

① Algo 1

$$T(0) = 1$$

$$T(n) = 1 + T(n-1)$$

$$\dots T(0) = \Theta(1)$$

$$\dots T(n) = \Theta(1) + T(n-1)$$

$$T(n) = 1 + T(n-1)$$

$$T(n-1) = 1 + T(n-2) \rightarrow T(n) = 1 + 1 + T(n-2)$$

$$T(n-2) = 1 + T(n-3) \rightarrow T(n) = 1 + 1 + 1 + T(n-3)$$

⋮

$$T(1) = 1 + T(0)$$

$$T(0) = 1$$

$$T(n) = \underbrace{1 + 1 + \dots + 1}_{n \text{ rekursiwnych zwołań}} + \overbrace{T(1)}^{T(1)}$$

n rekursiwnych zwołań

$$T(n) = n * 1 + 1$$

$$T(n) = n * \Theta(1) + \Theta(1)$$

$$T(n) = \underline{\underline{\Theta(n)}} + \Theta(1)$$

$$\underline{\underline{T(n) = \Theta(n)}}$$

② Algo 2

$$T(0) = 1$$

$$T(n) = 1 + T(n-2)$$

$$\dots T(0) = \Theta(1)$$

$$\dots T(n) = \Theta(1) + T(n-2)$$

$$T(n) = 1 + T(n-2)$$

$$T(n-2) = 1 + T(n-4) \rightarrow T(n) = 1 + 1 + T(n-4)$$

$$T(n-4) = 1 + T(n-6) \rightarrow T(n) = 1 + 1 + 1 + T(n-6)$$

⋮

$$T(2) = 1 + T(0)$$

$$T(0) = 1$$

$$T(n) = 1 + 1 + \dots + 1 + T(0)$$

keďže musíme preložiť rekursívnych zavolání aby sme dosiahli $T(0)$, keď budeme vstup zmenšovať vždy o 2?

(pýtame sa vlastne koľkokrát môžeme od n odčítať 2 dokým nedosiahneme 0)

$$T(n) = \underbrace{1 + 1 + \dots + 1}_{\lceil n/2 \rceil} + T(0)$$

$\lceil n/2 \rceil$ rekursívnych zavolání

$$T(n) = \lceil n/2 \rceil * 1 + 1$$

$$T(n) = \lceil n/2 \rceil * \Theta(1) + \Theta(1)$$

$$T(n) = \underline{\Theta(\lceil n/2 \rceil)} + \Theta(1)$$

$$T(n) = \Theta(\lceil n/2 \rceil) \rightarrow \text{dokážeme, že}$$

$$n/2 = \Theta(n) \text{ potom } \underline{\underline{T(n) = \Theta(n)}}$$

⑤ Algo 5

$$T(0) = 1$$

$$T(n) = 1 + T(n/3)$$

$$\dots T(0) = \Theta(1)$$

$$\dots T(n) = \Theta(1) + T(n/3)$$

$$T(n) = 1 + T(n/3)$$

$$T(n/3) = 1 + T(n/9) \rightarrow T(n) = 1 + 1 + T(n/9)$$

$$T(n/9) = 1 + T(n/27) \rightarrow T(n) = 1 + 1 + 1 + T(n/27)$$

⋮

$$T(0) = 1$$

$$T(n) = 1 + 1 + \dots + 1 + T(0)$$

kolikrát můžeme n vydělit 3 dokyž nedostaneme
(celíselne) 0?

$$T(n) = \underbrace{1 + 1 + \dots + 1}_{\lfloor \log_3 n \rfloor} + T(0)$$

$\lfloor \log_3 n \rfloor$ rekursivních
volání

$$T(n) = \lfloor \log_3 n \rfloor * \Theta(1) + \Theta(1)$$

$$T(n) = \underline{\underline{\Theta(\log_3 n)}} + \Theta(1)$$

$$T(n) = \Theta(\log_3 n) \Rightarrow \underline{\underline{T(n) = \Theta(\log n)}}$$