CMPSC 623 Problem Set 1
by Prof. Honggang Zhang

Out: September 12, 2006
Due: September 19, 2006, before class.

Problem 1. Exercise 1.2-2 on page 13. In addition, how might one rewrite the merge sort pseudocode to make it even faster on small inputs?

Problem 2. Rank the following functions by order of growth; that is, find an arrangement $g_1, g_2, ..., g_{23}$ of the functions satisfying $g_1 = \Omega, g_2 = \Omega(g_3), ..., g_{22} = \Omega(g_{23})$. Partition your list into equivalent classes such that $f(n)$ and $g(n)$ are in the same class if and only if $f(n) = \Theta(g(n))$.

$$(3/2)^n, (\sqrt{2})^{\lg n}, \lg^* n, n^2, n^3, \lg^2 n, \lg(n!), 2^{2^n}, n^{1/\lg n}, \lg\lg n, n \cdot 2^n, n^{\lg\lg n}$$

$$\ln n, 2^n, 2^{\lg n}, (\lg n)^{\lg n}, 4^{\lg n}, (n+1)!, \sqrt{\lg n}, n!, n, n \lg n, 1$$

Problem 3. Problem 2-1 on page 37.

Problem 4. Exercise 3.1-1 on page 50.

Problem 5. Exercise 3.1-3 on page 50.

Problem 6. Exercise 3.1-8 on page 50.