Fourth Hour 3

Your Name: _____   Collaborators: _____

Problem 1. Asymptotics. (continued from last week) Take the following list of functions and arrange them in ascending order of growth rate. That is, if function $g(n)$ immediately follows function $f(n)$ in your list then it should be the case that $f(n)$ is $\mathcal{O}(g(n))$.

$$f_1(n) = 10^n$$
$$f_2(n) = n^{1/3}$$
$$f_3(n) = n^n$$
$$f_4(n) = \log_2 n$$
$$f_5(n) = 2^{\sqrt{\log_2 n}}$$

Problem 2. Big-O and Big-Omega For each pair of functions f and g, indicate which of the statements are true.

1. $f(n) = 2n^2$, $g(n) = n^2 + n \log n$

                (a) $f(n)$ is $O(g(n))$ (b) $f(n)$ is $\Omega(g(n))$

2. $f(n) = \sum_{i=1}^{n} i$, $g(n) = n^3$.

                (a) $f(n)$ is $O(g(n))$ (b) $f(n)$ is $\Omega(g(n))$

3. $f(n) = n^2 \log n$, $g(n) = n^2$

                (a) $f(n)$ is $O(g(n))$ (b) $f(n)$ is $\Omega(g(n))$

Problem 3. Big-O Proof. Suppose f is $O(g)$. Prove that g is $\Omega(f)$.

Problem 4. Homework Problem. If you have time left, work on K&T Ch. 2 Ex. 6 with your group. This is a homework problem.