Algorithm Analysis

Memory(RAM)   **CPU**

(Space Complexity)   (Time Complexity)

Baisakh $\Rightarrow$ 2 Ghz   Lokesh $\Rightarrow$ 5 Ghz

$Sol^n \Rightarrow$ 3 Secs $Sol^n \Rightarrow$ 2 sec

It depends!!

CPU Time $\propto \dfrac{1}{t} \Rightarrow$ 2.5 Ghz

Clockspeed $2.5 \times 1024 \times 1024$

→ $O(n)$ → $2n+1$

3 → 4 → 5
$(2)(2)+1$ → 5
6 → 13 = 4 + 9
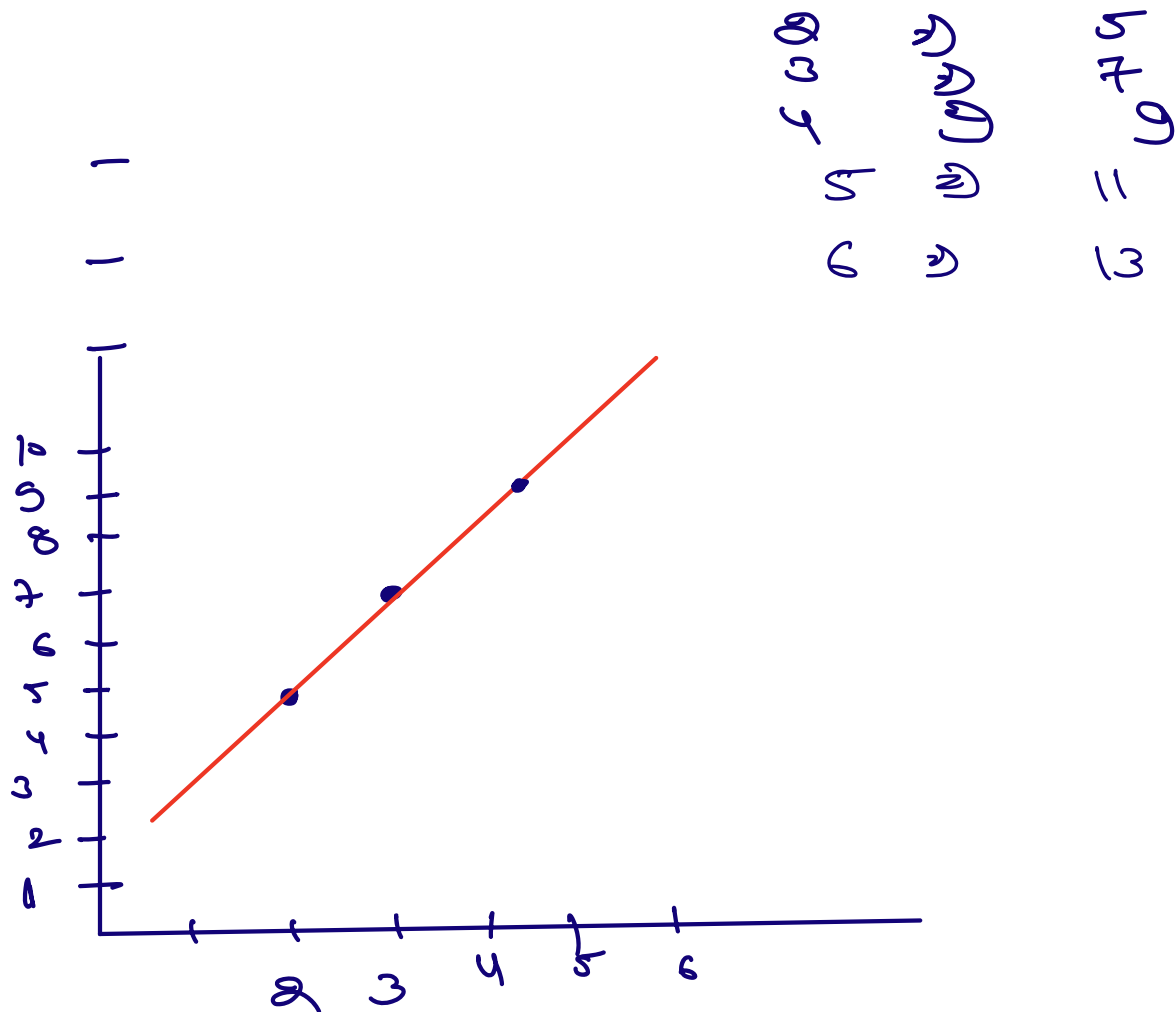
→ Only Trend of the Eqn

