Car , $\longrightarrow$ Petrol $\longrightarrow$ 1 km $\longrightarrow$ 1000 km
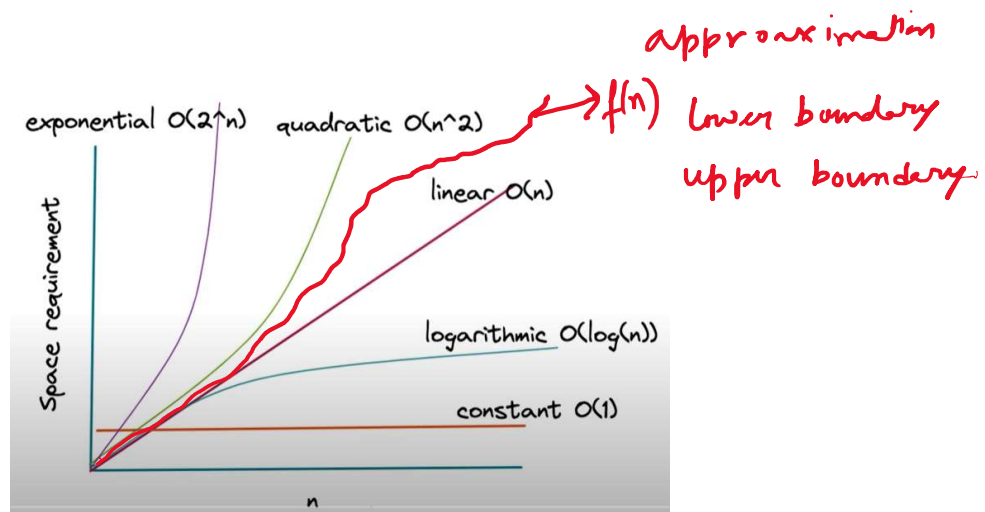
Car $\longrightarrow$ Diesel $\longrightarrow$ 1 km $\longrightarrow$ 1000 km $\quad$ fuel save hoga

Car $\longrightarrow$ CNG $\longrightarrow$ 1 km $\longrightarrow$ 1000 km

$\underline{Algorithm}$ — $\quad$ n ka value small hain $\longrightarrow$ T.C.
$\nearrow$ Input Size

$\quad\quad\quad\quad$ n ↑↑↑↑↑ $\longrightarrow$ T.C. difference will be significant.

exponential $O(2\uparrow n)$ $\quad$ quadratic $O(n^2)$

$\quad$ **approximation**

$\rightarrow f(n)$ **lower boundary**

$\quad\quad\quad\quad$ **upper boundary**

linear $O(n)$

logarithmic $O(\log(n))$

constant $O(1)$

Space requirement (y-axis) $\quad$ n (x-axis)

$$f(n) = 2n + 3 \quad;$$

Find

Find $g(n)$ such that $f(n) = O(g(n))$

$2n+3$

For $f(n) = O(g(n))$

$\downarrow$

$$\{\ 0 \leq f(n) \leq c \cdot g(n) \cdot \longrightarrow n, c > 0$$

$$f(n) \le c \cdot g(n)$$

$\Rightarrow \quad 2n+3 \le c \cdot n$

$\Rightarrow \quad 5 \le c$

$\Rightarrow \boxed{c \ge 5.}$

$2n+3 \le 5 \cdot n$

$\Rightarrow \quad 3 \le 3n$

$\Rightarrow \boxed{n \ge 1} \; //$

n	c
1	$\ge 5.$

$f(n) = 2n\log n + 3n.$

$TC \rightarrow 1 \le \log n < n < n\log n <$
$n^2 < n^3$

$f(n) = 3n + 2\log n$

$f(n) \le c \cdot g(n), \quad n, c > 0$

$2n+3 \le 5n \quad, \quad n \ge 1$

$$f(n) \le c \cdot g(n)$$

$2n+3 \le c \cdot n.$

if $c = 3 > 0, \qquad 2n+3 \le 3n$

$\Rightarrow \boxed{n \ge 3}$