CSE250, Spr'22 Real Assignment 9 Due Wed. 5/11, 11:59pm

Lectures and Reading:

The **Final Exam** is on **Friday, May 20**, from **11:45am** to **2:45pm**. It is in **Knox 20**, *not* the lecture room. It will have more liberal rules: *open book, open notes* but **no electronics**. In my opinion, the text is of limited value for the exam, so as to moot the question of allowing e-access to it during the exam. Separately, we ask you to bring a single binder of notes and avoid bringing a backpack into the room if you can—or if you do, to stow it at the side of the room rather than on the floor of the aisles. A long exam with longer problems typically brings more instances of questions that come up, and it can be difficult and disturbing to step over bags.

Friday's lecture will move to Chapter 21 and will cover all of the long section 21.2. Here, however, I encourage you to read the notes posted at https://cse.buffalo.edu/~regan/cse250/CSE250Week13.pdf as taking precedence over the text. Friday's lecture now spans pages 11–15 of those notes. Except that showing actual code may be left to Monday, this is the last lecture with material covered on homeworks (this one) and in-bounds for the final exam. The remaining time next week will be devoted to coverage related to the final project and some mix-in of *B-trees* frpm Chapter 19 and/or *quadtrees* from Chapter 20 (or related topics) as FYI content.

——— *Yes a Graded Assignment, for PDF submission to CSE Autograder* ———

(1) Draw the binary search tree that results from inserting the words of this sentence in the order given, allowing duplicate keys. And now using an AVL tree, so you will have to rebalance after some insertions. Use alphabetical order of lowercased words with the lower words at left. Then show the results of deleting all three occurrences of the word "the", one at a time, again using the AVL rules. (It is OK to use either the inorder successor or predecessor for deletion, and putting an equal key left or right, but please show each step separately on the relevant part of the tree—you do not have to re-draw the whole tree each time. A real 18 + 9 = 27 pts.)

(2) Insert the same words into a hash table with chaining of size 8, using as hash function h the sum of the numerical values of the last two letters in each word. For example, h(draw) = h(aw) = 1 + 23 = 24, which will go to cell 0 when you take the remainder modulo 8. And h(the) = 8 + 5 goes to cell 5, which will get collisions from the two other words "the." (You need not show the deletions of "the." 12 pts.)

(3) Now build a max-heap from the following numbers given in this order: 7, 25, 16, 3, 11, 30, 18, 14. Then show the result of popping the highest number three times. (12 + 9 = 21 pts., for 60 on the set)