MA/CSSE 473 – Design and Analysis of Algorithms

Homework 15 (59 points total, plus 10 points optional extra-credit)

updated for summer 2016

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):

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

Questions and answers from Piazza:

HW15 Q5 What does "can win" mean?

When it says if that side can win, does it mean on the current turn/move by taking the King?
Or does it mean in some future move, potentially n moves?
Answer: It means "Is there some sequence of moves that will result in a win for this player?"