CS 014 Assignment #1

1. Which of the following two functions has a faster growth rate?

$$f(n) = \log_3(100n)$$

$$g(n) = \log_2(n)$$

   Justify your answer using the definition of the Big-Oh notation.

2. Rank the following functions by order of growth; that is, find an arrangement $g_1, g_2, \ldots$ of the functions satisfying $g_1 = O(g_2), g_2 = O(g_3), \ldots$. Partition your list into equivalence classes such that functions $f(n)$ and $g(n)$ are in the same class if and only if $f(n) = \Theta(g(n))$.

$$(\sqrt{2})^{\lg n} \qquad n^2 \qquad n! \qquad (3/2)^n$$

$$n^3 \qquad \lg^2 n \qquad \lg(n!) \qquad 2^{2^n} \qquad \ln \ln n$$

$$1 \qquad \ln n \qquad e^n \qquad \sqrt{\lg n}$$

$$n \qquad 2^n \qquad n \lg n$$

Note: This assignment should be done individually. You can either deliver it on iLearn or hand it out at the *beginning* of the class. You can either handwrite it or type it on your favorite word processor. As an acknowledgment for your typing effort, you will get an extra 10% for typing it without exceeding 100% of the final grade.