Ques: GCD of 2 numbers

a & b

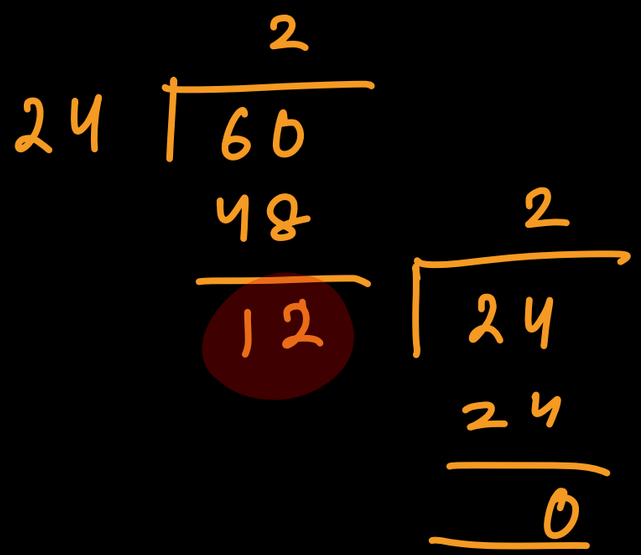
for loop se dono ka HCF nikaalo.

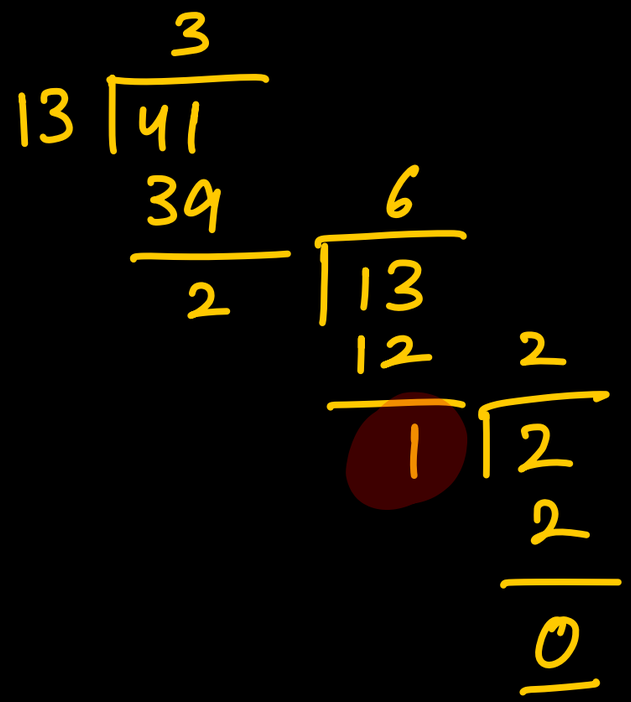
12 , 16
↓
4

12 → 1, 2, 3, 4, 6, 12

16 → 1, 2, 4, 8, 16

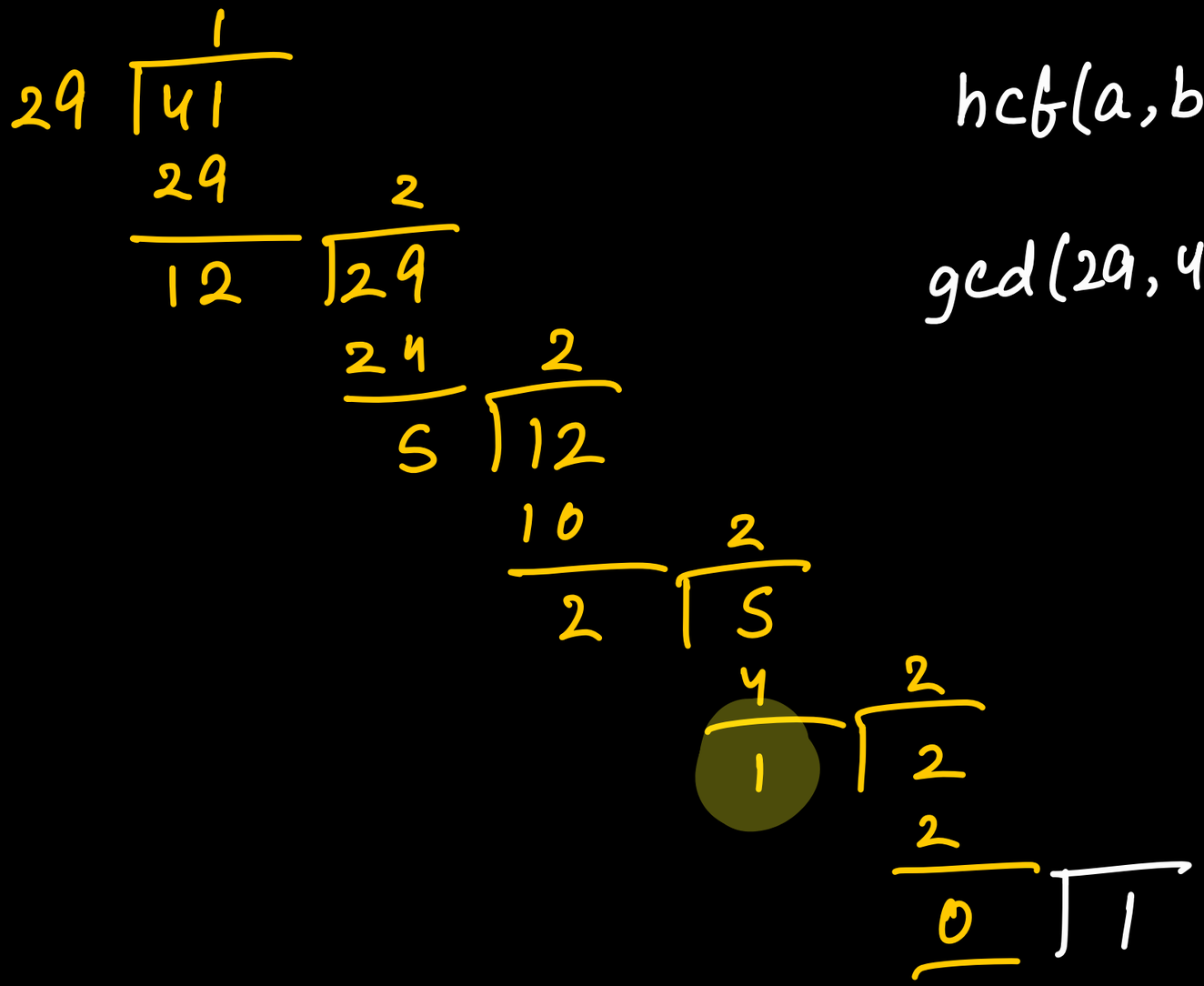
Ques: GCD of 2 numbers





a b
↓ ↓
b%a a

Ques: GCD of 2 numbers



$hcf(a,b) = hcf(b\%a, a)$

$gcd(29,41) \rightarrow gcd(12,29)$

Ques: GCD of 2 numbers

gcd(41, 29) → gcd(29%41, 41)
gcd(29, 41)

[a%b = a (if a<b)]

