

1-1 Comparison of running times

For each function $f(n)$ and time t in the following table, determine the largest size n of a problem that can be solved in time t , assuming that the algorithm to solve the problem takes $f(n)$ microseconds.

$f(n)$	time	second	minute	hour	day	month	year	century
$\lg n$	2^{10^6}	$2^{6 \times 10^7}$	$2^{36 \times 10^8}$	$2^{864 \times 10^8}$	$2^{2592 \times 10^9}$	$2^{31104 \times 10^9}$	$2^{31104 \times 10^{11}}$	$2^{31104 \times 10^{13}}$
\sqrt{n}	10^{12}	3.6×10^{15}	1.296×10^{19}	7.46496×10^{21}	6.718464×10^{24}	$9.67458816 \times 10^{26}$	$9.67458816 \times 10^{30}$	
n	10^6	60×10^6	3.6×10^9	8.64×10^{10}	2.592×10^{12}	3.1104×10^{13}	3.1104×10^{15}	
$n \lg n$	630×10^3	2.8×10^6	1.33×10^8	2.76×10^9	7.19×10^{10}	7.87×10^{11}	6.77×10^{13}	
n^2	10^3	7.75×10^3	60×10^3	293.94×10^3	1.61×10^6	5.58×10^6	55.77×10^6	
n^3	10^2	391.5	1532.6	4420.8	13736.6	31448.9	145972.8	
2^n	19.9	25.8	31.7	36.3	41.2	44.8	51.5	
$n!$	10^6	11	13	14	15	16	18	

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لحلحلة 18 عنصر فقط في حالة $n!$