August 08, Dynamic Programming

08 August 2020 19:08

H.W.

A. Revise complete DP.
B. Always follow R->M->T.
C. https://www.geeksforgeeks.org/ using-step-1-2-3/
D. https://www.geeksforgeeks.org/

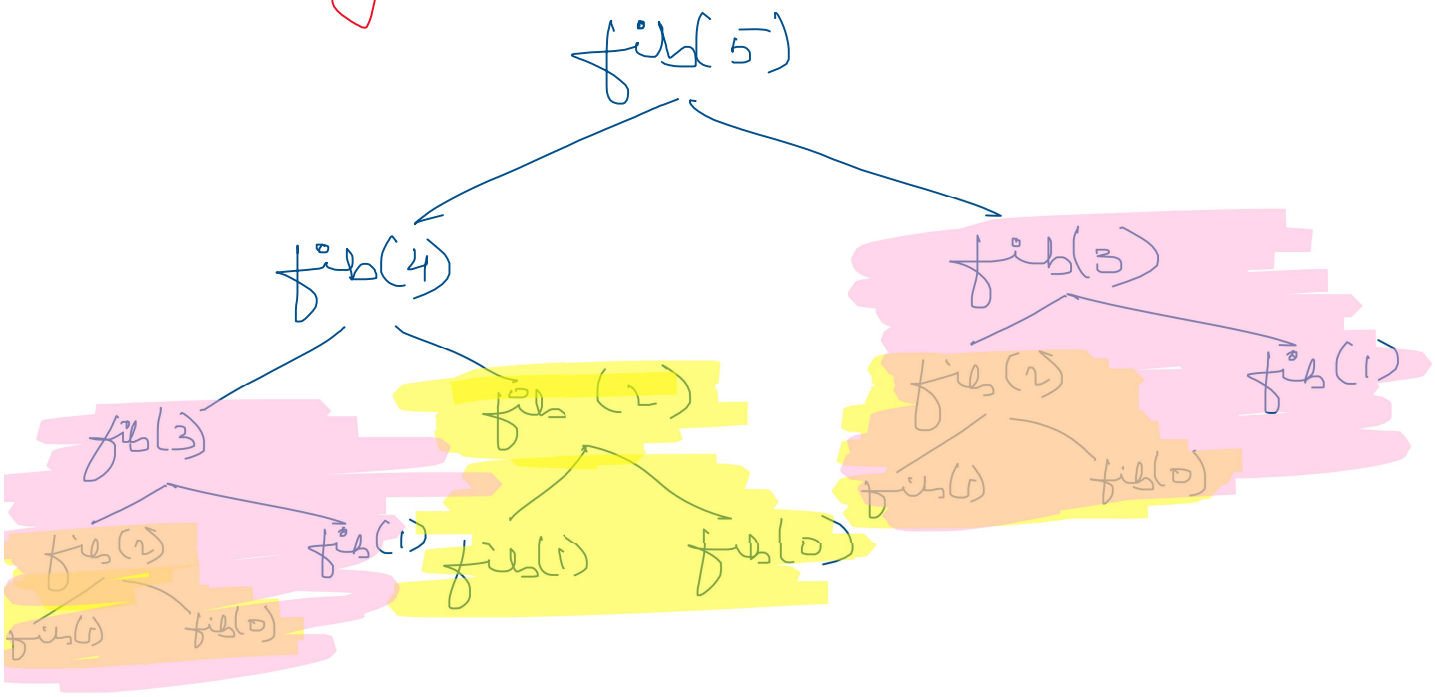
Fibonacci Series.