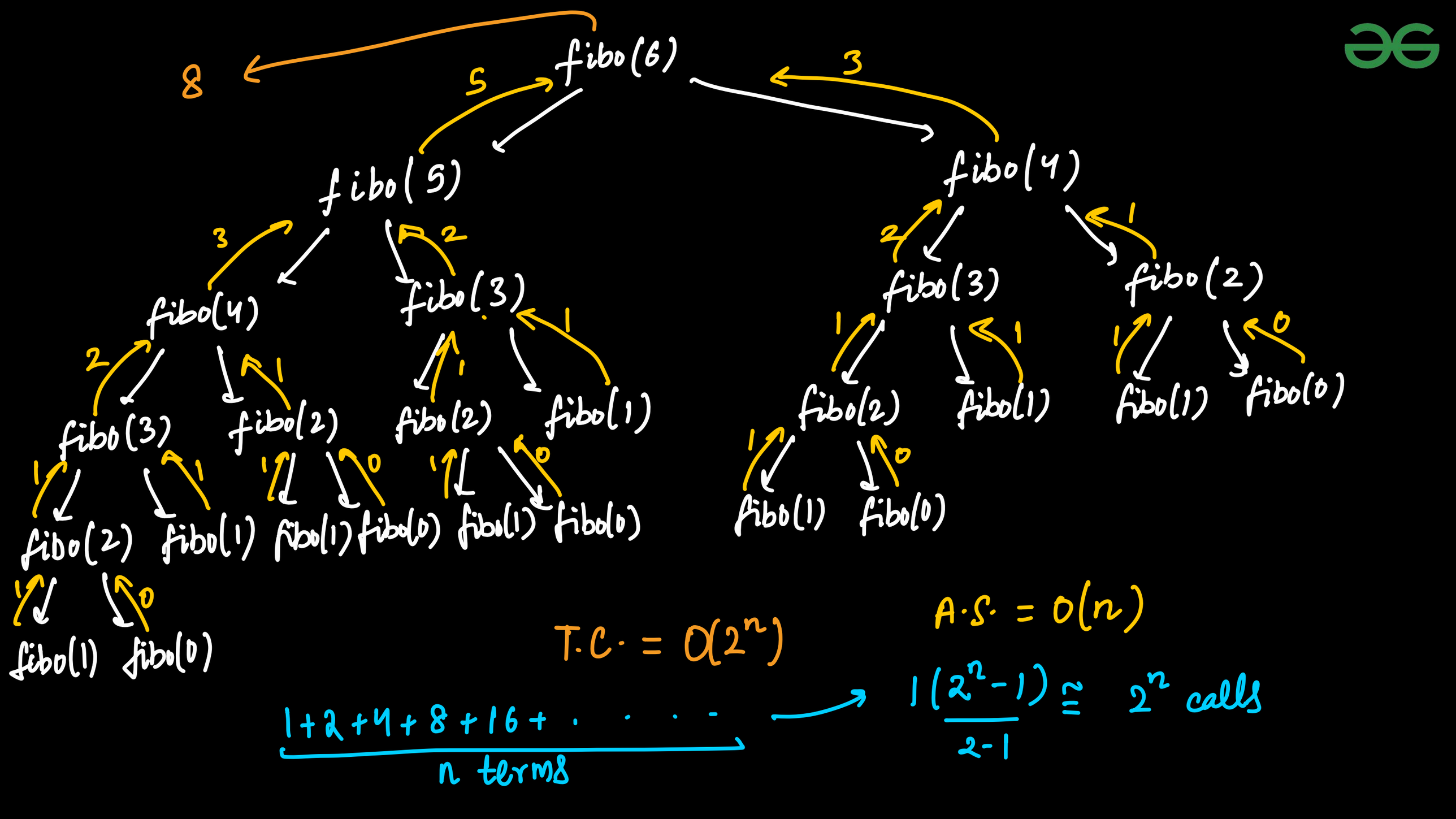
$$lcm(a,b) = \frac{a*b}{gcd(a,b)}$$

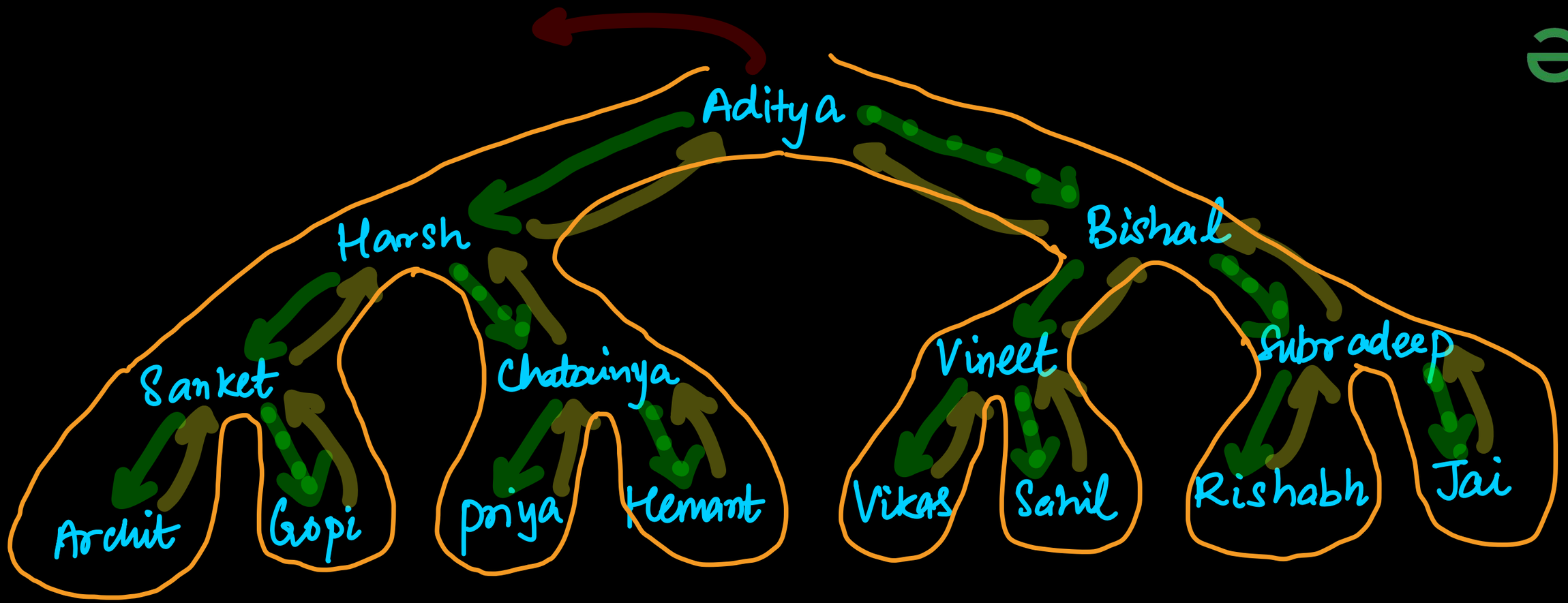
O(log(min(a,b)))

