

CS4104 Fall 2010 Homework Assignment 8  
Due at 11:00pm on Wednesday, October 20  
50 Points

**Pledge: I (we) have not received unauthorized aid on this assignment. I (we) understand the answers that I (we) have submitted. The answers submitted have not been directly copied from another source, but instead are written in my (our) own words.**

1. [15 points] Show that  $\lfloor 3n/2 \rfloor + 1 = \lceil (3n + 1)/2 \rceil$ .
2. [15 points] Use constructive induction to find  $f$ 's growth rate if

$$f(n) = f(n/a) + f(n - n/a) + O(n).$$

3. [20 points] Given an  $n \times m$  array of numbers where each of the  $n$  rows of  $m$  numbers are sorted in increasing order from left to right.
  - (a) Show that if we sort the numbers in each column in increasing order from top to bottom then the rows are still sorted in increasing order from left to right.
  - (b) Will the rows still be in increasing order from left to right if we sort the columns in decreasing order from top to bottom?