$$\frac{k!}{(k-2)!} = \frac{k \times (k-1) \times (k-2)!}{(k-2)!} \quad {}^{k}P_2$$

Paint Fence.

k-color. Same / Different

1	2	3	4
R, G, B (3)	RR GG BB k 3 (k)	6	18
R, G, B (3)	RG, RB, GB, GR, BR, BG (6) k(k-1) 9	18	48

18 + 48 = 66

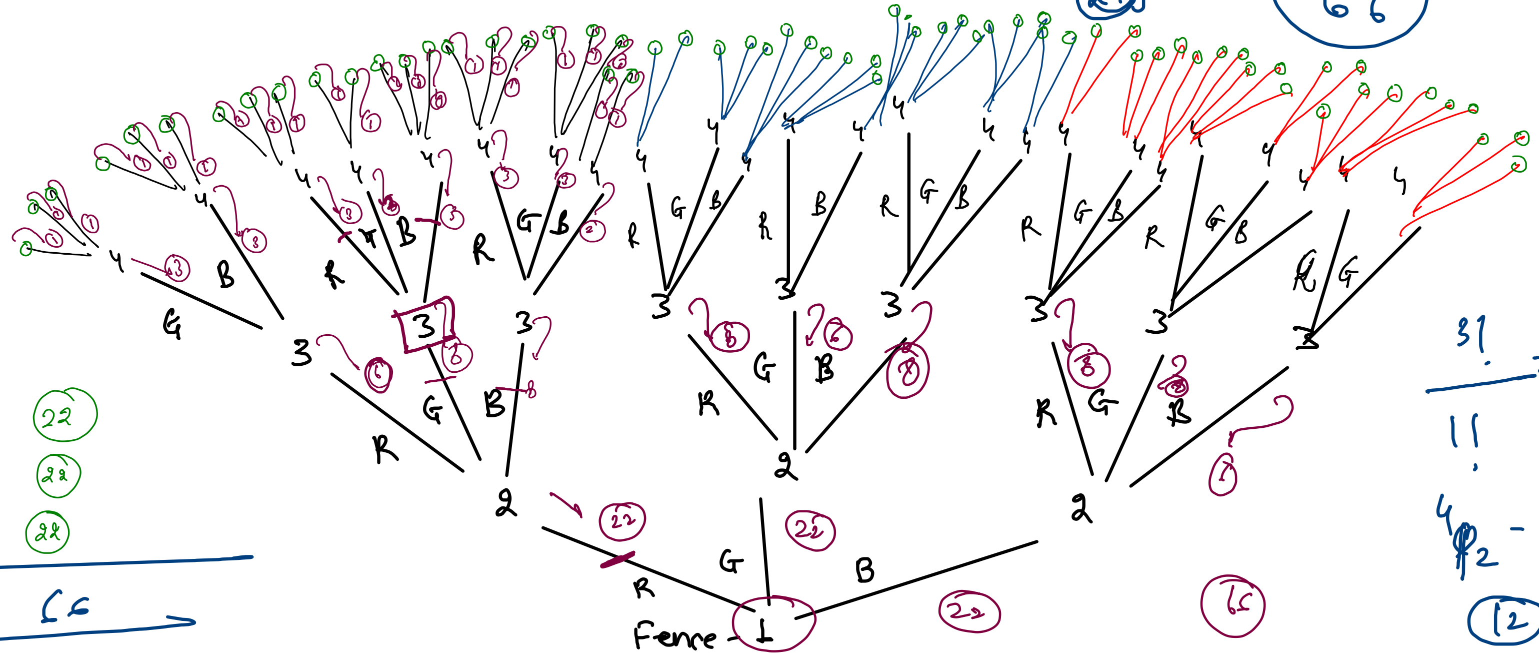
k = 3

RR } → 2
GG } → 2
BB } → 2

$3 \times (k-1)$

RG, RB, GB, GR, BR, BG → 2

$3P_2$



22
22
22

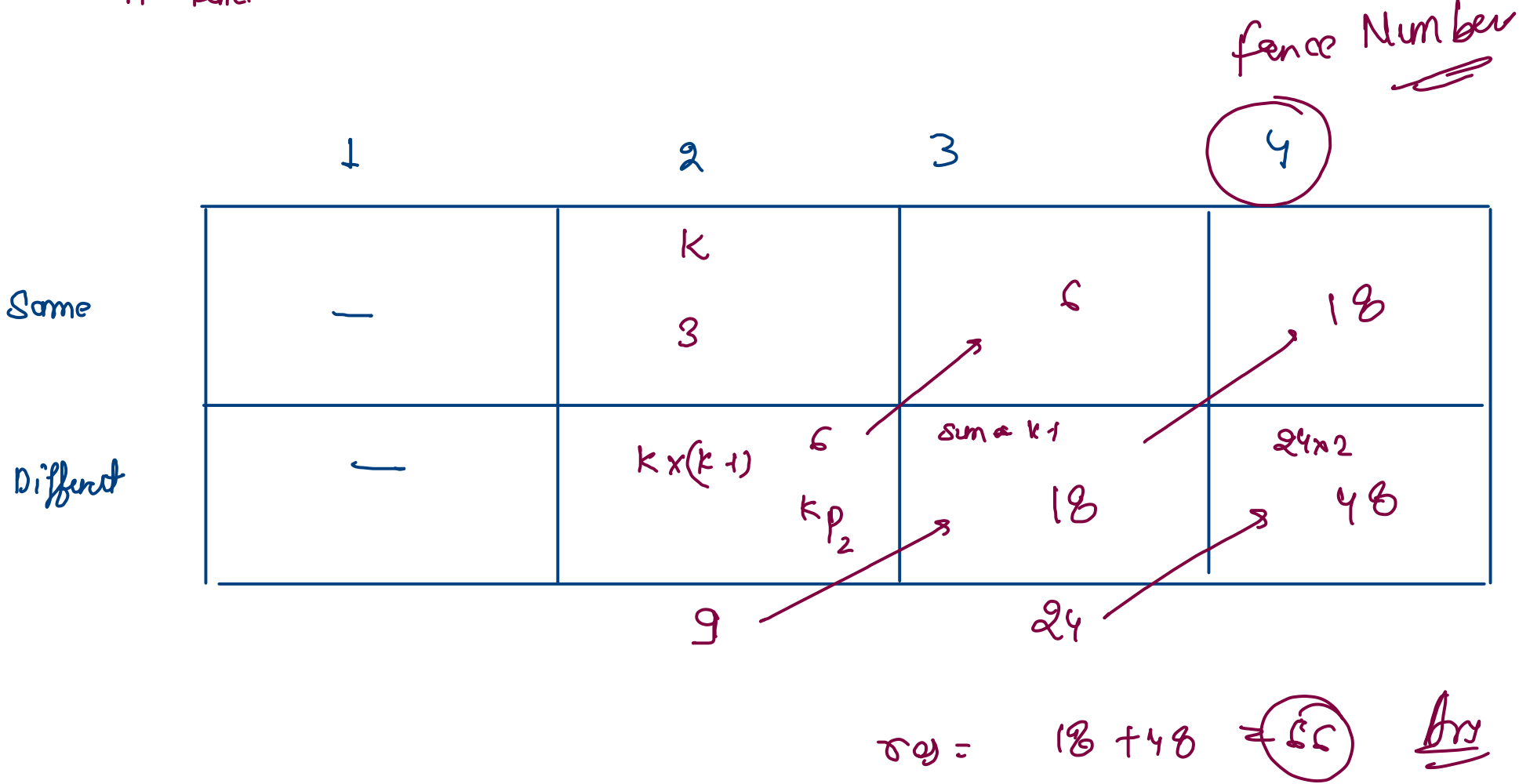
66

$\frac{3!}{1!} = 6$

${}^{4}P_2 = \frac{4!}{2!}$ = 12

k - colour $k=3$

