CSC282 Fall 2005 Homework #3

- 1. Show that the number of permutations that can be formed by merging two sorted segments A and B of lengths k and m, where k+m=n, is $\binom{n}{k}=\binom{n}{m}$. Assume $k\leq m$ for definiteness and assume no duplicate keys. Hint: One approach is to write a recurrence based on the relationship of A[0] and B[0], and use the result from question 2 of homework 1. But there are lots of other ways to look at it.
- 2. How many key comparisons are done by Mergesort if the keys are already in order when the sort begins?
- 3. Optimal-comparison sorting:
 - A. Give an algorithm to sort four elements using only five key comparisons in the worst case.
- *B. Give an algorithm to sort five elements that is optimal in the worst case. (Check out CLRS Chapter 9 if you want a hint.)
- 4. CLRS 6.4-3
- 5. CLRS 6.4-4
- 6. CLRS 7.4-2
- 7. CLRS 6.1-6
- 8. CLRS 7-6