→ $2(n)+1$ → Linear Trend

→ $O(n)$ (Term with
highest Degree)

10 → $log°$ ← Constant

Ex 5) $\left(3x^2\right) + 2x + C$

$O(n^2)$

```
def fun(x):
    if x==1:
        return 1
    else:
        return x × fun(x-1)
```

$\Big\} c_1$

$\Big\} c_2$

$\underbrace{}$
$4 \times f(3)$

$fun(4) \Leftarrow$

$f(1) \rightarrow 1. $

$f(2).$ $2 \times f(1)$

$f(3)$ $\textcircled{3} \; 3 \times f(2)$

$fun(4)$ $\textcircled{4} \; 4 \times f(3)$

(1)

$4 \Big\{$

5
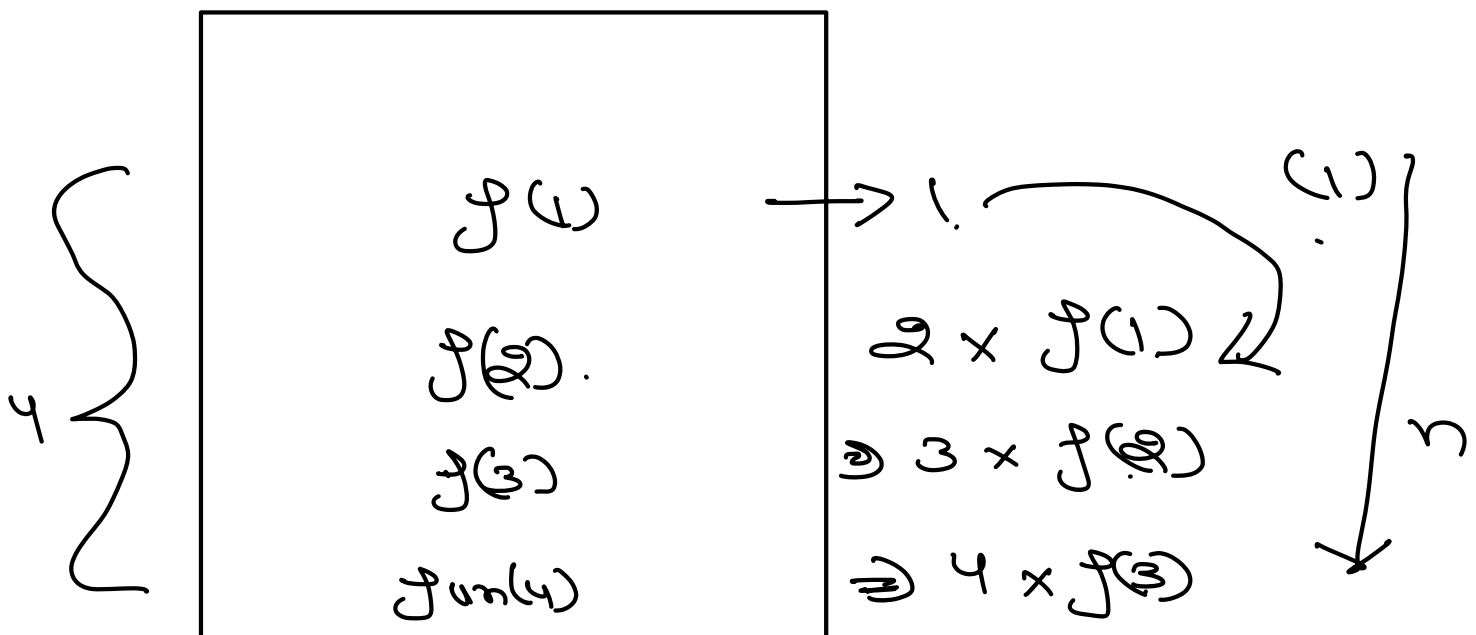
Call-Stack $\gg$ $SC \gg O(n)$

$4 \times 3 \times 2 \times n$

$n = 5$ $n \times C$

$(n-1) C_2 + C_1$

$\log_n (n) \Rightarrow 1$

$\log_n (n^x) \Rightarrow x$

