

Assignment 1 CSCI 3070

Asymptotic Notations, Divide and Conquer, Heap



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OTU

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Assignment 1

Part 1:

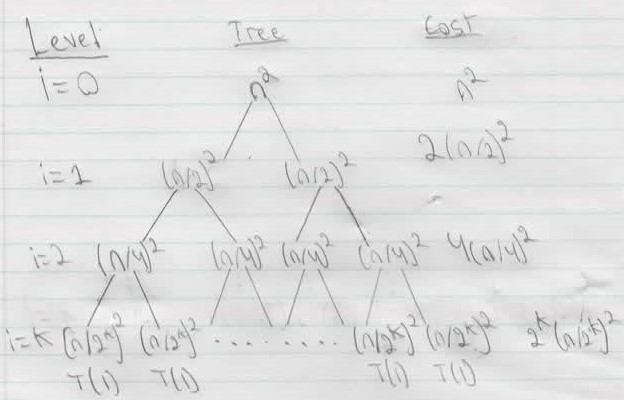
a) T(n) = 2T(n/2) + 3n + 7 (Master Theorem)

a = 2 b = 2

Since both and p = 0, case 2 of master theorem applies.

Therefor T ∈ .

b) T(n) = 7T(n/2) + (Recursion Tree)



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c) T(n) = T(n/2) + T(n/4) + T(n/8) + n (Substitution method with guess of O (n log n))

T(n) =

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T(n) = )

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T(n) = ) “n log n grows faster than n”

Therefor T(n) = O(n log n)

d) T(n) = 4T(n/16) + (Master Theorem)

a = 4 b = 16

Since both and p = 0, case 2 of master theorem applies.

Therefor T ∈ .

Part 2:

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| Category | Functions |
| Constant |  |
| Linear | , 18n |
| Polynomial | n2, 3n2 +7n+15, , n3 -log n , n3 , |
| Exponential | 2n, 4n, n71+5n +17n |
| Factorial | n! |
| Logarithmic | ,, |