Algorithms Homework 1*

Asymptotic notation and Summations

Reading: GT Chapter 1

1. (GT R-1.6) Order the following list of functions in ascending order of growth by the big-Oh notation. Group together those functions that are big-Theta of one another. For each pair of consecutive functions, give a brief justification on why they are in this order. For e.g., if you ordered $A < B < C$, you need to justify that $A < B$ and $B < C$.

$$6n \lg n, 2^{100}, \lg \lg n, \lg^2 n, 2^{\lg n}, 2^{2^n}, \sqrt{n}, n^{0.01}, 1/n, 4n^{3/2},$$

$$3n^{0.5}, 5n, 2n \lg^2 n, 2^n, n \log_4 n, 4^n, n^3, n^2 \lg n, 4^{\lg n}, 4^{\lg n}, \sqrt{\lg n}$$

2. (GT C-1.9) Give an example of a positive function $f(n)$ such that $f(n)$ is neither $O(n)$ nor $\Omega(n)$.

3. (GT C-1.11) Describe a method for finding both the minimum and the maximum of n numbers with fewer than $3n/2$ comparisons.