CS 240: Data Structures and Data Management **Spring 2025**

Assignment 2 Post-Mortem

Question 1

- Common error: forget to fix_up after swap A[i] and A[last].
- Another common error: students swapped A[i] with A[root], and then decrease size, run delete_max. This may break the heap's property.

Question 2

- No common error, well done!

Question 3

- For a, no common question, well done!
- For b, the question was mostly done well. Some students only provided M(n) and not the recursion for part b.
- For c, surprisingly a lot of students wrote $T(n) \in O(n^{1.71}) \subseteq O(n^2)$, we never talked about this in class. (and don't do this in the future). Some students used result out of lectures, like master theorem, which is not allowed in this question.

Question 4

- Common Errors: Some students forgot to provide the number of max inversions (nc2) in part a. Some students did not attempt part d considering the case of inversions / previous parts (ie. provided answers for vanilla insersion sort) Some students mentioned that one swap removes potentially one inversion - this is not correct since one swap should remove exactly one inversion A lot of students did not mention / explain how one swap removes one inversion / # inversions= #swaps Some students did not mention / hint at the fact that the runtime of insertion sort will be proportional to the number of inversions

Question 5

- No common error, well done!