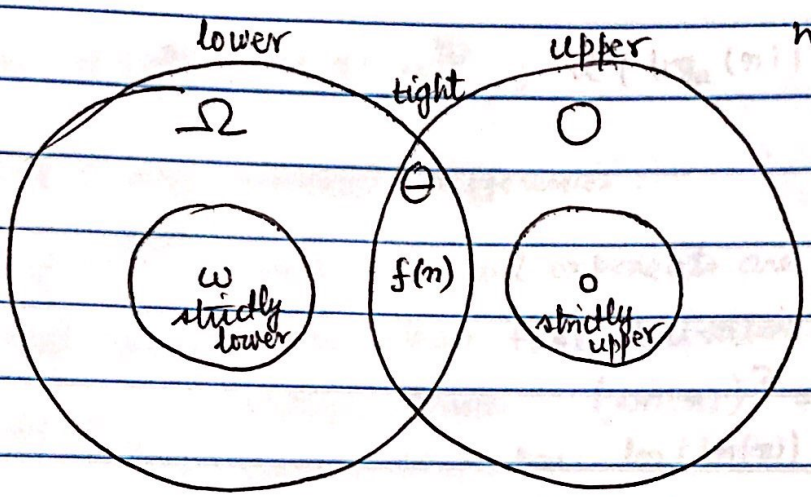
Asymptotic Growth of Functions

Def 1	O	upper	$\Leftarrow$ $0 \le L < \infty$ (Th3)	$\not\Rightarrow$ Ex A
Def 2	Ω	lower	$\Leftarrow$ $0 < L \le \infty$ (Th4)	$\not\Rightarrow$ Ex C
Def 3	Θ	tight	$\Leftarrow$ $0 < L < \infty$ (Ex B)	$\not\Rightarrow$ Ex B
Def 4	o	strictly upper	iff $L = 0$	(Lemma 1)
Def 5	ω	strictly lower	iff $L = \infty$	(Exercise 5)

$$\lim_{n\to\infty} \frac{f(n)}{g(n)} = L$$



Reflexivity : $f(n) = \Theta(f(n))$; $f(n) = Of(n)$, $f(n) = \Omega f(n)$

Symmetry : $f(n) = \Theta(g(n))$ iff $g(n) = \Theta(f(n))$

Transpose symmetry : $f(n) = O(g(n))$ iff $g(n) = \Omega f(n)$

$f(n) = o(g(n))$ iff $g(n) = \omega f(n)$

Transitivity Θ, O, Ω, o, ω

$\ldots, \ln\ln(n), \ln(n), \ldots, n, n^2, \ldots, n^{100}, \ldots 2^n, e^n, 10^n, \ldots$

logarithms — Polynomials — exponentials