

# CSE 680 - Problem Set 1

## Due lecture on October 11th

Problem numbers are from the second edition or the third of “Introduction to algorithms”. If unsure about which problem to solve, ask. Collaboration is permitted; looking for solutions from external sources (books, the web, etc.) is prohibited.

1. Give the asymptotic complexity ( $\Theta$ ) of each of the following functions in simplest terms and then order the functions by asymptotic dominance. That is, produce a permutation  $f_1(n), f_2(n), \dots$  such that  $f_i = O(f_{i+1})$ . Note if any two functions are asymptotically equivalent, i.e. if  $f_i = \Theta(f_{i+1})$ .

(a)  $f_a(n) = \log_3(6n + 7) \log_2(5n^{0.3} + 21)$

(b)  $f_b(n) = \sum_{i=1}^{n^2} \left(\frac{3}{4}\right)^i$

(c)  $f_c(n) = 2 \log_4(4n + 17)$

(d)  $f_d(n) = \sum_{j=1}^{2n} (4j + 1)$

(e)  $f_e(n) = 6^{13}$

(f)  $f_f(n) = 5n^{0.6} + 3n^{0.7}$

(g)  $f_g(n) = 6 \log_5(n^5 + 3n^3) + 3n^{0.2}$

(h)  $f_h(n) = \sqrt{3n^2 + 2n + 74}$

(i)  $f_i(n) = 5 \log_2(3n^2 + n + 8)$

(j)  $f_j(n) = \sqrt{2 \log_2(n) + 3 + 7n}$

(k)  $f_k(n) = 2n \log_3(2n^3 + 17n + 1)$

(l)  $f_l(n) = 2 \log_3(n) + \sqrt{2n} + 3n$

2. Exercise 2.2-2.
3. Problem 2-1, parts a, b, d.