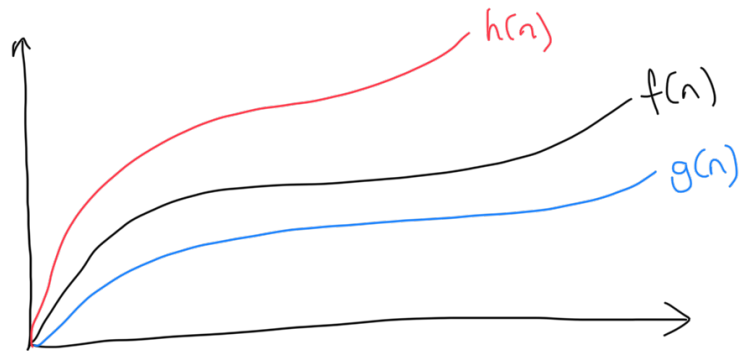# complexity of algorithms

big O

upper bound for f

↳ **little o**

upper bound for f but never equal to it.

$|f(n)| \leq C|h(n)|$

"$f(n)$ is big-oh of $g(n)$"

$f(x) \Rightarrow O(g(x))$

worst case

omega Ω

lower bound for f

$|f(n)| \geq c|g(n)|$

"$f(n)$ is big omega of $g(x)$"

$f(x) \Rightarrow \Omega(g(x))$

best case

★ lower bound for f but never equal to it, is $\omega(g)$

theta Θ

exact bound for

$0 \leq c_1 k(n) \leq f(n) \leq c_2 k$

average case

example

$f(n) = 2n^2 + 5$

- $f(n)$ is $O(n^2)$ or $O(n^3)$
- $f(n)$ is $\Theta(n^2)$
- $f(n)$ is $\Omega(n)$