Summer 2013 **CMSC 351: Homework 2** Clyde Kruskal

Due at the start of class Wednesday, June 5, 2013.

Problem 1. Consider Insertion Sort (as described in class).

(a) What is the exact best case number of moves? No justification needed.

(b) What is the exact worst case number of moves? Write it as a summation, and evaluate the sum.

(c) What is the exact average case number of moves? Write it as a *double* summation, and evaluate the sum.

Problem 2. Assume we design a new version of (Linear) Insertion Sort (with a little bit of the flavor of binary insertion sort). Instead of looking at the items from largest to smallest one-at-a-time as we do an insertion, we skip every other item (and come back up one item when the item being inserted is larger than the item on the list).

(a) Give pseudo code for this algorithm using the sentinel technique. You should make your algorithm as analogous as possible to Linear Insertion Sort, as described in class. Note that there should be two sentinels.

(b) What is the exact worst case number of comparisonss? Write it as a summation, and evaluate the sum. HINT: You may want to evaluate n even and n odd separately.

(c) Compare and contrast the worst case number comparisons in (Linear) Insertion Sort and in this modified version.