CS 325 – Asymptotic Analysis

Practice Problems

Big-O, Ω,Θ Examples

For each of the following pairs of functions, either f(n) is O(g(n)), f(n) is Ω(g(n)), or f(n) = Θ(g(n)). Determine which relationship is correct.

Try all the problems first before watching the solution video.

1) f(n) $0.00001n^3$; g(n) = 500000n + 4000000

3

1) f(n) = $\log n^3$; g(n) = logn + 5

4

3) f(n)=log(logn); g(n) = logn

5

4) f(n) = $\log n^3$; g(n) = $\log^3 n$

6

5) f(n)=nlogn; g(n) = log(n!)

7

6) f(n)=10; g(n) = log10

8

7) $f(n) = 2^n$; $g(n) = 10n^2$

9

8) $f(n) = 4^n$; $g(n) = 2^{2n}$; $h(n) = 2^{n+1}$

10

9) $g(n) = 2^{2n}$; $h(n) = 2^{n\text{^}2}$

11

10. Prove or disprove (with a counterexample).

If $f_1(n) = O(g_1(n))$ and $f_2(n) = O(g_2(n))$ then $f_1(n)+f_2(n) = O(\max\{g_1(n), g_2(n)\})$.

12