MA/CSSE 473 – Design and Analysis of Algorithms

Homework 2

(Summer: drop box) 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.

2.1.7	(and 2.1.8. Effect of changing problem size on runtime)
2.1.10	(chess-board doubling)
2.2.1	(efficiency of sequential search)
2.2.2	(informal definitions of asymptotic notations)
2.2.6	(orders of growth for polynomials and exponentials)
2.2.9	(effect of presorting on running time)
2.3.1	(summation practice)
2.3.5	(Secret algorithm)
2.3.6	(Enigma algorithm)

Another good practice problem to prepare for this assignment: The "growable array" exercise from 230. See the three files from days 01 and 02 in the 230-materials folder.

Problems to write up and turn in:

1. 2.1.4   (6 points)   (socks and gloves)
2. 2.1.5   (6 points)   (number of digits in the representation of a positive integer))
3. 2.2.3   (10 points) (big-theta of specific functions with proofs)
                For parts a&b, use limits; for e, use formal definitions of O and Ω;
                 for c and d, can use theorem on p 56.
4. 2.2.7a,d   (4 points)   (proof or disproof of properties using the formal definition)
5. 2.2.10   (6 points)   (door in a wall)
6. 2.3.2   (8 points)   (big-theta for various summations)
7. 2.3.10   (10 points) (GE Algorithm – yeah, it's a big secret what GE stands for ☺)