CS140 - Group Assignment 3

Due: Friday, Feb. 9 at 10pm

Note: you only need to submit one assignment *per group*.

1. Induction on trees

   Use a proof by strong induction to show that a binary tree of height h has at most 2^h leaf nodes.

2. Recreating binary search trees

   (a) Suppose that we have numbers between 1 and 1000 in a binary search tree, and we want to search for the number 363. Which (and there might be more than one) of the following sequences could *not* be the sequence of nodes examined?

       i. 2, 252, 401, 398, 330, 344, 397, 363
       ii. 924, 220, 911, 244, 898, 258, 362, 363
       iii. 925, 202, 911, 240, 912, 245, 363
       iv. 2, 399, 387, 219, 266, 382, 381, 278, 363
       v. 935, 278, 347, 621, 299, 392, 358, 363

   (b) Given any sequence of numbers and any number for which you're searching, how could you determine whether the sequence could be the sequence of nodes examined?

3. Group experience

   What was each person's favorite class in high school? Least favorite? (Don't forget your TA!)