CS140 - Group Assignment 5.2
Due: Friday, Oct. 7 at 11:59pm

- This week your group should talk through some basic data structures and make sure that everyone is comfortable with them.

- Back to groups: each group should turn in a single response on Gradescope.

- Note that if not everyone in your group can be there at the start of the meeting, the rest of you should feel free to start discussion the problem set with each other and the TA. Then when everyone gets to the group meeting you can work together on these group assignments.

1. Induction on trees

   Use a proof by strong induction to show that a binary tree of height n has at most 2^n 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!)