

MA/CSSE 473 – Design and Analysis of Algorithms

Homework 9 (43 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.

- 4.5.10 (Best crossover point for Strassen's Algorithm)
- 5.4.1 (Reasonableness of generating all permutations, subsets of a 25-element set)
- 5.4.9 (Generation of binary reflected Gray Code based on traversing edges of an n-dimensional cube)
- 5.5.4 (multiplication à la Russe)
- 5.5.7 (Josephus problem for $N=40$)
- 5.5.9 (Prove properties of Josephus solutions)

Problems to write up and turn in:

1. (5) 5.4.10 (Generation of all k-combinations from an n-element set)
2. (5) 5.4.11 (Generation of binary reflected Gray code based on Tower of Hanoi moves)
3. (6) 5.5.2 (Ternary Search)
4. (12) 5.5.3 (fake coin divide-into-three) Levitin made me do it!

5. (5) Which permutation immediately follows 37246510 in lexicographic order?
Show how you use the algorithm from Day 21 class to get your answer.

6. (5) If the permutations of the numbers 0-7 are numbered from 0 to $8!-1$,
what is the (lexicographic ordering) sequence number of the permutation 37246510?

7. (5) Which permutation of 01234567 is number 25000 in lexicographic order?

Preview of Assignment 10:

5.6.10a (moldy chocolate) This is a tough problem, so begin thinking about it now.

Don't forget to work on the Convex Hull implementation problem (Due Day 27)