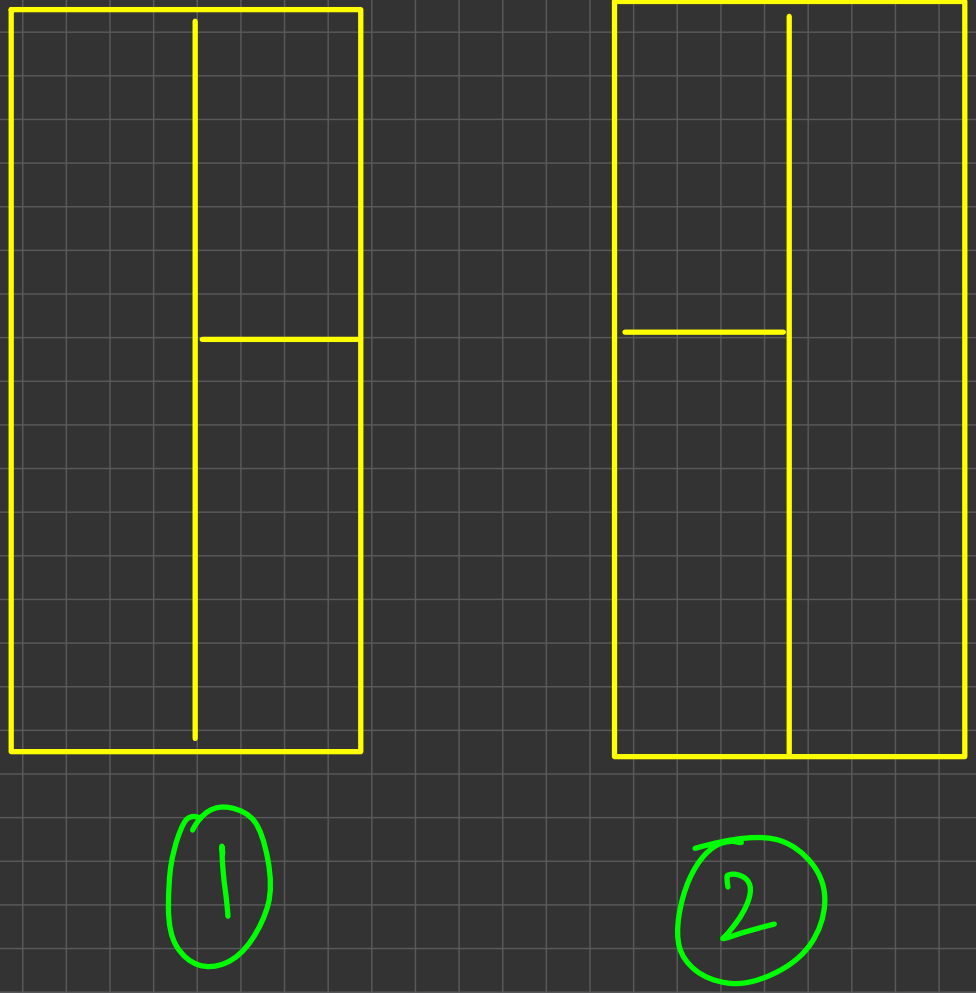

1
2

$1 \leq t \leq 100$

$1 \leq n \leq 10^6$

10^8

$O(t \cdot n \log n)$

