

CSE 22.1
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LAB-01

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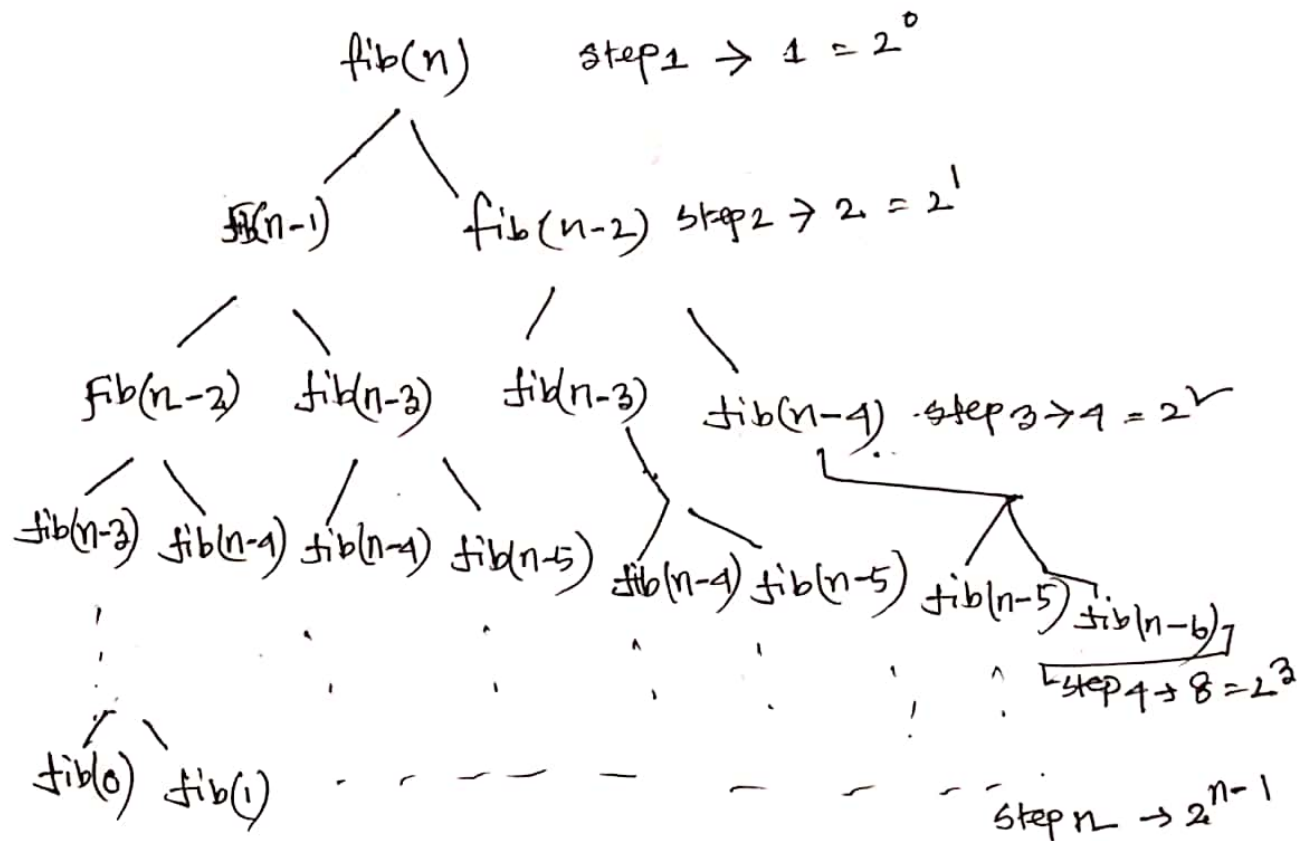
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Sec : 02

2) N-th Fibonacci Number:

Implementation - 1

It is a recursive algorithm.



$$\therefore 2^0 + 2^1 + 2^2 + 2^3 + \dots + 2^{n-1} = 2^{n-1+1} - 1$$

$$= 2^n - 1$$

$$\therefore \sigma(2^n)$$

Implementation - 2

$$1 + 1 + 1 + \underbrace{n-2}_{\rightarrow \text{for loop}} + 1$$
$$= n+2$$

$\therefore O(n)$

We can see that, implementation 1 is time complexity with $O(2^n)$ and implementation 2 is with $O(n)$. So, implementation 2 is better than implementation 1.

④ Matrix Multiplication:

Here we have 3 nested loops and each loop iterate from 0 to $n-1$, that means n times.

\therefore time complexity: $O(n^3)$