

MA/CSSE 473 – Design and Analysis of Algorithms

Homework 8 (68 points total)

When a problem is given by number, it is from the textbook. 1.1.2 means “problem 2 from section 1.1” .

Problems for enlightenment/practice/review (not to turn in, but you should think about them):

How many of them you need to do serious work on depends on you and your background. I do not want to make everyone do one of them for the sake of the (possibly) few who need it. You can hopefully figure out which ones you need to do.

- 5.1.5 (insertion sort sentinel)
- 5.1.10 (Shell's sort) This should be review from 230
- 5.2.2 (adjacency matrix vs adjacency list for DFS)
- 5.2.7 (Use BFS/DFS to find a graph's connected components)
- 5.2.10 (DFS and mazes)
- 5.3.1 (Topological sort examples)
- 5.3.2 (Theoretical properties of topological sort)
- 5.3.9 (Strongly connected components)

Problems to write up and turn in:

1. (5) 5.1.1 (Ferrying Soldiers)
2. (5) 5.1.3 (generate power set)
3. (5) 5.1.9 (binary insertion sort efficiency) get big-theta for the number of comparisons and the number of moves.
4. (6) 5.2.3 (independence of properties from specific DFS traversals) Explain your answers.
5. (10) 5.2.8a (Bipartite graph checking using DFS)
6. (9) 5.3.6 (finding dag sources) Be sure to do all three parts.
7. (10) 5.3.10 (Celebrity identification)
8. (9) 5.3.9 (Strongly connected components of a digraph)
9. (9) 5.4.2 (Examples of permutation generation algorithms)

You do not have to write any code, but you can do it that way if you wish.