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CSC375-01

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3.4, 3.8 (a, c), 3.9 (a, c, e, g), 3.10 (b, d, e, f)

Homework 4

3.4a) Growth rate of 2n yields (n+log264) or n+6 (Six more inputs) for each machine 64 times faster.

3.4b) Growth rate of n2 corresponds to [(√64)n] = 8n (Eight times as many inputs) for each 64 times faster.

3.4c) Growth rate of 8n corresponds to [(82)n] = 64n (Eight times as many inputs) for each 64 times faster.

3.8a) c1n <= c1n2 ;c1=1

(1) = (1)2  ;cross-over point n0=1

(2) < (2)2 ; n=2

So c1n2 = O(c1n) for c1 = 1 and n0=1.

3.8c) c4nlog(n) +c5n <= c5(2n) ; c4 = 1 c5=10

(1)(1)log(1) +10(1) <= 10\*2(1) ; n0=1

10 = 20 ; cross-over point n0=1

(5)(2)log(2) +10(2) <= 10(2) ; n=2

10log(2) < 20 ; c4nlog(n) +c5n <= c5n

So c5n is O(c4nlog(n) where c4 = 5 c5=10

3.9a) log n2 = 2 log n, so f(n) = θ( g(n) )

3.9c) Divide both sides by log n, log n > 1, so f(n) = Ω( g(n) )

3.9e) Divide both sides by log n and ignoring insignificant terms; log n > 1, so f(n) = Ω( g(n) )

3.9g) 2n > 10n2, so f(n) = Ω( g(n) )

3.10b) θ( n )

3.10d) θ( n2log n )

3.10e) θ( n2 )

3.10f) θ( n )