

# MA/CSSE 473 – Design and Analysis of Algorithms

## Homework 8 (45 points total)

These are to be turned in as hard copy. You can write solutions out by hand, or write them on your computer and print them. If there are multiple pages, please staple them together.

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.

- 5.1.3 (generate power set)
- 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) 5.1.9 (binary insertion sort efficiency) get big-theta for number of comparisons and number of moves.
3. ( 6) 5.2.3 (independence of properties from specific DFS traversals) Explain your answers
4. (10) 5.2.8a (Bipartite graph checking using DFS)
5. ( 9) 5.3.6 (finding dag sources)
6. (10) 5.3.10 (Celebrity identification)

**Don't forget to work on the Quickhull implementation problem:**