Ques: nth Fibonacci Number

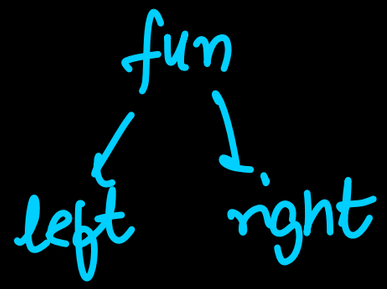
0	1	1	2	3	5	8	13	21	34	55	89	.	.
0	1	2	3	4	5	6	7	8	9	10	11		

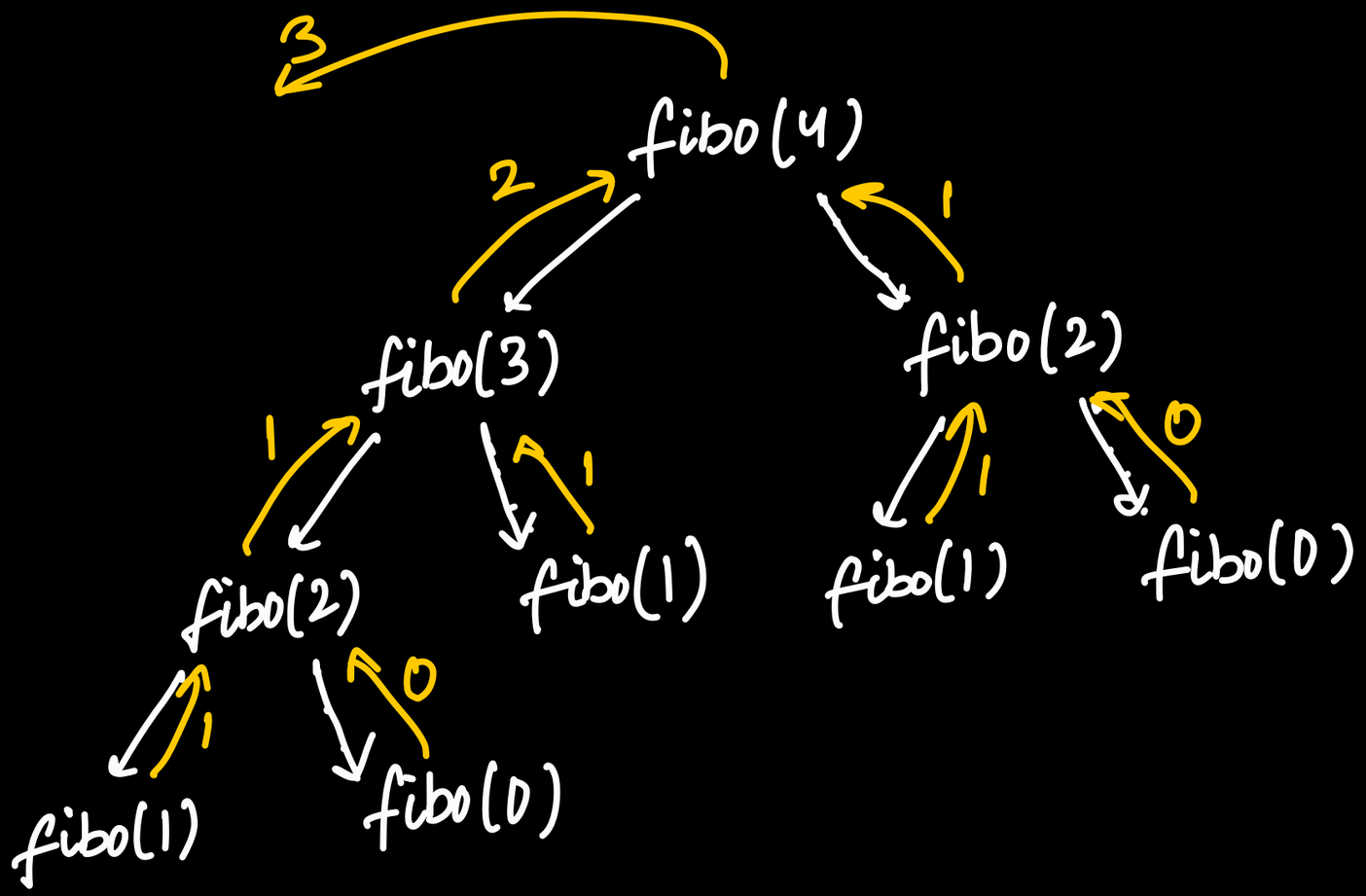
```
int fibo(n){
    if(n<=1) return n;
    return fibo(n-1) + fibo(n-2);
}
```

