Checkpoint1

O(1)	O(log(log(n)))	O(logn)	O(log^2(n))	O(n)	O(nlog(n))	O(n^
O(1),O(4)	O(log(log(n)))	O(log(n))	O(log^2(n))	O(n),O(4n+3)	O(nlog(n))	O(n^2),O(n^2+20

Checkpoint2

证明

要证

$$n^3+300n \in O(n^3)$$

设 $f(n)=n^3+300n, g(n)=n^3, c=301$，求解 $f(n_0) \leq c \times g(n_0)$，可得$n_0=1$，所以存在 $c=301, n_0=1$，使得 $\forall n \geq n_0$，有 $f(n) \leq cg(n)$，证毕

Checkpoint3

证明

$$\begin{aligned}
&\because f(n) \in O(g(n)) && (1)\\
&\therefore \exists c \in R^+, n_0 \in Z^+, \text{s.t.} \forall n \geq n_0, f(n) \leq cg(n) && (2)\\
&\because k \gneqq 0 && (3)\\
&\therefore \exists c \in R^+, n_0 \in Z^+, \text{s.t.} \forall n \geq n_0, kf(n) \leq ckg(n) && (4)\\
&\therefore kf(n) \in O(kg(n)) && (5)\\
&\because kg(n) \in O(g(n)) && (6)\\
&\therefore kf(n) \in O(g(n)) && (7)
\end{aligned}$$