

SPRING 2017: **COT 5407** INTRO. TO ALGORITHMS
[HOMEWORK 4; DUE FEB 9 VIA EMAIL]

General submission guidelines and policies: ADD THE FOLLOWING SIGNED STATEMENT. Without this statement, your homework will not be graded.

I HAVE ADHERED TO THE COLLABORATION POLICY FOR THIS CLASS. IN OTHER WORDS, EVERYTHING WRITTEN DOWN IN THIS SUBMISSION IS MY OWN WORK. FOR PROBLEMS WHERE I RECEIVED ANY HELP, I HAVE CITED THE SOURCE, AND/OR NAMED THE COLLABORATOR.

Read the handout on **Homework guidelines and collaboration policy** from your course website before you start on this homework. This is very important. You only need to submit solutions to problems marked (**Regular**). All others are optional.

Problems

25. (**Exercise**) QUICKSORT runs in time $O(n^2)$ in the worst-case. Describe how to design IMPROVED-QUICKSORT that runs in worst-case $O(n \log n)$ by using the IMPROVEDSELECT algorithm we discussed in class.
26. (**Exercise**) If QUICKSORT always picks the last item as the pivot for partitioning, describe the worst-case input.
27. (**Exercise**) Read and understand COUNTINGSORT from Section 8.2 in [CLRS]. Then solve Exercise 8.2-1 on p196.
28. (**Exercise**) Write down an invariant for RADIXSORT.
29. (**Regular**) Solve Exercises 8-2 a., b. and c. on p206.
30. (**Regular**) Solve Exercise 8-5 a., b., c., d. and e. on p207.
31. (**Exercise**) Go over the time complexity analysis in Section 9.3 for the IMPROVEDSELECT algorithm.
32. (**Exercise**) Solve Exercise 9.3-1 on p223.
33. (**Regular**) Solve Exercise 9.3-8 on p223.