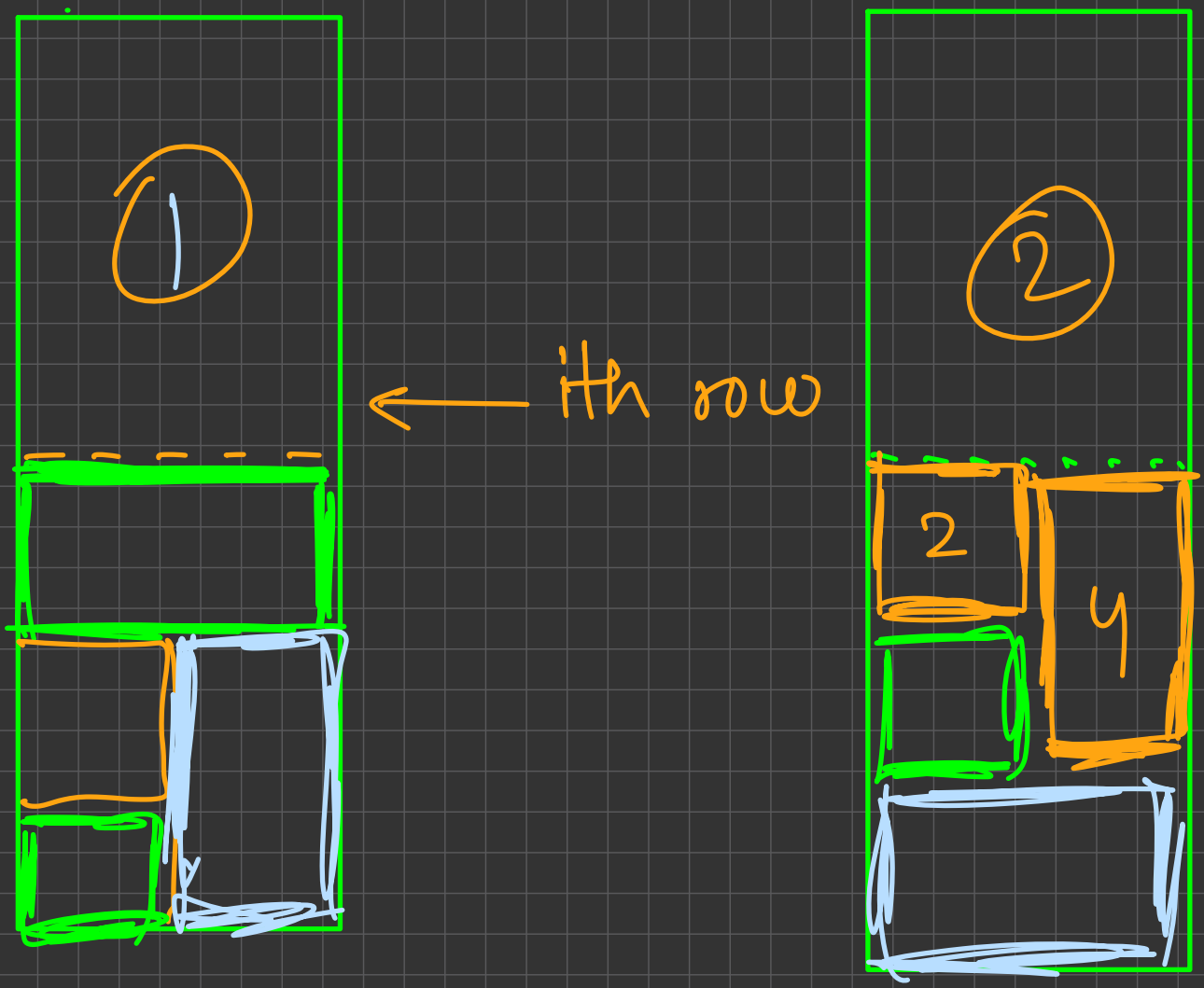
$100 \cdot 10^6 \cdot 20$

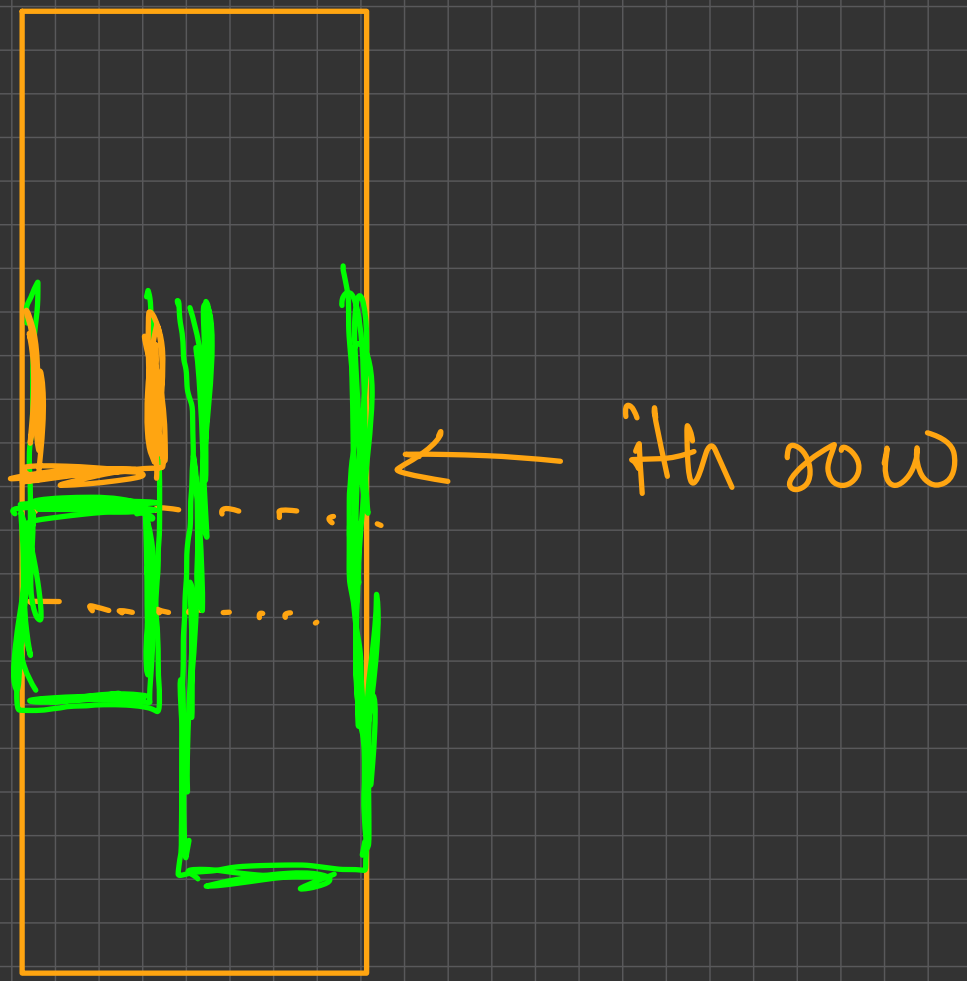
$O(t \cdot n)$

