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Programming Assignment 1
ESO207: Data Structures & Algorithms

2021-01-31

1 Problem 1

1.1 Recurrence relation

$$U_n = 3U_{(n-1)} + D_{(n-1)} \tag{1}$$

$$D_n = U_{(n-1)} + 3D_{(n-1)} \tag{2}$$

Equations (1) and (2) are the recurrence relation in the given problem with initial values as $U_1 = 3$ & $D_1 = 1$.

1.2 Recursive Method Code

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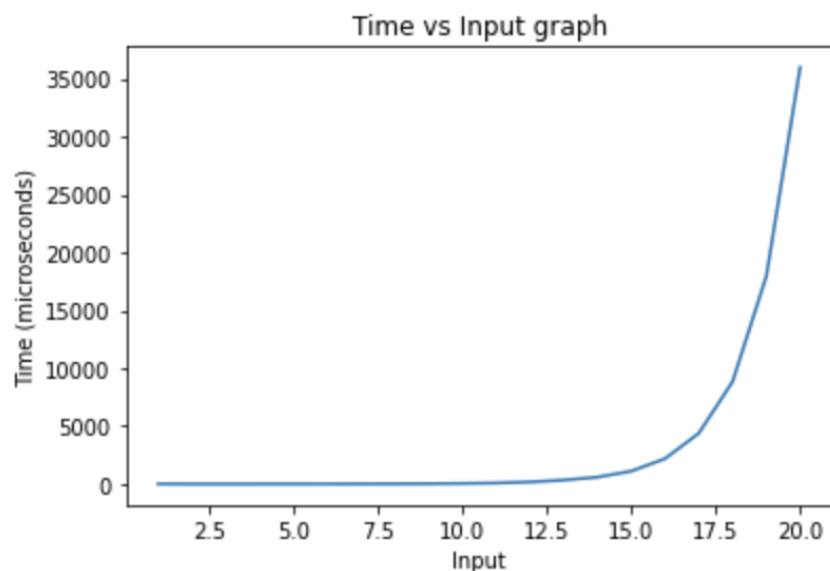
1.3 Iterative Method Code

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1.4 Matrix Exponential Method Code
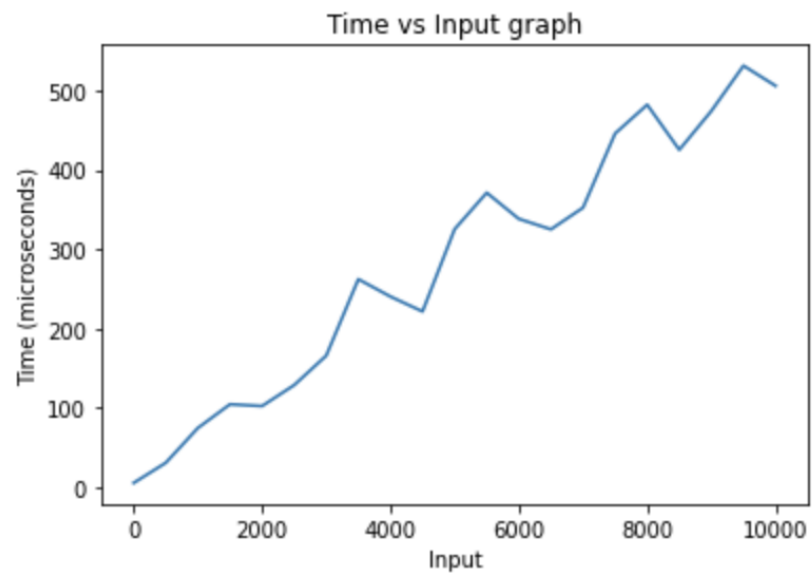
Submitted via Hackerrank

1.5 Input vs Time graphs

1.5.1 Recursive Method

Text(0.5, 1.0, 'Time vs Input graph')

1.5.2 Iterative Method

Text(0.5, 1.0, 'Time vs Input graph')

Time vs Input graph

1.5.3 Matrix Exponential Method

Text(0.5, 1.0, 'Time vs Input graph')

Time vs Input graph