

ESO207 Programming Assignment 1

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Question 1 (a)

Let $U(n)$ and $D(n)$ be the total possible localities directed "upwards" and "downwards" respectively. We define the recurrence relation as follows:

$$U(1) = 3$$

$$D(1) = 1$$

$$U(n) = 3U(n-1) + D(n-1)$$

$$D(n) = U(n-1) + 3D(n-1)$$

$$\forall n > 1, n \in \mathbb{N}$$

Question 1 (e)

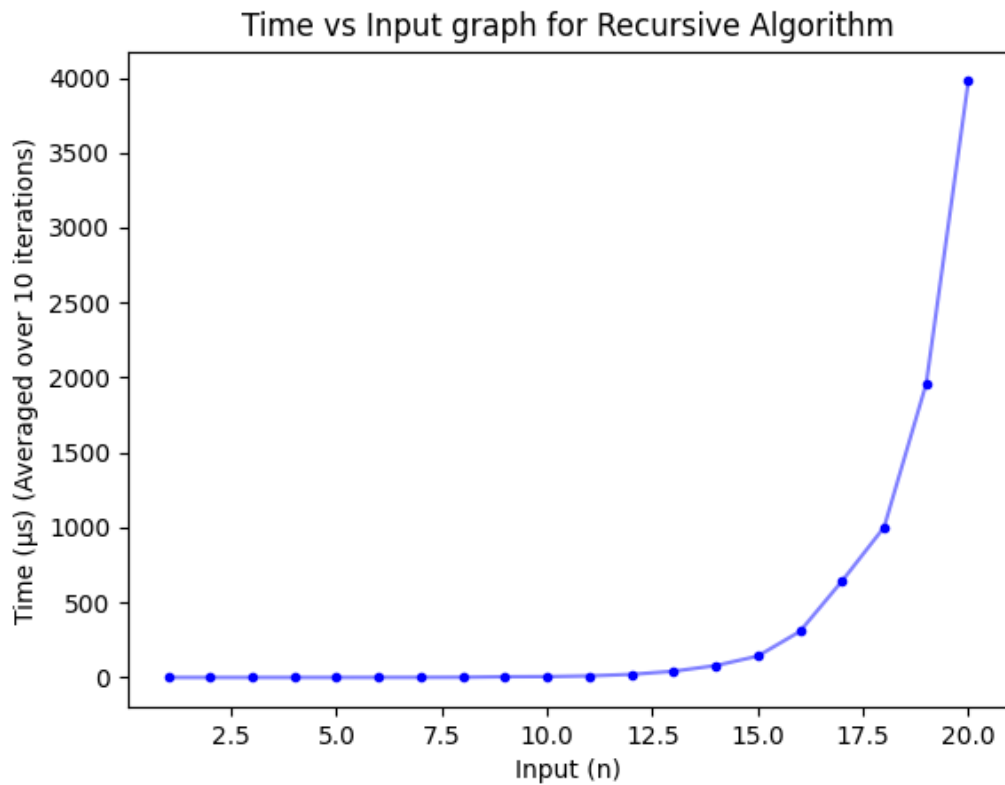


Figure 1: Average runtime for recursive algorithm

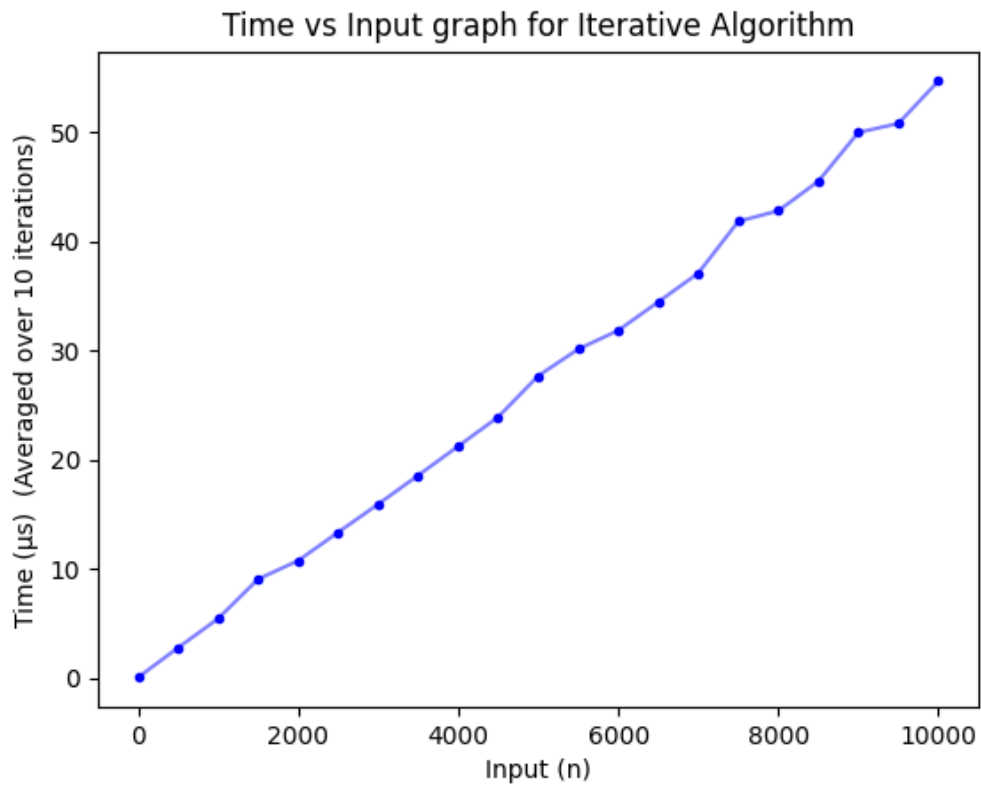


Figure 2: Average runtime for iterative algorithm

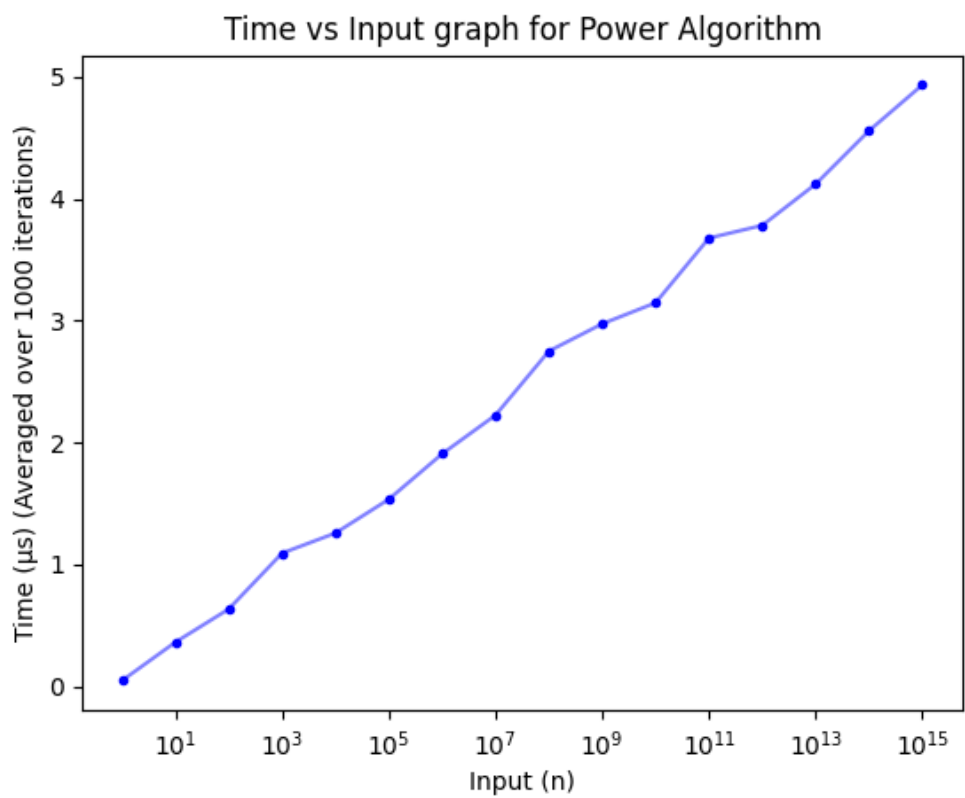


Figure 3: Average runtime for power algorithm