MA/CSSE 473 – Design and Analysis of Algorithms

Homework 12 (30 **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.

8.1.1	(Compare and contrast dynamic programming with divide-and-conquer)
8.1.4	(Space efficiency of dynamic programming for Binomial coefficients)
8.2.2	(Time efficiency of Warshall's Algorithm)
8.3.1	(Practice optimal BST calculation)
8.3.2	(Time and space efficiency of optimal BST calculation)
8.3.9	(Include unsuccessful searches in optimal BST calculation)

IMPORTANT NOTE: I moved 3 problems that were in this assignment to HW 13, because I was concerned that we might not get to the material in class soon enough for you to do them as part of this assignment. Thus this assignment short and HW 13 long. If indeed we do discuss Optimal Binary Search Trees before this assignment is due (and I think we will), I recommend that you go ahead and do problems 1-3 on HW 13, so that you will not be too pressed for time when working on the rest of HW 13 later.

Problems to write up and turn in:

1. (5) 8.1.5   (Order of growth of C(n, k)) For (iii), Stirling's approximation may help you to simplify.
2. (10) 8.1.10   (World Series odds) Note: In a 7-game series (such as the real American baseball World Series), the first team to win 4 games wins the series. 7 is the maximum number of games that can be played before one of the teams must win four games. But if one team wins 4 games sooner, the series ends.
3. (5) 8.2.3   (Warshall with no extra memory use)
4. (10) 8.2.4   (More efficient Warshall inner loop)