I SAY HELLO.

1. How many bits in the ASCII representation of the HelloGoodbye string (90 characters long)?

2. Fixed-length codes (fixed number of bits per character). If the message we encode has *d* different characters and a total of *m* characters in the message, what is the minimum number of bits in the encoded message (including the code table)?

3. If we use variable-length codes, which characters should get the shortest codes?

4. Why can we not allow one variable-length code to be a prefix of another code?

5. Which node of the Huffman tree for a message must be constructed last?

6. What is the role of the Priority Queue in the Huffman algorithm?

7. Using the Huffman tree that we'll draw on the board, what is the code for "TANNER"?

8. Decode the "message" 011001110101, determining whether it is a legitimate message.

Note that this question and the previous one are artificial; in practice we would not use the tree for one message to encode and decode different messages.

9. Why can the code table that is part of a message be just a list of characters and frequencies?

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

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

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

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

14.