MA/CSSE 473 Day 31

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?