

Com S 311, Exam 2

Name	Recitation Time

- When asked to give an algorithm, write pseudo code. Please do not write Java/C program.
- For any (sub) problem, if you write “*Do not grade*” (and nothing else), you will receive 20% credit, unless stated otherwise.
- You may use the following algorithms and their time bounds that were discussed in the lecture as a black box unless you are told otherwise: (You need not write code for these algorithms, or analyze run time): *In-order, pre-order and post-order traversals of trees. Add/Delete/Search in BST, hash tables, arrays, and linked lists. Constructing min/max heaps, extracting smallest/largest element from min/max heaps, selecting k-th smallest/largest element of an array, Merge Algorithm, Sorting algorithms, BFS, DFS, Topological Sorting, reversing a graph, SCC*
- You are not allowed to use Master Theorem to derive recurrence relations.
- If your solutions require the use of any other algorithms discussed in lecture, or variants of above algorithms/data structures, then you must write pseudo code and derive run time.
- For all algorithm design problems, part of the grade depends on the efficiency.
- For every graph $G = (V, E)$, the vertex set is $V = \{1, 2, \dots, n\}$.
- Useful equalities

$$\sum_{i=1}^n i = n(n+1)/2$$

$$1 + 1/a + 1/a^2 + 1/a^3 + \dots = \frac{1}{1-1/a} \text{ (when } a > 1\text{)}.$$