0	1	2	3	4	5	6	7	8	—	—	—
0	1	1	2	3	5	8	13	21			

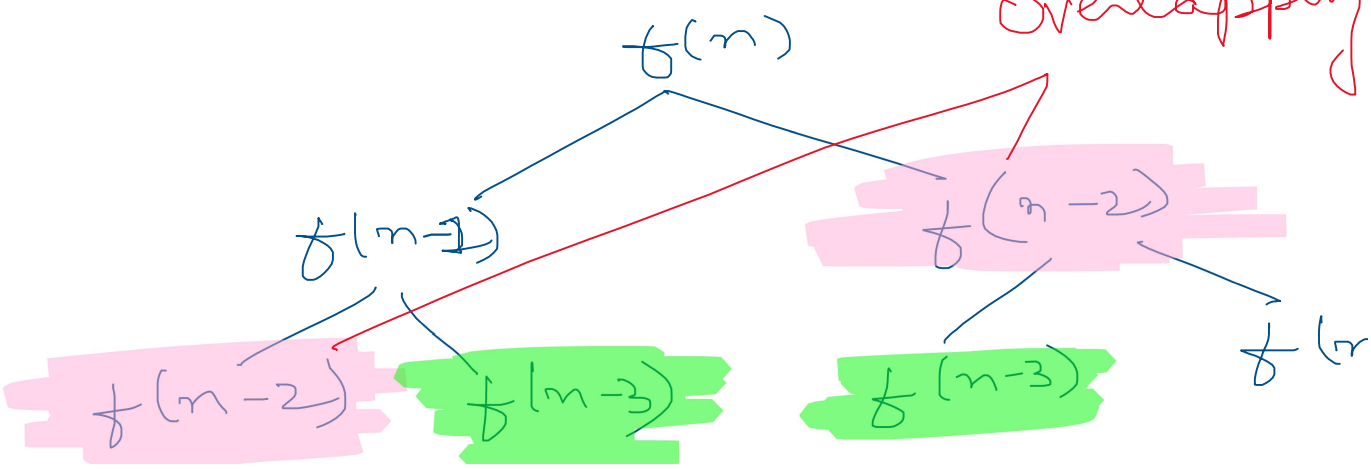
$$fib(n) = fib(n-1) + fib(n-2);$$

↳ State Expression

Visualizing → Recursion Tree



Generalized



Solution we offer

→ Store the value when calculate

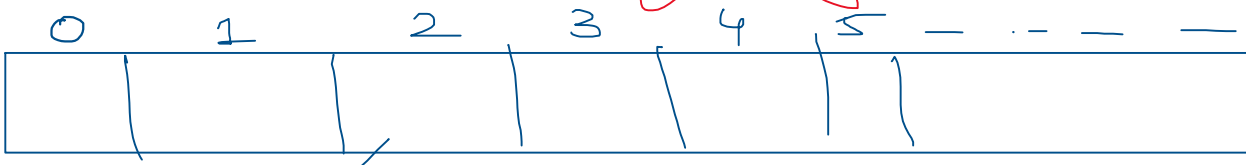
→ Next time do not recalc

Pick from storage.

MEMOIZATION

For storage use an array

In this case size of Array = n+1

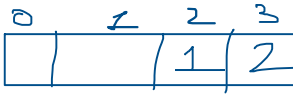


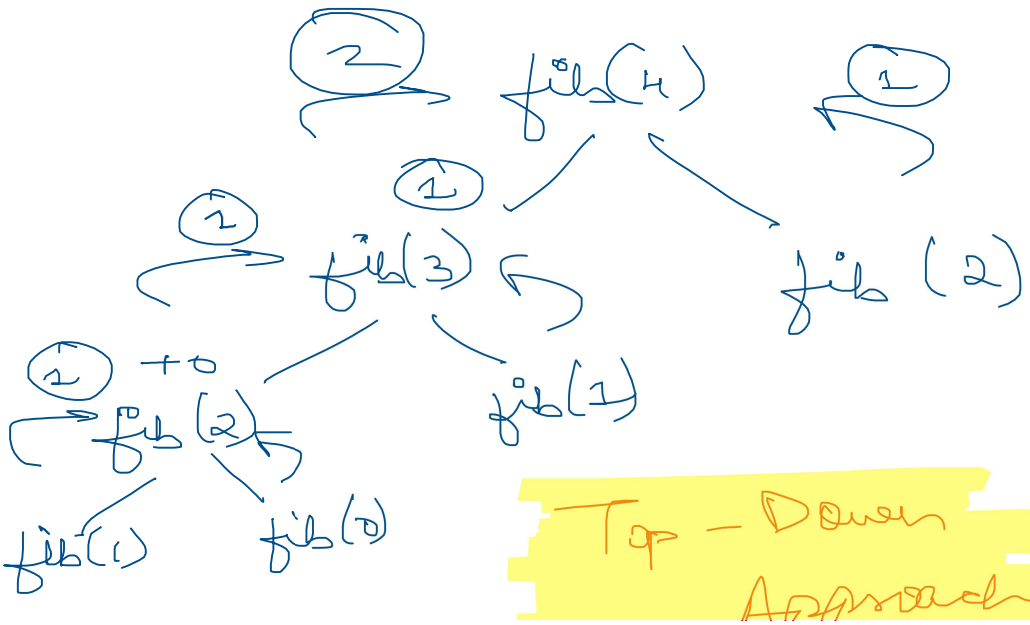
At each array element fib(index

1 → Create Array of size n + 1

2 → Store answers once calcula

3 → If answer exists then do n
recalculate & pick from



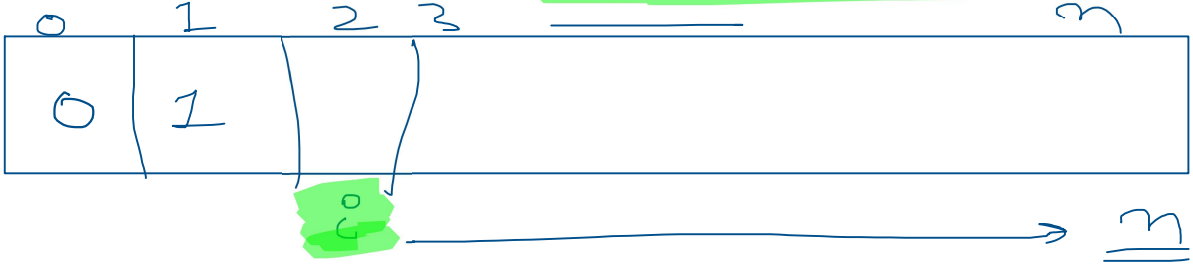


O(n

10ms

Top - Down Approach

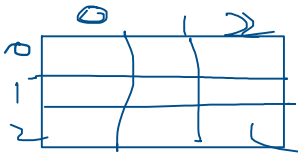
TABULATION → Bottom - Up



for(⟶)

{ arr[i] = arr[i-1] + arr[i

}



3 × 3

(m

((m-

How to Solve Any DP Problem in 3 Steps:

1. **Create a Recursive Solution for the problem**
   // Check if prerequisites of DP are there then apply next 2 steps
2. **Memoize It**
   a. **Create a storage array whose dimensions depend on the question(Number of variables in the question) & pass it.**
   b. **Store the results in the array.**
   c. **Check if the function call has already been made and its value is stored in our storage. If so, then do not recalculate and reuse that value.**
3. **Tabulate it**
   a. **See the memoized solution and tabulate accordingly in bottom up manner.**