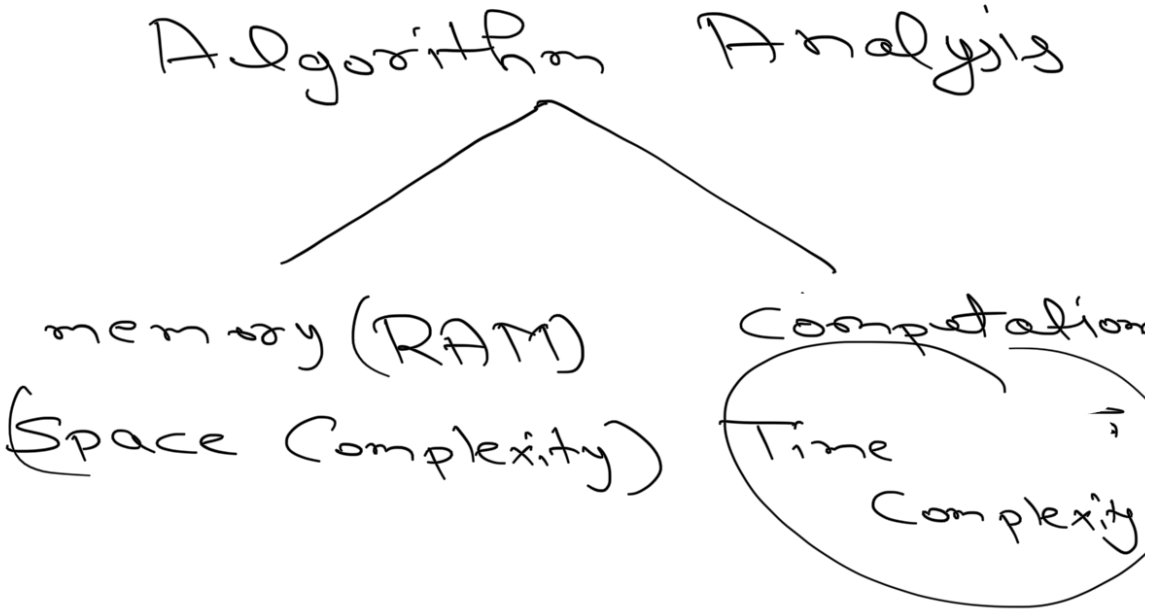
Basics of Time and Space Complexity



Fun1 → 2 sec

Fun2 → 6 secs

Clock Speed 3 GHz → $\frac{1}{t}$ → $3 \times 1024 \times 1024 \times 1024$

3.5 GHz

Big O $[O(n)]$

↑

Polynomial with Biggest Power

⇒ $3x^2 + 2x^2 + x$

Big O ? $5x^2 + x$

$5x^2$ → $O(n^2)$

Ex-2 ⇒ $cx + x^{1/2} + x^{1/3}$

cx → $O(n)$

Ex-3 ⇒ $x^{1/2} + 10 x^1$

⇒ $x^{(1/2)} + 10x^0$

$O(n^{0.5})$

```
n = 10
for i in range(n):
    print(i)
for j in range(n):
    for k in range(n):
        print(j*k)
```

$n \times n$

$n \times n$

$2n^2 + 3n + C$

$O(n^2)$

```
n
Loop
n = n//2
```

```
n = n//3
```

$\log_3 n$

① $n/2$

② $n/2^2$ +

③ $n/2^3$ +

| +

| +

| +

(K) $n/2^K \leq 1$

$n \leq 2^K$

$\log_2 n \Rightarrow K \log_2 2$

$K \Rightarrow \log_2 n$

```
def fact(n) #T(n) O(n)
    if n == 1:
        ret 1
    else:
        return n * f(n-1)
```