Fall 1996 **CMSC 251: Homework 4** Samir Khuller

Due in class: Oct 8.

(1) Use the iteration method to solve the following recurrence.

$$T(1) = 1$$

$$T(n) = T(n-1) + n^2 \quad \text{if } n > 1$$

Find a function $g(n)$ such that $T(n) = \Theta(g(n))$. (The function $g(n)$ should be expressed without the use of any $\sum$ symbols.)

(2) Use the master theorem to solve the following recurrence. You may assume that n is a power of 2.

$$\begin{aligned} T(1) &= 1 \\ T(n) &= 4T(\tfrac{n}{2}) + n^c \end{aligned}$$

Find a function $g(n)$ such that $T(n) = \Theta(g(n))$. (The function g may involve several cases depending on what c is. The cases should be clearly and easily specified.)

(3) Solve the following recurrence by iteration.

$$T(1) = 1$$

$$T(n) = 2T(n/2) + n \log^2 n \quad \text{if } n > 1$$

(4) Page 61. Problem 4.2-4. Assume that $T(a) = \Theta(1)$ and that n is a multiple of a.