

## Homework Assignment #2

CSCI 2720

Fall 2004

Posted: Friday, September 3<sup>rd</sup>, 2004

Due: Wednesday, September 8<sup>th</sup>

### 40 points

1. Write a simple Quick Sort algorithm using pseudo-code. Evaluate the worst-case and average-case running time of this algorithm using statement-counting approach. (10 points)
2. Write a recurrence relation for Quick Sort. Analyze running time using recursion tree approach. (10 points)
3. Provide a solution for the following problem from Chapter 1 of Lewis and Denenberg using iteration method. (5 points)
  - Problem 36.a
4. Give tight asymptotic bounds for  $T(n)$  in each of the following recurrences. Assume that  $T(1) = 1$ . (Use the master method) (5 pts each)
  - $T(n) = 8T(n/2) + \Theta(n^3 \log n)$
  - $T(n) = 3T(n/2) + \Theta(n)$
  - $T(n) = 3T(n/2) + \Theta(n^2)$