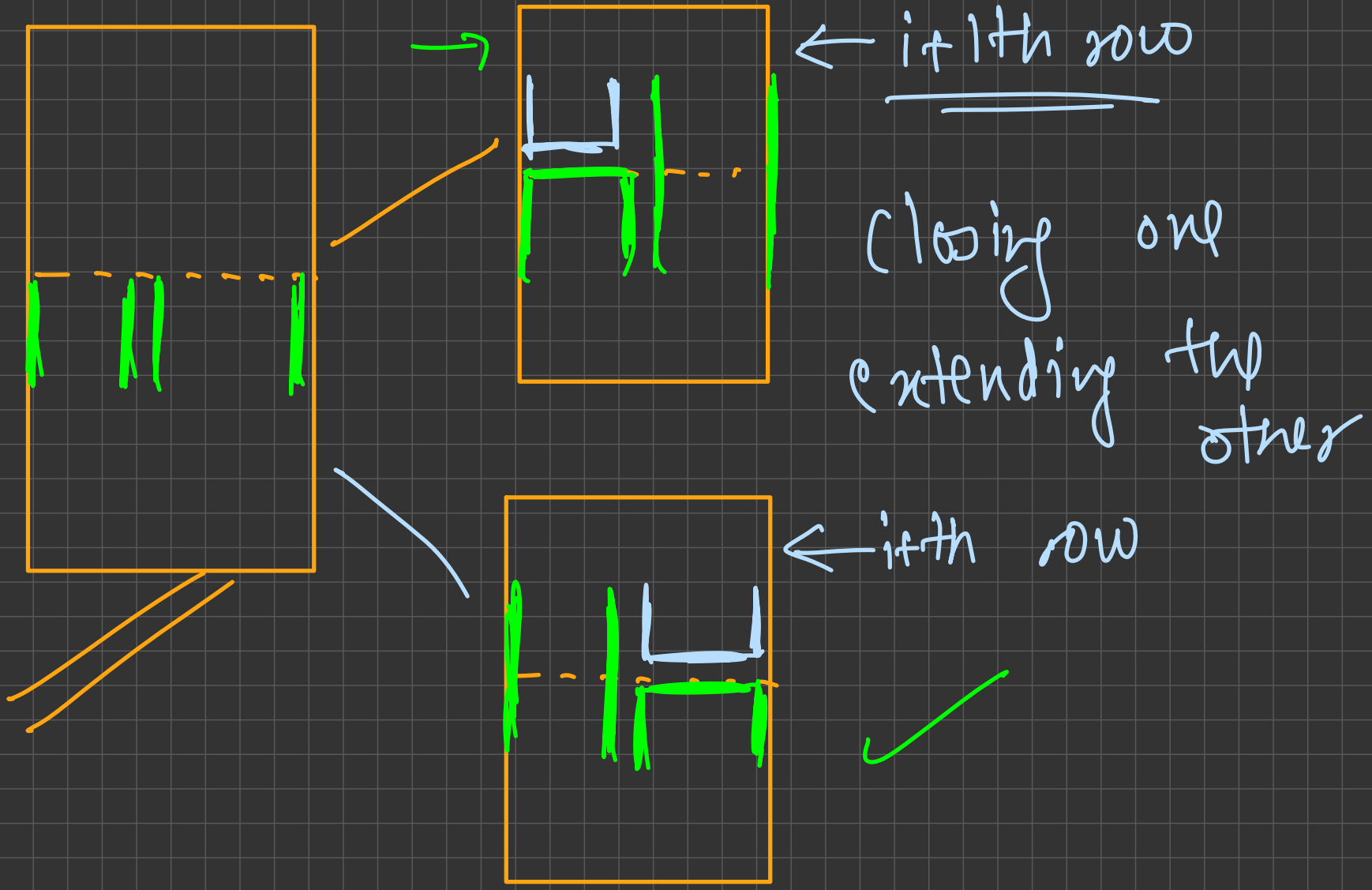
$100 \cdot 10^6$

$3 \cdot t \cdot n$

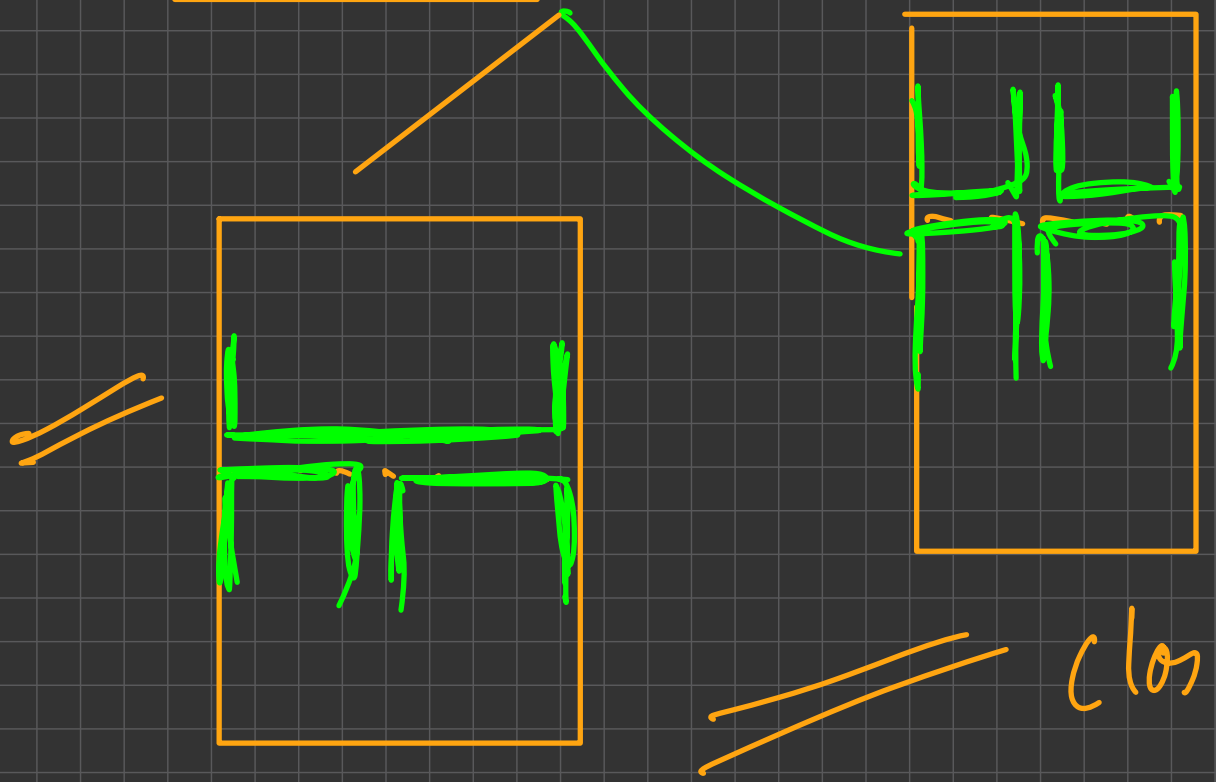
