$$\Omega(g(n)) = \left\{ \begin{array}{l} f(n) : \text{there exists positive constant } c \text{ and} \\ n_0 \text{ such that } 0 \le C\,g(n) \le f(n) \\ \text{for all } n \ge n_0 \end{array} \right.$$

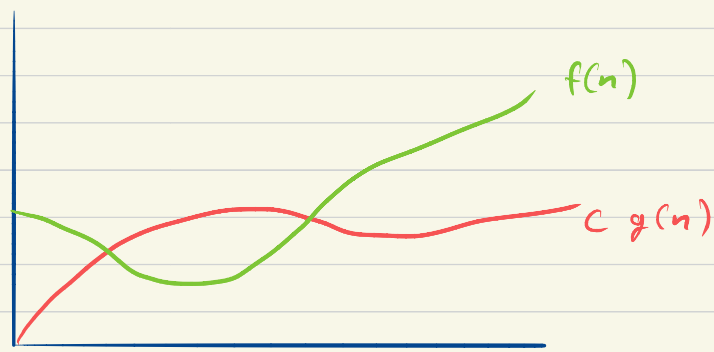
Ω :* Big Omega
* Asymptotically lower bound

prove that

$$6n^2 + 2n = \Omega(n)$$

Solution:

f(n) g(n)



$$Cn \le 6n^2 + 2n$$

constant growing

stay Input

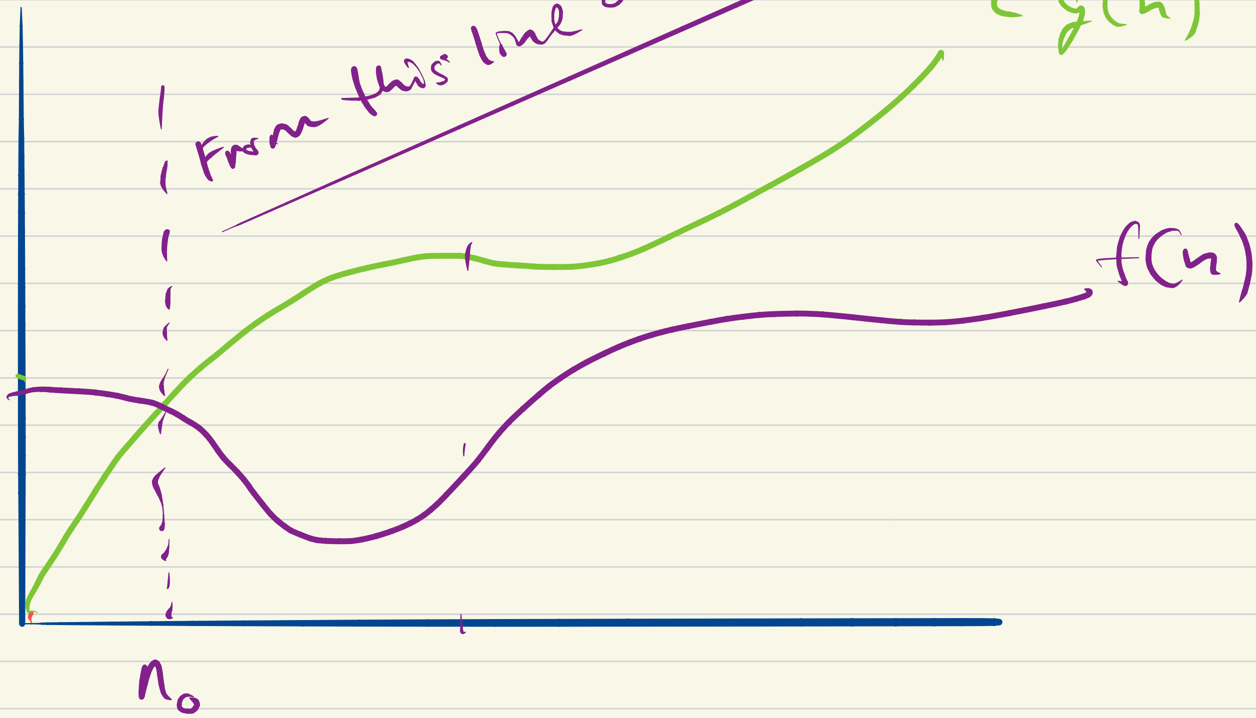
$$C \le 6n + 2$$

If $n = 1$, $C = 8$

As $n \to \infty$, it surpasses the constant in the above equation.

End of the day

$F(n)\ O(g(n))$



$$O(g(n)) = \left\{ f(n) : \text{there exists positive constant } c \text{ and } n_0 \text{ such that } 0 \le f(n) \le c\,g(n) \text{ for all } n \ge n_0 \right.$$

O : Big O

* Asymptotically upper bound.

1. Insertion Sort

5 | 2 9 5 1 8

2 5 | 9 5 1 8

2 5 9 | 5 1 8

2 5 5 9 | 1 8

1 2 5 5 9 | 8

1 2 5 5 8 9

2. Merge Sort

5 2 9 | 5 1 8

5 2 9   5 1 8

5 2   9   5 1   8

5   2   9   5   1   8

2   5   9   1   5   8

2 5   9   1 5   8

2 5 9   1 5 8

1 2 5 5 8 9