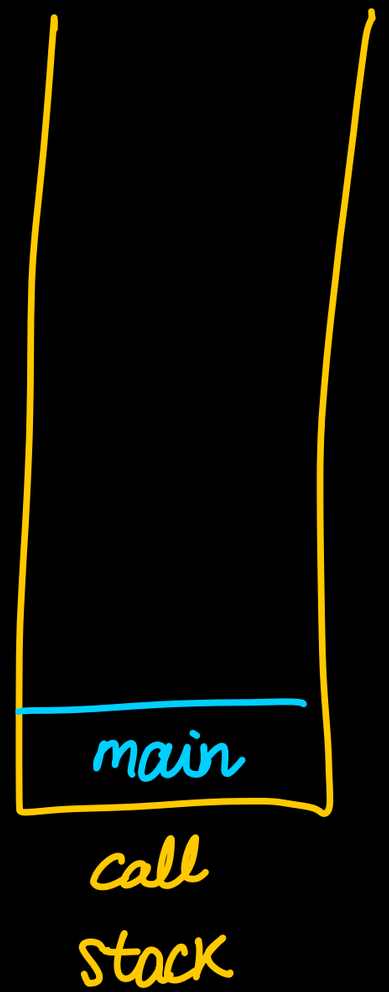

fibo(6)
8
5
3
fibo(5)
fibo(4)
3
2
fibo(3)
fibo(4)
2
1
fibo(3)
fibo(2)
fibo(2)
fibo(1)
fibo(2)
fibo(1)
fibo(1)
fibo(0)
fibo(1)
fibo(0)
fibo(1)
fibo(0)
fibo(4)
2
1
fibo(3)
fibo(2)
1
1
0
fibo(2)
fibo(1)
fibo(1)
fibo(0)
fibo(1)
fibo(0)
T.C. = O(2^n)
1+2+4+8+16+ . . . .
n terms
1(2^n - 1)/(2-1) ≅ 2^n calls
A.S. = O(n)