$5 \cdot t \cdot n$

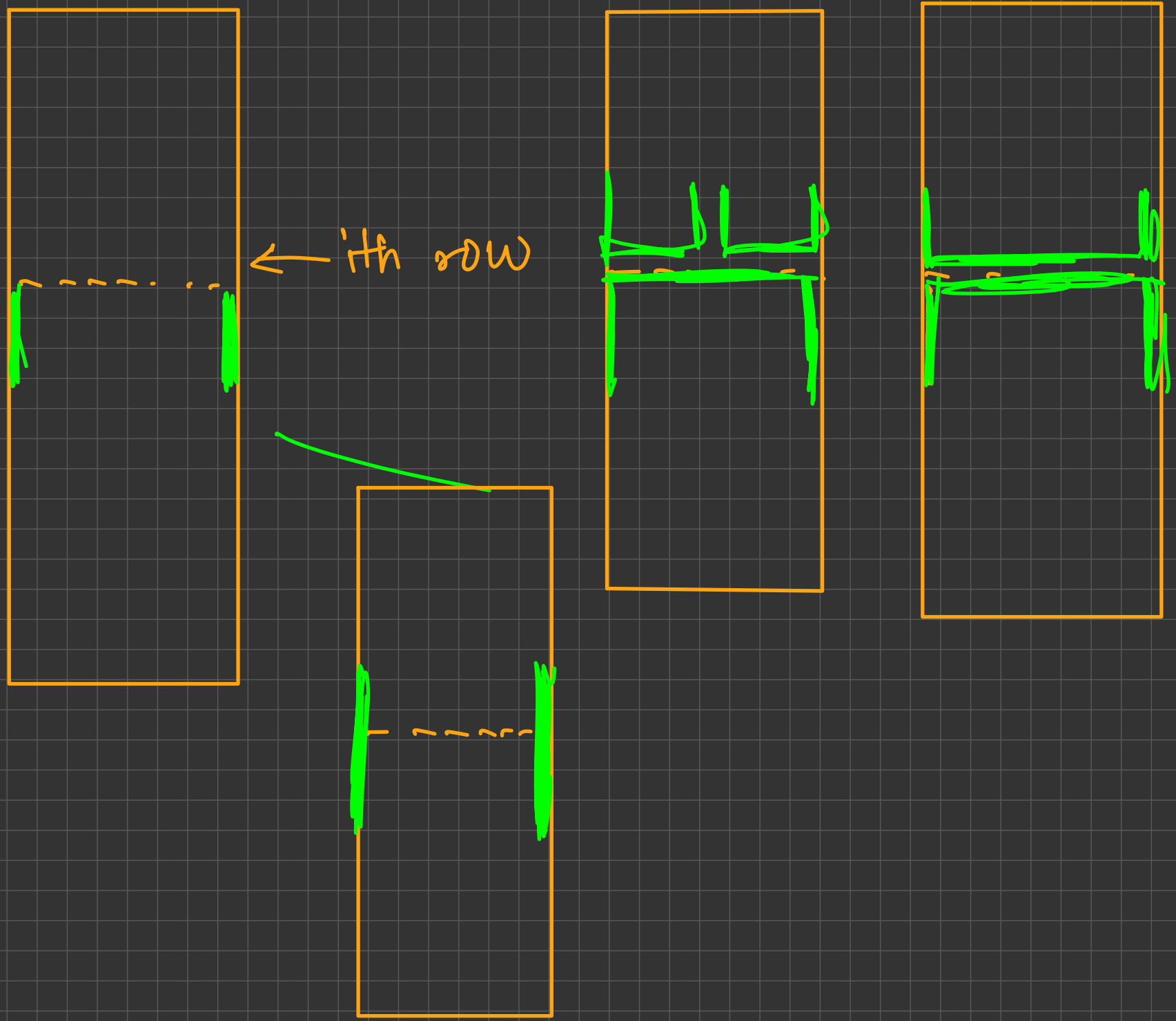

1
2
ith row
2
4

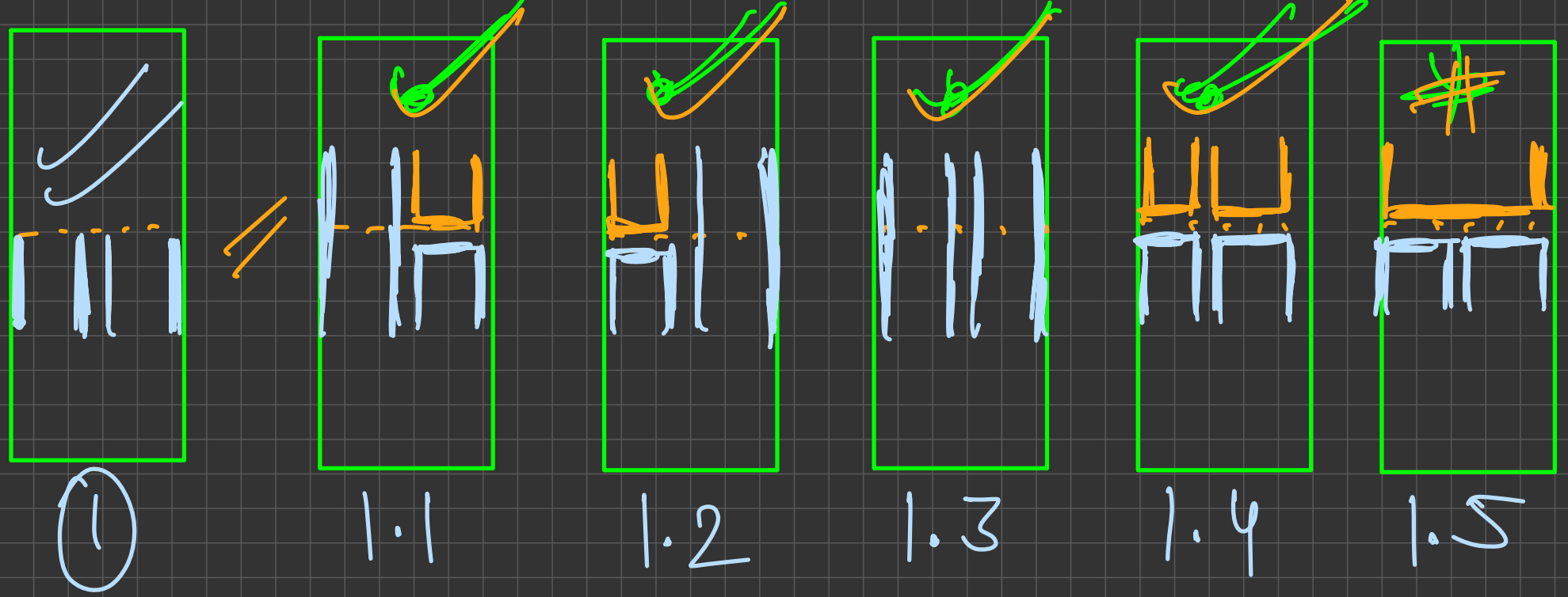

ith row

