

Fundamental Algorithm Techniques

Problem Set #2–#3

Due: February 3, 2026

Problem 1 (Sorting Algorithms). *Write Sorting Algorithms:*

1. write own bad $\mathcal{O}(n^2)$ sorting (bubble sorting)
2. create few tests of various sizes and control that algo. is working
3. write own Quick Sort
 - add random pivot
 - add average pivot (down + middle + up)
4. write own Merge Sort
5. write own Heap Sort

Problem 2 (Analyse Sorting Algorithms). *Analyse succinctly, for all sorting Algorithms above, time and space complexities using the master theorem where applicable*