

MA/CSSE 473 – Design and Analysis of Algorithms

Homework 15 (59 points total, plus optional extra-credit) updated for summer 2012

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 y 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**