



DAC - Part I

Complete Course on Algorithm for GATE - CS & IT

Big-Oh-Notation (O, \leq)

n^2 = $O(n)$ ✗
= $O(n^2)$ ✗ \Rightarrow TUB
= $O(n^3)$ ✗ \Rightarrow Upper Bounds (UB)
= $O(n^4)$ ✓
= $O(n^{10})$ ✓ \Rightarrow NTUB

Small-Oh ($o, <$)

~~$n^2 = o(n)$ ✗~~
 ~~$= o(n^2)$ ✗~~
 ~~$= o(n^3)$ ✓~~
 ~~$= o(n^4)$ ✗~~
 ~~$= o(n^{10})$ ✓~~

\nearrow NTUB

$$A = o(B)$$

\Downarrow
• NTUB

$$A = O(B)$$

\Downarrow
UB



Omega notation (Ω , \geq)

$$\begin{aligned} n^4 &= \Omega(n) \checkmark \\ 6 &= \Omega(n^3) \checkmark \\ &= \Omega(n^4) \checkmark \\ &= \Omega(n^5) \text{ } \times \\ &= \Omega(n^6) \text{ } \times \end{aligned}$$

\Rightarrow NTLB

\Rightarrow Lower Bound

TLB

Small omega not (ω , $>$)

$$\begin{aligned} n^4 &\neq \omega(n) \checkmark \\ &= \omega(n^2) \checkmark \\ &= \omega(n^3) \checkmark \\ &= \omega(n^4) \text{ } \times \\ &= \omega(n^5) \text{ } \times \end{aligned}$$

$$A = \Omega(B)$$



$$n^3 = O(n^3) \Rightarrow \underline{+UB}$$

$$n^3 = \Omega(n^3) \Rightarrow \underline{+LB}$$



$$n^3 = \theta(n^3)$$



$$A = \theta(B)$$



TUB

TLB

Complexity classes