Collin Varisco

C00304484

CMPS 340

1a.) T(n) = T(n2/9) + C

Θ(n) = n2

1b.) T(n) = log(n) + C

T(n) ∈ Θ(log(n))

1c.) T(n) = 2T(n/2) + C

T(n) = n

T(n) ∈ Θ(n)

2.) Yes.

[(2n6 + 3n5 + 4n4 + 5n3 + 6n2 + 7n + 8) / (n7)]

= (2/n) + (3/n2) + (4/n3) + (5/n4) + (6/n5) + (7/n6) + (8/n7)

lim (n→infinity)[ 1/infinity ] = 0

3.) No.

[ (n4) / (3n7 + 4n6 + 5n5 + 6n4 + 7n3 + 8n2 + 9n + 10)]

= (1/3n3) + (1/4n2) + (1/5n) + (1/6) + (n/7) + (n2/8) + (n3/9) + (n4/10)

= (n + n2 + n3 + n4 + C) / (n + n2 + n3 + C)

which is greater than 0.

4a.) 5n3 + 3100n5 ∈ O(n5)

5n3 + 3100n5 ∈ Ω(n5) >= O(n)

4b.) 3n 7 + 4n 6 + 5n 5 + 6n 4 + 7n 3 + 8n 2 + 9n + 10 ∈ O(n7)

3n7 + 4n6 + 5n5 + 6n4 + 7n3 + 8n2 + 9n + 10 ∈ Ω(n7) >= O(n7)

5a.) T(n) = T(n-1) + n (assume T(0) = 0)

Θ(n2)

5b.) T(n) = 2T(n-1) + 3 (assume T(0) = 0)

Θ(2n)

5c.) T(n) = 2T(n/2) + n (assume T(1) = 1)

Θ(2log(n))

6.) Largest number for recursive sequence: 49

Iterative algorithm time: .000004 seconds