CSCI 303 Algorithms

Homework 2

Due: 11:00 in class, September 18, 2001

1. (9 points) Order the following functions by growth rate. No explanation is necessary.

   n, $\sqrt{n}$, $n^{1.5}$, n^2, $n\log n$, $n\log\log n$, $n(\log n)^2$, $n^2\log n$, n^3.

2. For each of the following program fragments, give an analysis of the running time. You may use summations to evaluate the running times of nested loops.

   (a) (2 points)

   ```
   sum = 0
   for i = 1 to n
      for j = 1 to n * n
         sum ++
   ```

   (b) (2 points)

   ```
   sum = 0
   for i = 1 to n
      for j = 1 to i
         sum ++
   ```

   (c) (3 points)

   ```
   sum = 0
   for i = 1 to n
      for j = 1 to i * i
         for k = 1 to j
            sum ++
   ```

   (d) (4 points)

   ```
   sum = 0
   for i = 1 to n
      for j = 1 to i * i
         if j mod i == 0
           for k = 1 to j
              sum ++
   ```