

Algorithmic Excursions (CS:4980:0001 or 22C:196:001)
Homework 2

The homework is due in class on Thursday, March 24th. If you can't make it to class, drop it in my mailbox in the MacLean Hall mailroom.

1. As stated on page 2 of lecture notes for Week 4, show that for any $1 \leq k \leq n$, the set $\{C_1, C_2, \dots, C_k\}$ of centers computed by the greedy permutation algorithm is a γ_k -packing.
2. As stated on page 3 of lecture notes for Week 4, construct an example where the local search algorithm for k -median fails to output an optimal solution.
3. As stated on page 6 of lecture notes for Week 5, describe an example where Lloyd's method (also known as the k -means heuristic) terminates with a solution that does not minimize the k -means objective.
4. Explore if there are examples where Lloyd's method fails to find the "right clustering", which is a subjective notion. Report on your explorations. How helpful do you think it would be to run the method several times, varying the initial set of centers?