**CS590 homework 2 – Recurrences**

Assignment 2 is split into two parts. The first part is a paper based on recurrence problems. The due date for this assignment isSaturday, March 4th, at 11.59pm*.*  The second part, the coding assignment, will be published next week after Sorting Algorithms and Order Statistics II.

Any sign of collaboration will result in a 0 and be reported to the Graduate Academic Integrity Board. This assignment will be done individually. No collaboration is allowed between students. The late submission policy described in the syllabus will be applied.

**Part 1 (20 points, 4 points each)**

**Recurrences:** Solve the following recurrences using the substitution method. If the provided guess function is not valid, find a new solution. Use Master’s Theorem to confirm the solution if applicable. Otherwise, explain the inapplicability.

1. . Our guess function: . Show for some constant . (Note: is monotonically increasing for )
2. . Our guess function: . Show for some constant .
3. . Our guess function: . Show for some constant .
4. . Our guess function: . Show for some constant .
5. . Our guess function: . Show for some constant .

**Part 2: Master’s Theorem (20 points, 4 points each)**

For each of the following recurrences, give an expression for the running time if the recurrence can be solved with the Master Theorem. Please provide the case number and constants ( if applicable. Otherwise, indicate that the Master Theorem does not apply.