n - fence size $n=4$



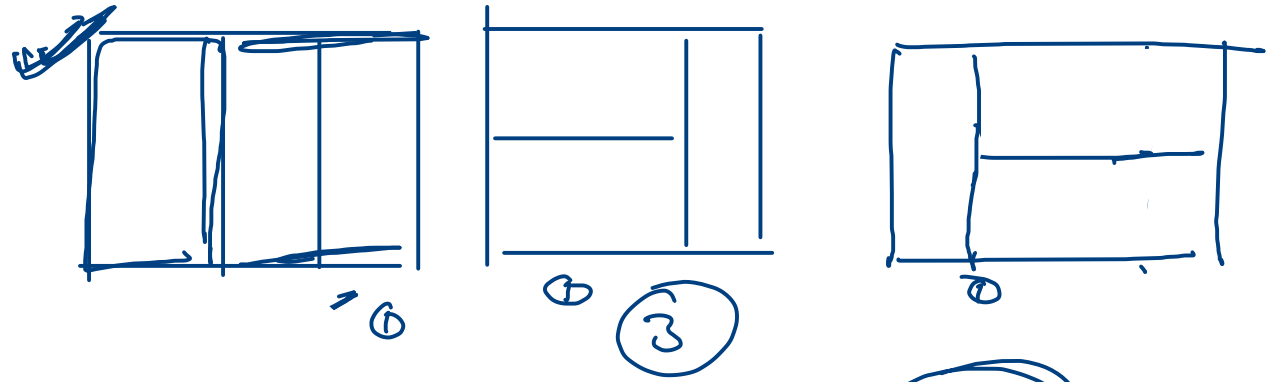
ans = 18 + 48 = 66 Ans

Tiling 2 * 1

n = 3

Board — 2 * n

Tile → 2 * 1



1 x y x + y

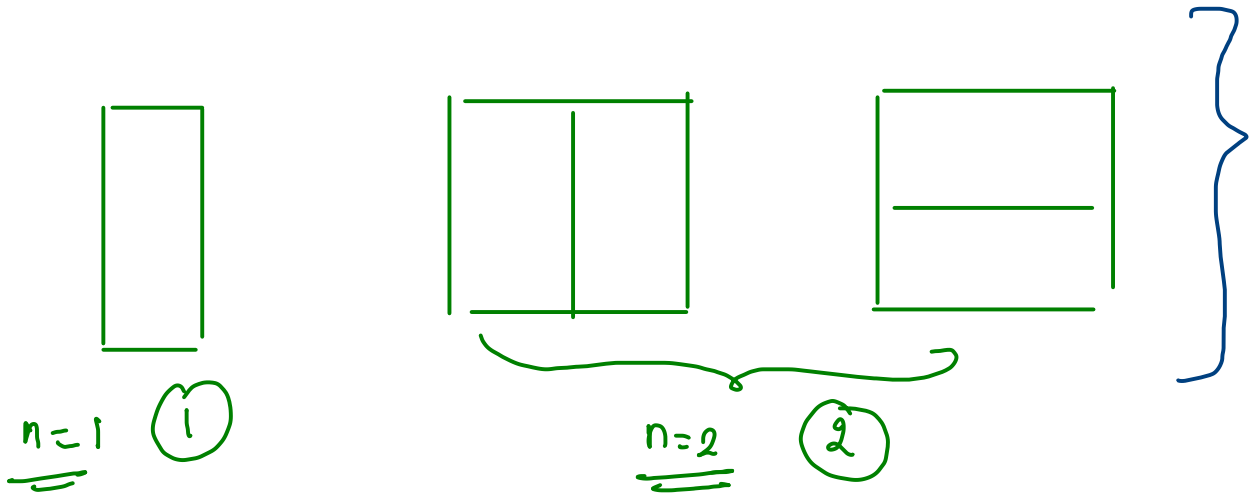
x x y

Vertical arrange → → (n-1)

Horizont arrange → (n-2)

