Solutions to "Introduction to Algorithms, 3rd edition"

Jian Li
(yinyanghu)

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Acknowledgements

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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

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