

* When comparing the complexities of algorithms, we compare their rates of growth. 3-1a

↪ "最大項"

* "algo. A is better than algo B" means

"A is faster when n is sufficiently large"

insertion sort: $O(n^2)$

merge sort: $O(n \lg n)$



faster for small n



better

* Simple

* Constants depend on

-- hardware

-- programming skills

f, g : two functions (假設可以調整係數, when $n \rightarrow \infty$) 3-1b

* 如果 f, g 的最大項不一樣, 分出勝負

↔ 調整係數無法改變大小關係

$$f(n) = n^3 + n^2 - 100n \quad \text{大}$$

$$g(n) = 30n^2 + 100n \quad \text{小}$$



$$10^{-6} \times f(n) \quad \text{大}$$

$$10^6 \times g(n) \quad \text{小}$$

* 如果 f, g 的最大項一樣, 由最大項係數決定

↔ 調整係數可以改變大小關係

$$f(n) = 4n^3 + n^2 - 100n \quad \text{大}$$

$$g(n) = 3n^3 + 5n^2 + 100n \quad \text{小}$$



$$f(n) \quad \text{小}$$

$$10^6 \times g(n) \quad \text{大}$$