Analysis of Algorithms: Assignment 4

Due date: February 1 (Thursday)

Problem 1

For each of the following functions, give an asymptotically tight bound (Θ-notation). Make your expression inside Θ as simple as possible.

Example: $2n^3 + 3n^2 = \Theta(n^3)$.

(a) $(2n^6 + 6n^2)^3$

(b) $(n+2)^2 \cdot (n+3)^3 \cdot (n+6)^6$

(c) $3^{2n} + 2^{3n}$

(d) $\sqrt{2n+2} \cdot \sqrt[3]{3n+3} \cdot \sqrt[6]{6n+6}$

(e) $3^{6n} + n! + \sqrt{n^n}$

(f) $2^{\frac{\log_3 n}{\log_9 2}}$

Problem 2

Give an example of functions $f(n)$ and $g(n)$ that satisfy all of the following conditions:

$f(n) \neq \Theta(g(n))$
$f(n) \neq o(g(n))$
$f(n) \neq \omega(g(n))$