

Algorithms and Data Structures

Summer Semester 2025

For discussion on Wednesday, May 7, 2025

1. For each of the five algorithms from GTG p. 143, state the expected running time in big-Oh notation. You can also find the program code in the book's github repository at

`https://github.com/mjwestcott/Goodrich/blob/master/ch03/exercises.py`

2. (GTG Exercise C-3.35) Assuming it is possible to sort n numbers in $O(n \log n)$ time, show that it is possible to solve the three-way set disjointness problem in $O(n \log n)$ time.
3. (GTG Exercise C-3.36) Describe an efficient algorithm for finding the ten largest elements in a sequence of size n . What is the running time of your algorithm?
4. (GTG Exercise C-3.37) Give an example of a positive function $f(n)$ such that $f(n)$ is neither $O(n)$ nor $\Omega(n)$.
5. (GTG Exercise R-4.1) Describe a recursive algorithm for finding the maximum element in a sequence, S , of n elements. What is your running time and space usage?
6. (GTG Exercise C-4.15) Write a recursive function that will output all the subsets of a set of n elements (without repeating any subsets).