$n//2$

$\log_2(n)$

$50\%, 25\% \Rightarrow, 12.5, 6.75...$

$n//3$

$\Rightarrow \log_3(n)$

$\log_2(n)$

==Binary Search==

Target = 4

| 1 | 2 | 3 | 4 | 5 |

S

$m \downarrow$

$\xrightarrow{\quad\quad}$ E

$\xleftarrow{\quad\quad}$

① Calculate m.p

② Compare ① T > m.p
   S ⇒ m + 1

   ② T < m.p
   E ⇒ m - 1

   ③ T = m.p
   return

③ Repeat Until S > E

$\boxed{1/3}$ $\leftarrow$ $\frac{1}{5} \, 3\log_5 n$

0 $\vdash - \, \not\vdash - \, - T$

Cov

$33.3 \, \ni \, 66./3$

22

$\log_3 n$
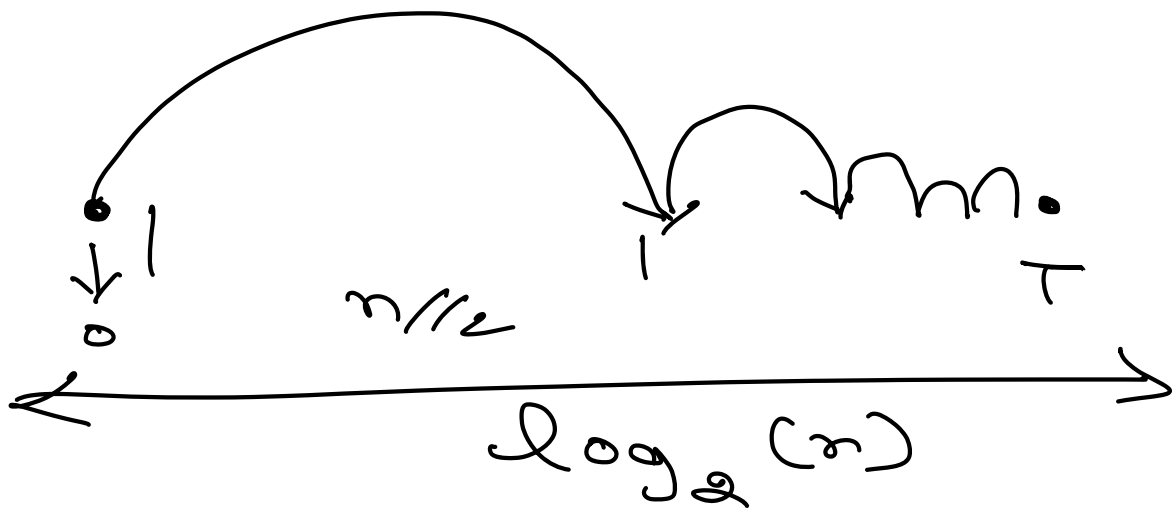
Sorting algo

$O(n^2)$

Bubble Sort

Selection Sort

Insertion Sort

$O(n \log n)$

QuickSort

Mergesort

Count Sort

Radix Sort