Class 06 TC

Tuesday, June 1, 2021 10:57 PM

Complexity Analysis

→ Time

→ Memory

Time Complexity

$1s \longrightarrow 10^8$ Task

$\frac{10^5}{10^8} = 10^{-3} = 0.001s$

1ms

$n = 10^5$

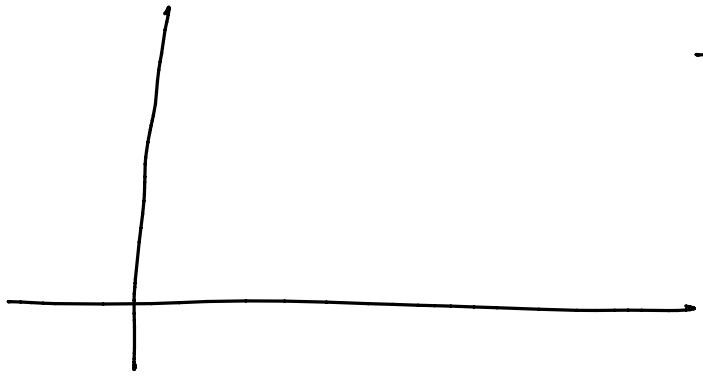
$O(n)$

```
for(i=0; i<n; i++)
{
    cout << "hello
}
```

$f(n) = n^2 + 1$

$O(1)$

```
cin >> n;
cout << n+1;
```



→ n

4 বার print

$N \longrightarrow 1, 2, 3, \ldots, N$ $O(N)$

$1, 3, 5, \ldots$ $O(N/2)$

$\ldots\ldots d \ldots\ldots$

$a, a+d$ $N \cdot O(N/d)$

↓

$N \longrightarrow 1, 2, 4, 8, 16, \ldots\ldots, N \rightarrow O(\log_r N)$

$r = 2$

$O(\log_2 N)$

$k \longrightarrow 2^k = N$

$15^2 = 225$

$\sqrt{k} = 10$

225 100

225 10

$\Rightarrow \log 2^k = \log N$

$\Rightarrow k \log 2 = \log N$

$\Rightarrow k = \frac{\log N}{\log 2} = \log_2 N$

$O\left(2^n\left(n^2 + \sqrt{k} + (\log_2 n)^2\right)\right)$

$2^n\left(n^2 + (\log_2 n)^2\right)$

$\boxed{2^n(n^2)} \Rightarrow O(2^n \cdot n^2)$

2^{15}

$32768(225 + 25)$
