10.2

What is a good algorithm, and why use asymptotic running time?

What is a good algorithm?

Running time...

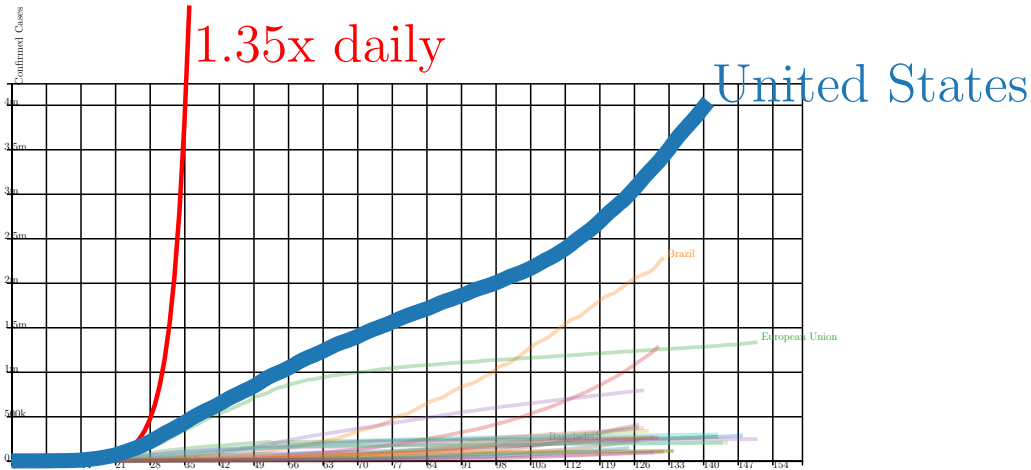
Input size	n^2 ops	n^3 ops	n^4 ops	$n!$ ops
5	0 secs	0 secs	0 secs	0 secs
20	0 secs	0 secs	0 secs	16 mins
30	0 secs	0 secs	0 secs	$\mathbf{3 \cdot 10^9}$ years
100	0 secs	0 secs	0 secs	never
8000	0 secs	0 secs	1 secs	never
16000	0 secs	0 secs	26 secs	never
32000	0 secs	0 secs	6 mins	never
64000	0 secs	0 secs	111 mins	never
200,000	0 secs	3 secs	7 days	never
2,000,000	0 secs	53 mins	202.943 years	never
$\mathbf{10^8}$	4 secs	12.6839 years	$\mathbf{10^9}$ years	never
$\mathbf{10^9}$	6 mins	12683.9 years	$\mathbf{10^{13}}$ years	never

What is a good algorithm?

Running time...

Exponential growth is bad

COVID 19 cases

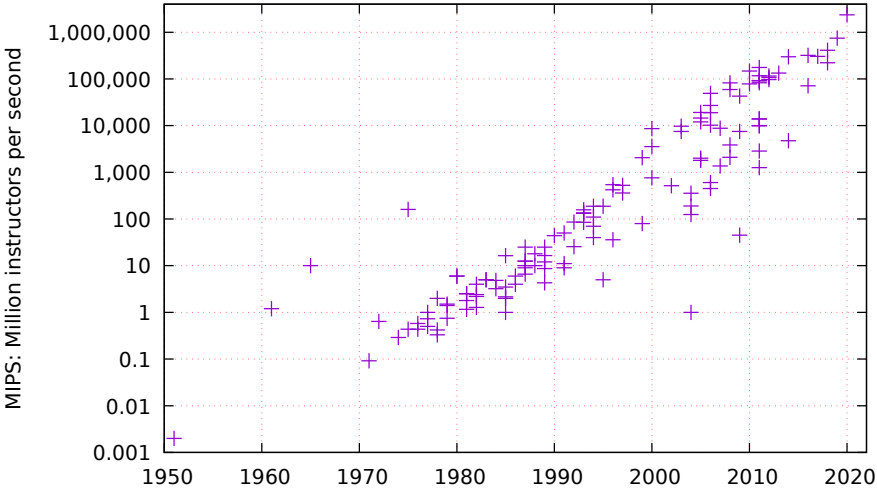


Snapshot: July 24, 2020.

CPU/Computer performance in MIPS over the years

No, no, no, exponential growth is good

https://en.wikipedia.org/wiki/Instructions_per_second



THE END

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(for now)