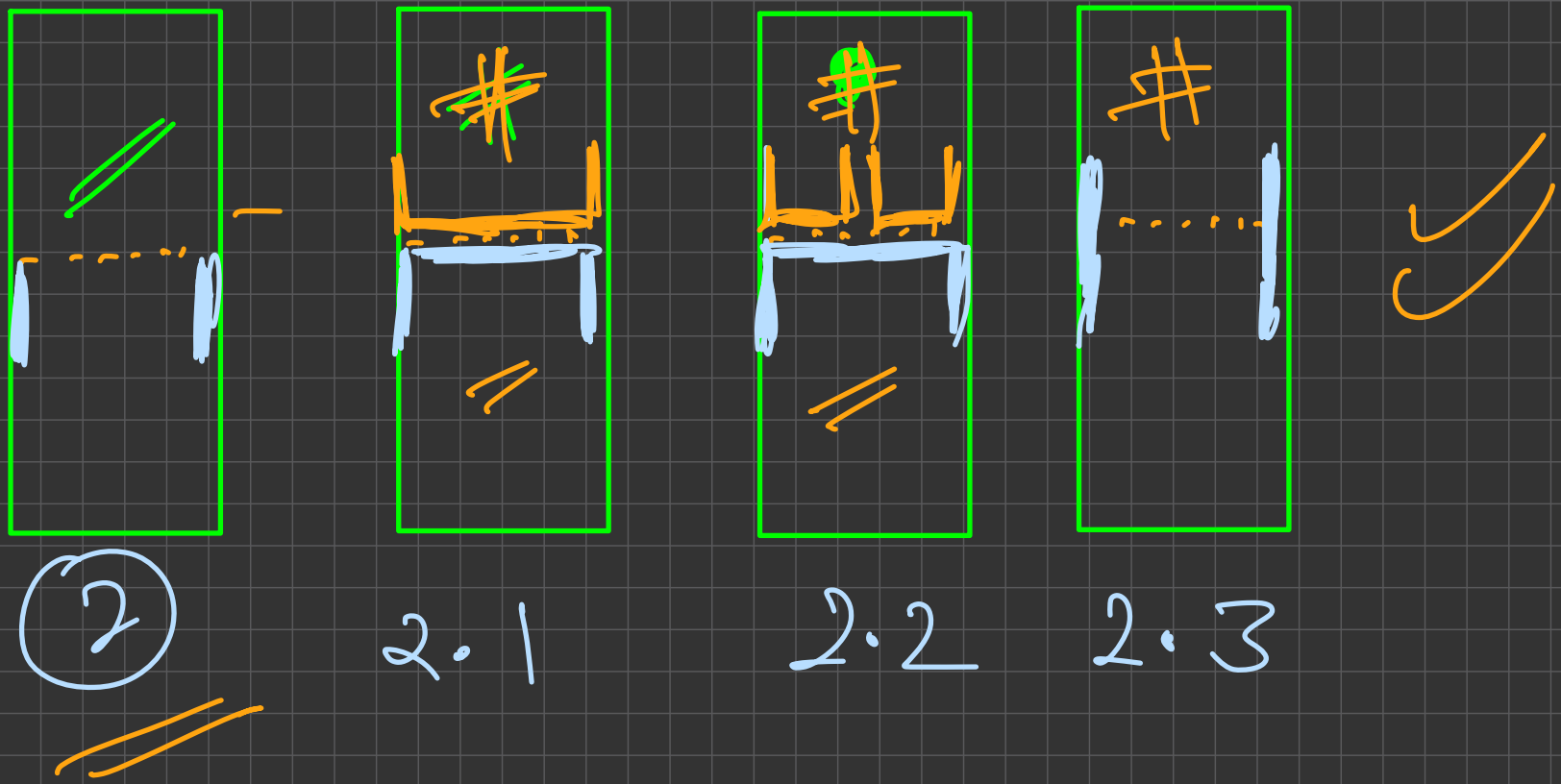

i+1th row
closing one
extending the
other
i+th row


← i+th row
① extension of both


②
← i+th row
= closed both


ith row


①
1.1
1.2
1.3
1.4
1.5


②
2.1
2.2
2.3

dp[i][0] = no. of ways to fill the grid from ith row to n-1 th row such that there is a horizontal block tying to extend from the i-1th row

dp[i][1]

=

transitions :

