

## Recursion - Problem solving - 3

17 June 2022 20:09

Q n → return min steps

n → 1

- ① Subtract no. 1
- ② Divide by 2, if no. is divisible by 2
- ③ Divide by 3, if no. is divisible by 3.

n = 7

$$7 - 1 \Rightarrow 6 \xrightarrow{2} 3 \xrightarrow{3} 1$$

1      2      3

(13)

(7) → 7 - 1 ⇒ 6 / 2 ⇒ 3 / 3 ⇒ 1

- ① Base case } ③ Setf work  
② Rec

8 → 8 / 2 ⇒ 4 / 2 ⇒ 2 / 2 ⇒ 1

n = 9

array → 0 → 9 ⇒ n+1

df =

0	0	1	1						
0	1	2	3	4	5	6	7	8	

✓ (1)  $dp[1] = dp[1-1] + 1$

⊗ (2)  $i=2 \rightarrow$  divisible by 2

✓

↓  
divide by 2

x

$\min(dp[i], dp[i/2] + 1)$

↓  
 $dp[i] \quad (1, 1)$

⊗ (3)  $i=3 \Rightarrow$  divisible by 3

✓

↓  
divide by 3

$\min(dp[i], dp[i/3] + 1)$

$(dp[3], dp[1] + 1)$

$(2, 0 + 1)$

$\min(2, 1) \Rightarrow 1$

Algorithm

Algorithm

minStepsToMin

Algorithm / DP / Intermediate

// n  $\rightarrow$  +ve given no.

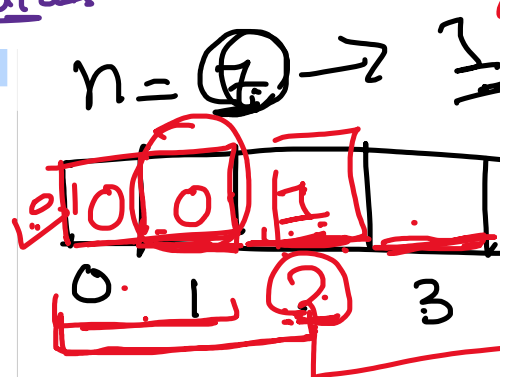
// dp

Easy  $\rightarrow$  intermediate

Algorithm

```

function minStepsToOne(n){
    // n is +ve given no
    // dp[1:n+1] => size of n+1
    n=1
    dp[1] = 0;
    for i=2 to n do{
        dp[i] = dp[n-1] + 1;
        if(i%2==0){
            dp[i] = min(dp[i], minStepsToOne(n/2)+1);
        }
        if(i%3==0){
            dp[i] = min(dp[i], minStepsToOne(n/3)+1)
        }
    }
    return dp[n]
}
    
```



$7/2$   
 $n=1$   
base case

1-7  
 $n=7$

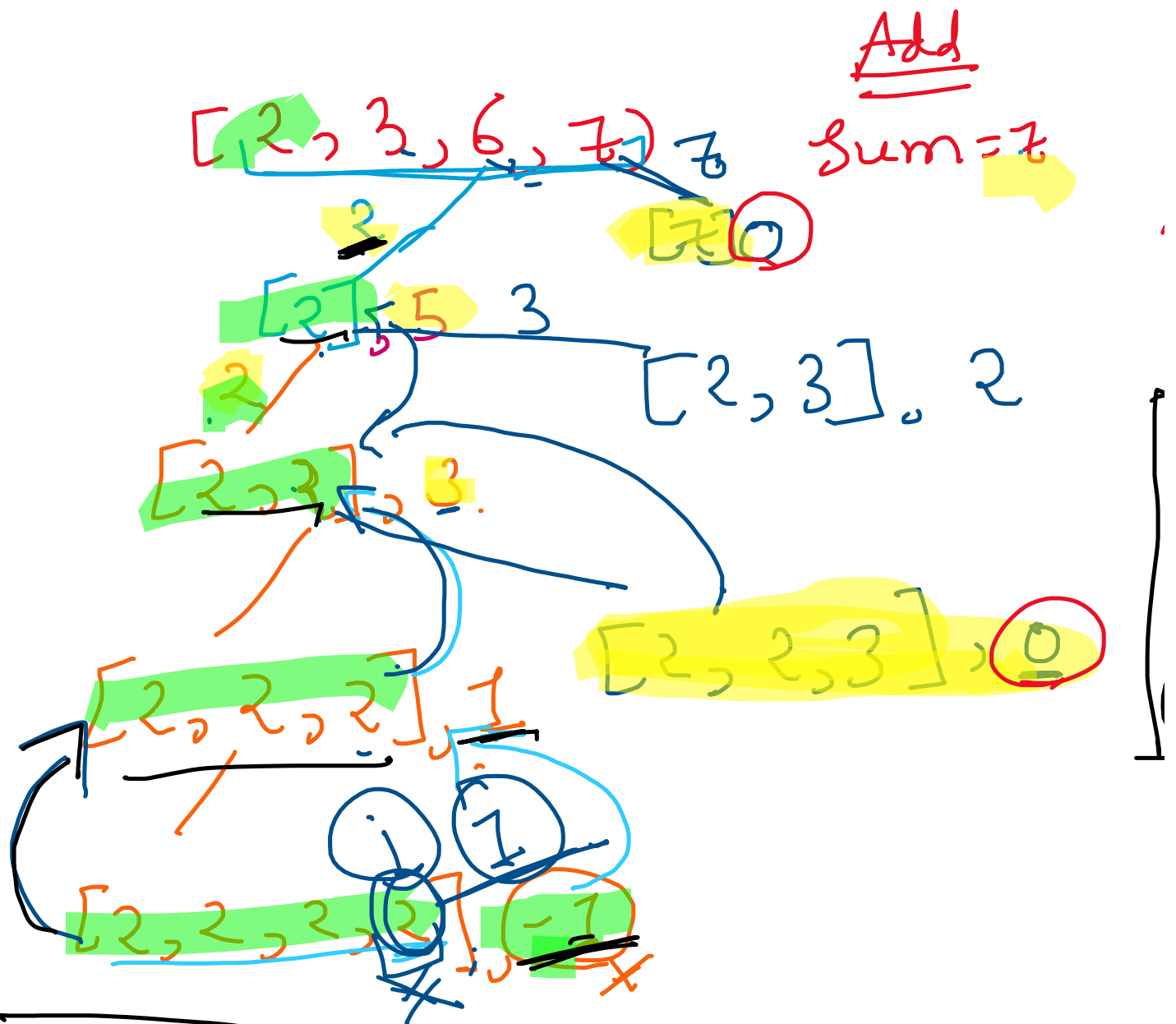
Dipanghu

7  
 12  
 13

Ekta  
 11-6  
 6  
 +1

# Q Combination Sum

ILP

 $[2, 3, 6, 7]$ 
target  $7$ 
OR  $[[2, 2, 3], [7]]$ 


Q Find minimum no. of curr  
l. & r. value.

no. of notes of diff denomin

$$n = 867$$

1, 5, 10

500 → 1

50 → 1

200 → 1

10 → 1

100 → 1

5 → 1

1 → 3

fn

amount = 8

↳

notes = [1, 5, 10, 50, 100]

noteCounter = [11, 9]

for i = 0 to 9

if (amount >= notes[i])  
{

noteCounter[i] = am

Amount = - amount - 1000



$$\frac{868}{1}$$