Hierarchy of Asymptotic Complexities of Some Basic Functions

all depending on n as variable

growing slower ↑

Class	*Name*		*Remarks*	*Suitability*
1	constant		$\sin(n), \cos(n) \in O(1)$	usually suitable for big problems
$\mathbf{\log_b(\log_b(n))}$			value of b does not matter	
$\mathbf{\log_b(n)}$	logarithmic		value of b does not matter	
$\mathbf{(\log_b(n))^k}$ where k > 1	polylogarithmisch		value of b does not matter	
$\mathbf{n^k}$ where 0 < k < ½		polynomial	$= \sqrt[a]{n^b}$ where k = b/a	
$\mathbf{\sqrt[2]{n} = n^{0.5}}$			$= n^{½}$	
$\mathbf{n^k}$ where ½ < k < 1			$= \sqrt[a]{n^b}$ where k = b/a	
n	linear			
$\mathbf{n \cdot \log(n)}$ where n > 1	quasi-linear / log-linear		$\log(n!) \in \Theta(n \cdot \log(n))$	
$\mathbf{n^k}$ where 1 < k < 1.5		polynomial		
$\mathbf{n \cdot \sqrt[2]{n}}$			$= n^{1.5}$	
$\mathbf{n^k}$ where 1.5 < k < 2				
$\mathbf{n^2}$	quadratic			usually unsuitable for big problems
$\mathbf{n^k}$ where 2 < k < 3				
$\mathbf{n^3}$	cubic			
$\mathbf{n^k}$ where k > 3				
$\mathbf{n^{\log_b(n)}}$	quasi-polynomial	superpolynomial	Value of b does not matter	
$\mathbf{k^n}$ where k > 1	exponential			
n!	factorial		$n! \underset{n \to \infty}{\approx} \sqrt[2]{2 \cdot \pi \cdot n} \cdot (n/e)^n$	
$\mathbf{n^n}$			corresponds to $(n/k)^n$ where k = 1	

↓ growing faster