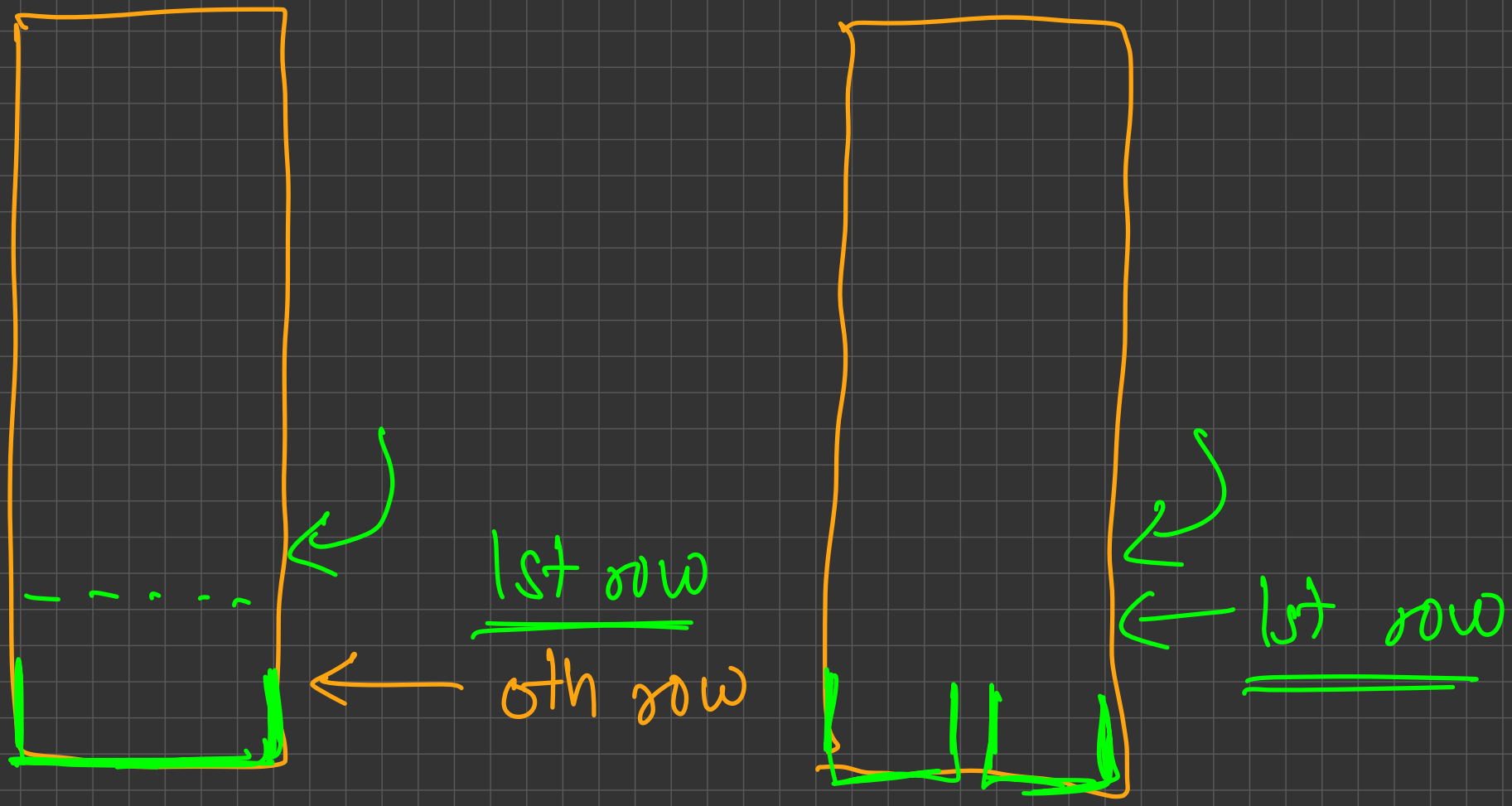
$$dp[i][0] = 2 \cdot dp[i+1][0] + dp[i+1][1]$$

$$dp[i][1] = 4 \cdot dp[i+1][1] + dp[i+1][0]$$

$dp(n)(0) = 1$

$dp(n)(1) = 1$

Base cases



$$(dp(1)(0) + dp(1)(1))$$

final subproblem

Time Complexity :

of states x avg T.T.

$2n$ $O(1)$

$O(n)$ $O(1)$

$O(n)$

$O(n)$

Actual T.C

O(t.n)

Space Complexity :

O(n)