


Solutions to
"Introduction to Algorithms, 3rd edition"

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Part I

Foundations

Chapter 1

The Role of Algorithms in Computing

	1 second	1 minute	1 hour	1 day	1 month	1 year	1 century
$\log(n)$	2^{10^6}	$2^{10^6 \cdot 60}$	$2^{10^6 \cdot 60 \cdot 60}$	$2^{10^6 \cdot 60 \cdot 60 \cdot 24}$	$2^{10^6 \cdot 60 \cdot 60 \cdot 24 \cdot 30}$	$2^{10^6 \cdot 60 \cdot 60 \cdot 24 \cdot 365}$	$2^{10^6 \cdot 60 \cdot 60 \cdot 24 \cdot 365 \cdot 100}$
\sqrt{N}	$(10^6)^2$	$(10^6 \cdot 60)^2$	$(10^6 \cdot 60 \cdot 60)^2$	$(10^6 \cdot 60 \cdot 60 \cdot 24)^2$	$(10^6 \cdot 60 \cdot 60 \cdot 24 \cdot 30)^2$	$(10^6 \cdot 60 \cdot 60 \cdot 24 \cdot 365)^2$	$(10^6 \cdot 60 \cdot 60 \cdot 24 \cdot 365 \cdot 100)^2$
n	10^6	$10^6 \cdot 60$	$10^6 \cdot 60 \cdot 60$	$10^6 \cdot 60 \cdot 60 \cdot 24$	$10^6 \cdot 60 \cdot 60 \cdot 24 \cdot 30$	$10^6 \cdot 60 \cdot 60 \cdot 24 \cdot 365$	$10^6 \cdot 60 \cdot 60 \cdot 24 \cdot 365 \cdot 100$
$n \log(n)$	62,746	$2.8 \cdot 10^6$	$1.33 \cdot 10^8$	$2.75 \cdot 10^9$	$7.18 \cdot 10^{10}$	$7.97 \cdot 10^{11}$	$6.86 \cdot 10^{13}$
n^2	1,000	7,746	60,000	293,939	$1.6 \cdot 10^6$	$5.6 \cdot 10^6$	$5.6 \cdot 10^7$
n^3	100	391	1,533	4,421	13,737	31,594	146,646
2^n	20	26	32	36	41	45	51
$n!$	(9, 10)	(11, 12)	(12, 13)	(13, 14)	(15, 16)	(16, 17)	(17, 18)

Table 1.1: Solution to Problem 1.1

1.1 Comparison of running times

Table 1.1 shows the solution. We assume the base of $\log(n)$ is 2. And we also assume that there are 30 days in a month and 365 days in a year.

Note Thanks to [Valery Cherepanov\(Qumeric\)](#) who reported an error in the previous edition of solution.

Part II

Sorting and Order Statistics

Part III

Data Structures

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