Euler's Tour Tree

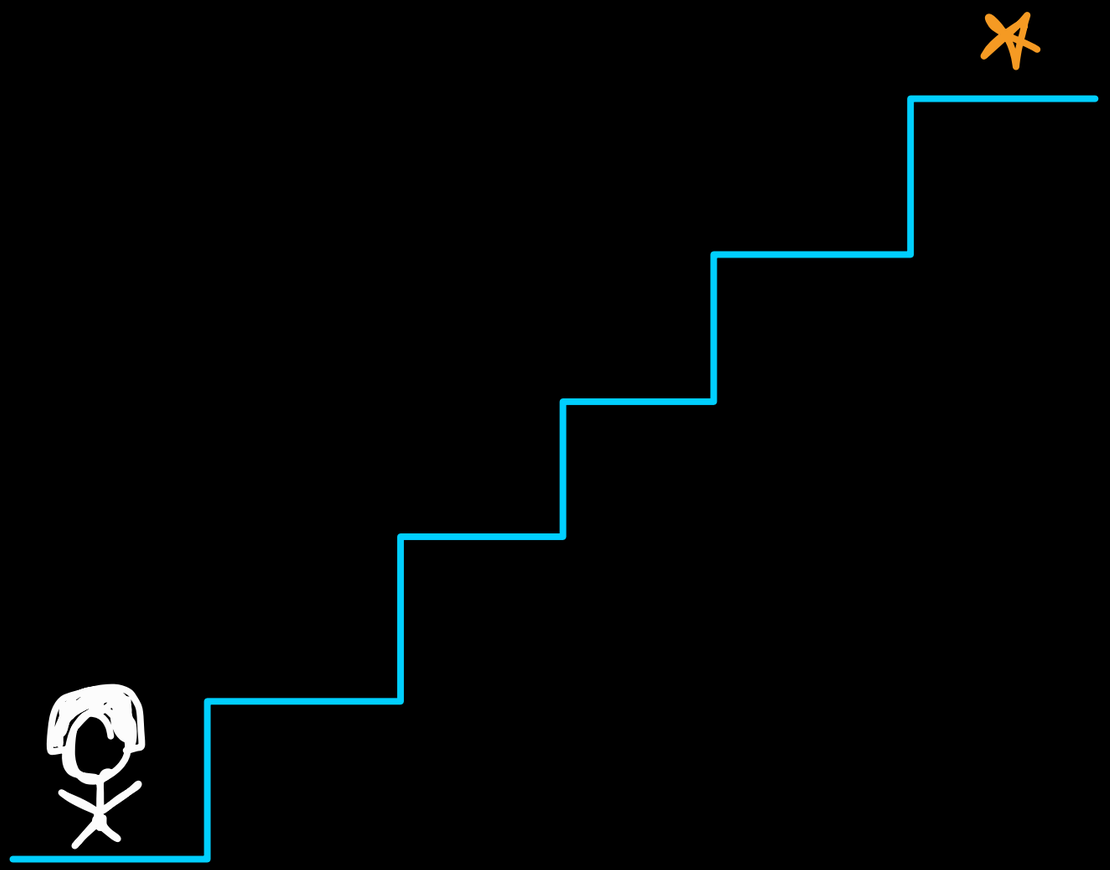



3
fibo(4)
2
1
fibo(3)
fibo(2)
1
1
1
0
fibo(2)
fibo(1)
fibo(1)
fibo(0)
1
0
fibo(1)
fibo(0)


main
call
stack

Ques: Ways to reach the n'th stair (max 2 jumps)

n = 5



1 1 1 1 1

1 1 1 2

1 1 2 1

1 2 1 1

1 2 2

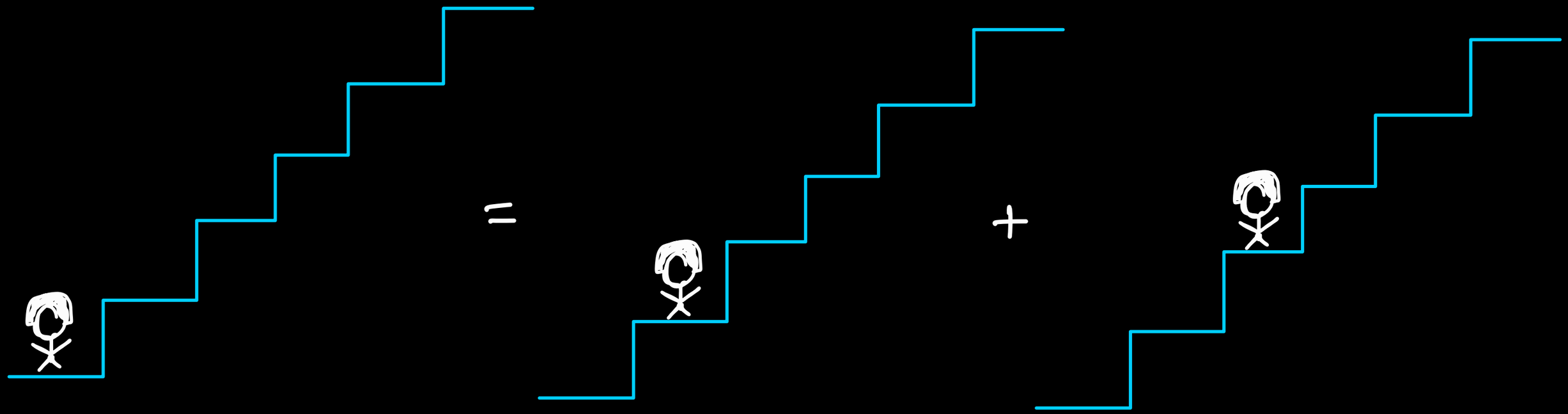
2 1 1 1

2 1 2

2 2 1

8 ways

Ques: Ways to reach the n'th stair



stair(n) = stair(n-1) + stair(n-2)

stair(1) = 1 , stair(2) = 2