

$O(1) < O(\log n) < O(n) < O(n \log n) < O(n^2) < O(n^3) \dots < O(2^n) \dots < O(n^n)$

### Asymptotic Notations

Big Oh(O) Notation-->Worst cse

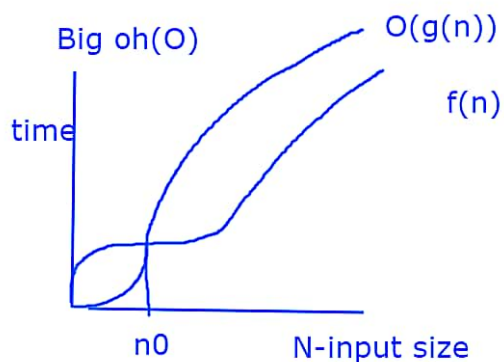
Big Omega Notation--->Best case

Theta Notation--->Avg case

Small oh(o) Notation

small omega Notation

Upper Bound



$f(n) \leq c \cdot g(n)$   
 $c$ -constant  
 $n \geq n_0$

$f(n) = 3n + n = 4n \dots \rightarrow O(n)$

$f(n) = 2n^2 + n = 4n^2 \dots \rightarrow n=1 \dots \rightarrow O(n^2)$   
 $c=4$

## Asymptotic Notations

Big Oh( $O$ ) Notation

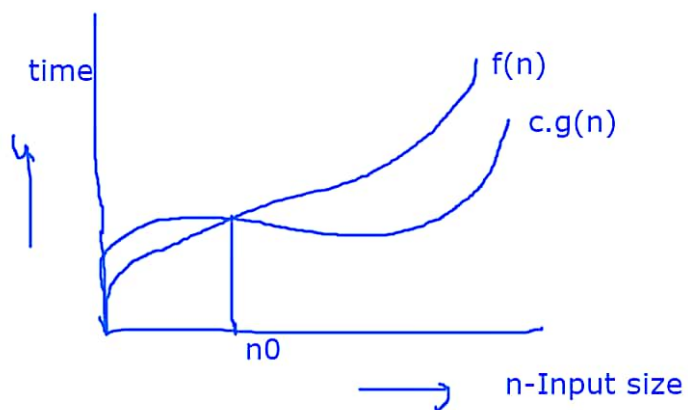
Big Omega Notation

Theta Notation

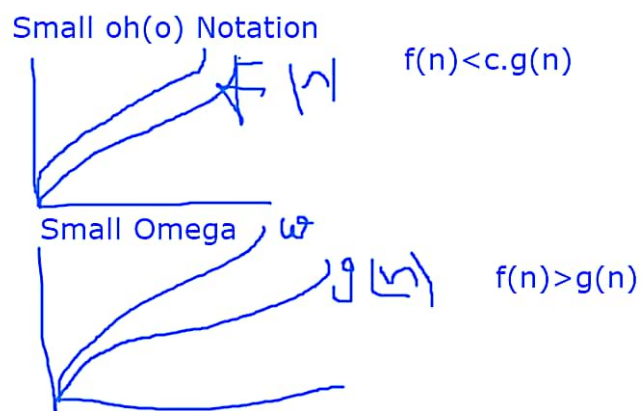
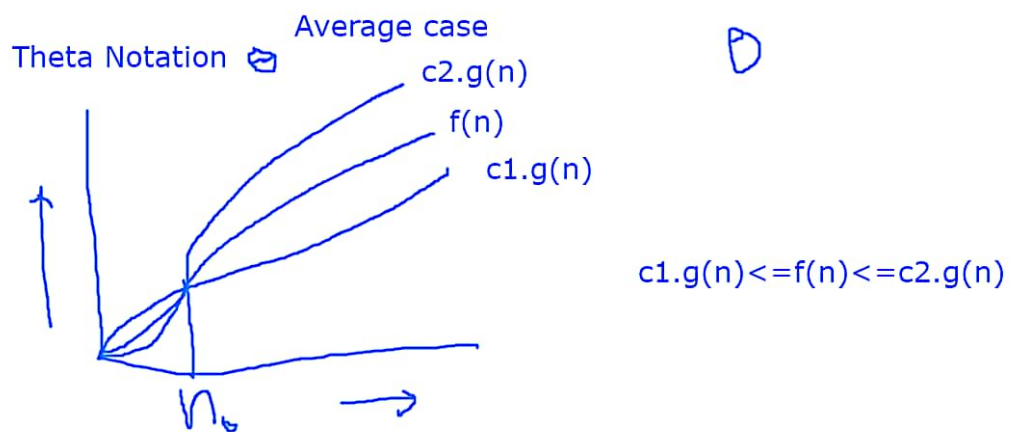
Small oh( $o$ ) Notation

small omega Notation

Big Omega  $\Omega$  Best-case



$$\begin{aligned} f(n) &\geq c.g(n) \\ f(n) &= 3n^2 + n \\ 3n^2 + n &\geq c.n^2 \\ c &\leq 2 \\ 3n^2 + n &\geq 2n^2 \\ n &\geq 0 \\ f(n) &\rightarrow O(n^2) \end{aligned}$$



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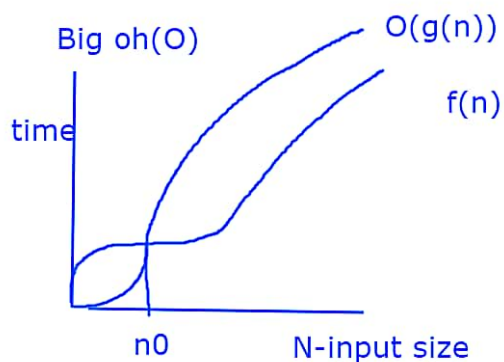
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