

MA/CSSE 473 – Design and Analysis of Algorithms

Homework 15 (59 points total, plus 10 points optional extra-credit) updated for summer 2015

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.

- 11.1.2 (lower bound towers of Hanoi)
- 11.1.3 (trivial lower bounds)
- 11.1.6 (lower bound on sorting by exchanging adjacent elements)
- 11.1.11 (tight lower bound for closest numbers problem)
- 11.2.2 (median of 3 lower bound)
- 11.2.4 (best comparison-based sort for 4 elements)
- 11.2.9 (tournament tree)
- 11.2.11 [11.2.10] (jigsaw puzzle)
- 11.3.5 (polynomial-time 2-coloring algorithm)

Problems to write up and turn in:

1. (5) 11.1.1 (lower bound for alternating disk algorithm)
2. (5) 11.1.4 (fake coin minimum number of guesses)
3. (12) 11.1.10 (matrix multiplication and squaring) (6, 6)
4. (9) 11.2.10ab [11.2.8ab] (advanced fake-coin problem) (4, 5)
5. (5) 11.3.1 (Chess decidable?) Explain your answer.
6. (8) 11.3.2 (tractable?) Explain your answer.
7. (5) 11.3.6 (brute force composite number)
8. (5) 11.3.7a (polynomial-time check of knapsack solution)
9. (5) 11.3.11 [11.3.10] (Venn diagrams)
10. (10) 11.3.12 [11.3.11] (King Arthur problem) **Optional, extra-credit problem**