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*

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 succintly, for all sorting Algorithms above, time and space complexities using the master theorem where applicable*