

# Assignment 1

## ESO 207 Report

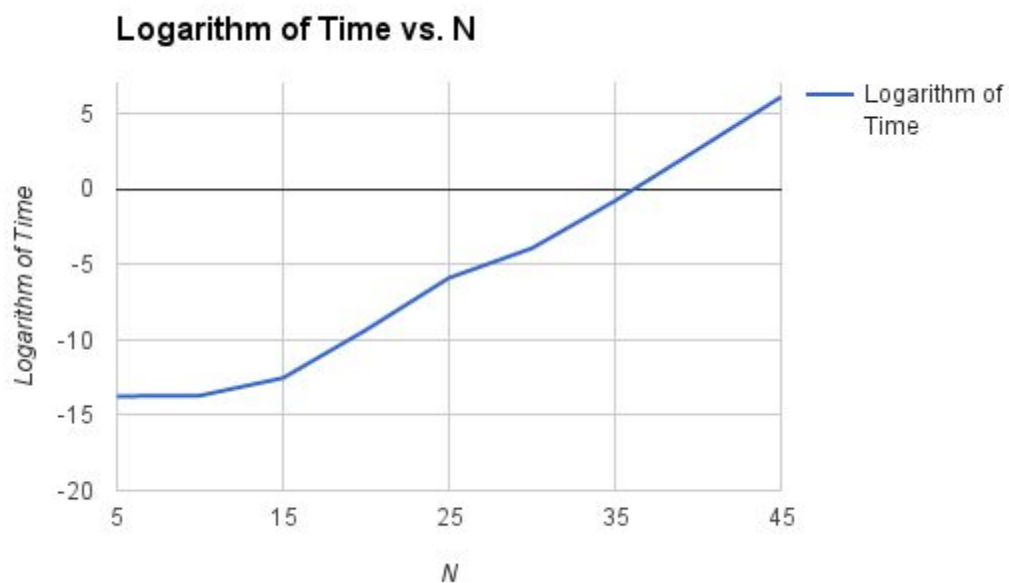
Siddhartha Saxena

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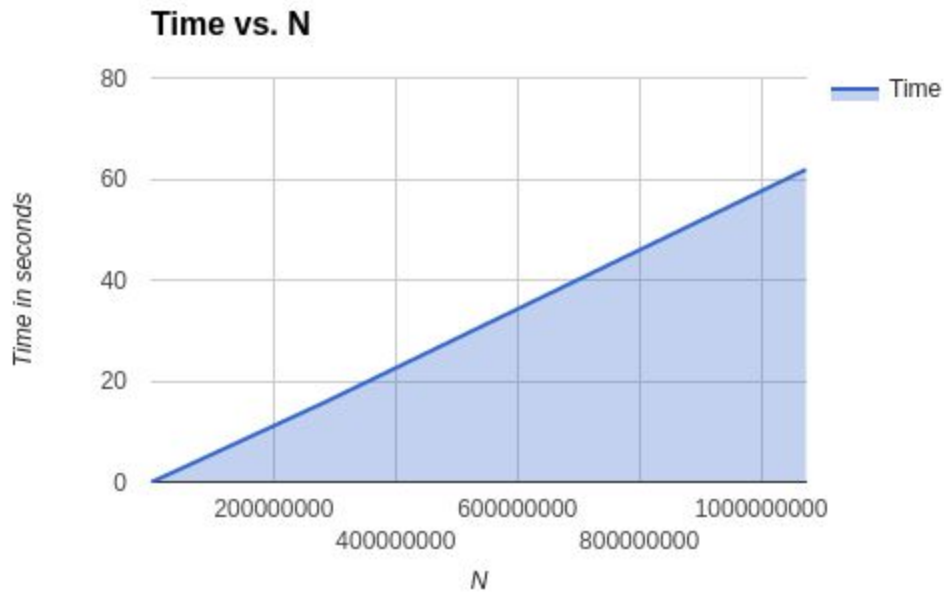
For the question, I have taken the following values for a, b and c  
A = 3, B = 4, C = 7, M = 5.

Time	-5	-4	-3	-2	-1	0	1
Max value of n for recursive algorithm	1	13	19	26	31	36	41
Max value of n for iterative algorithm	1	300	4400	115000	1700000	20000000	200000000
Max value of n for matrix method	1	3	$>10^{19}$	$>10^{19}$	$>10^{19}$	$>10^{19}$	$>10^{19}$

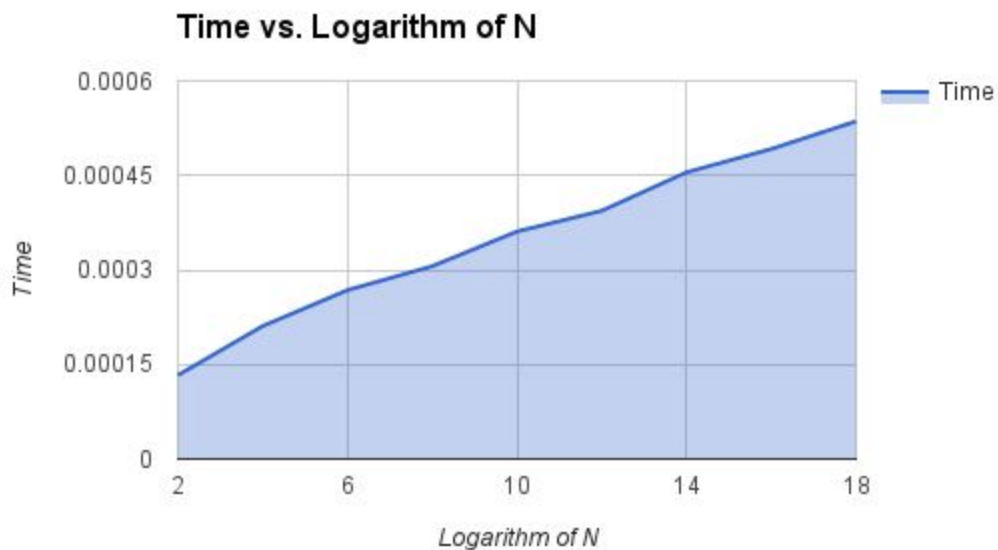
For the recursive algorithm



For the iterative algorithm



For algorithm using a matrix



All the above graphs are tending to be straight lines as it should be. This is because the first one has an exponential time complexity. So the logarithm of time vs N is linear, although it is not

perfectly one because initially the number of computations are lower, so comparable to other operations done. In the iterative algorithm, the time complexity is linear leading to a perfect straight line in the time vs  $N$  curve. Finally in the matrix multiplication algorithm, the time complexity is logarithmic. Thus time vs  $\log$  of  $N$  makes a linear curve too.