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

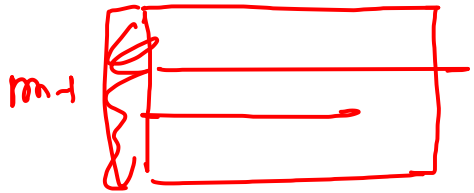
$$f(n) = f(n-1) + f(n-2)$$ } fibbonacci



Base case

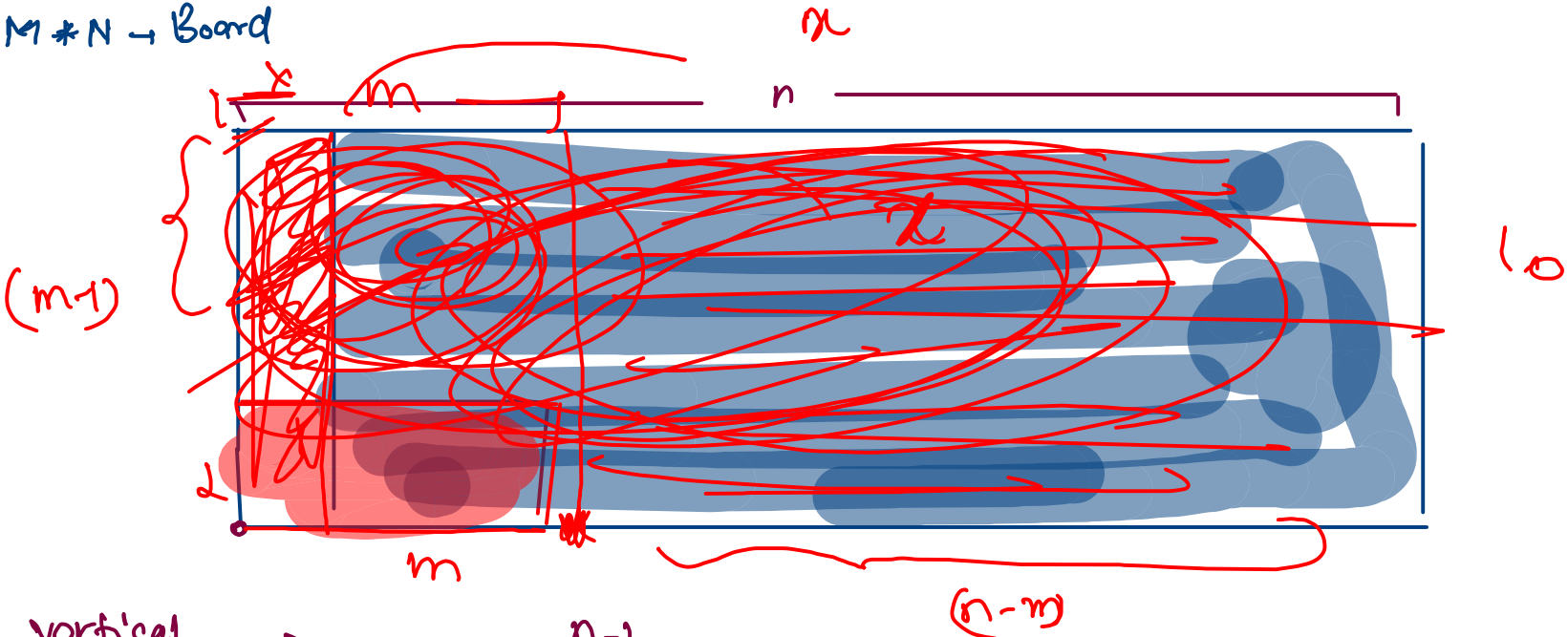
n => length n →	1	2	3	4	5	6	7
	1	2	3	5	8	13	21

Tiling M*1



M*1 tiles.

M*N → Board



Vertical → n-1

Horizontally → (n-m)

5x1

mxn

mxn

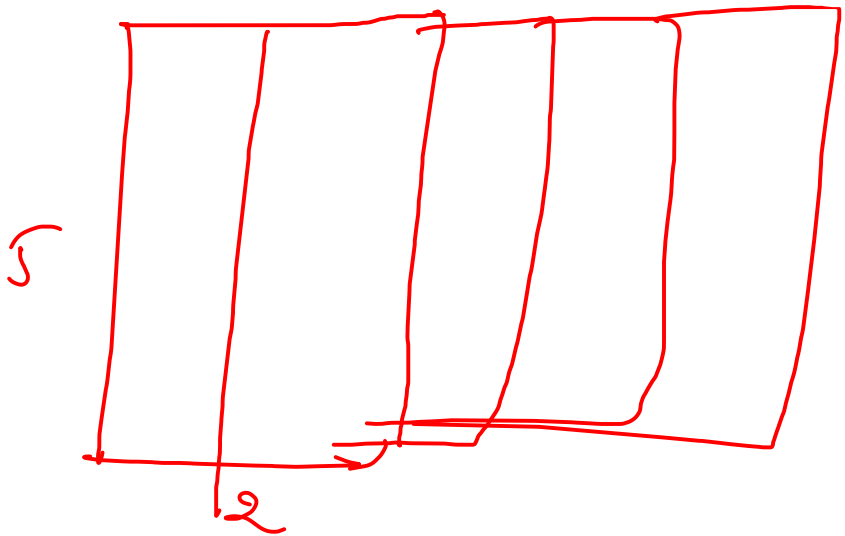
n < m

5x2

mxm

5x3

$f(n) = f(n-1) + f(n-m)$

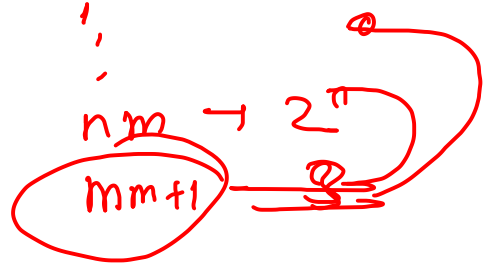


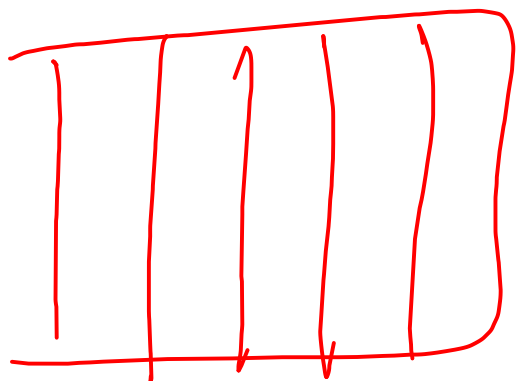
$n_1 \to 1$

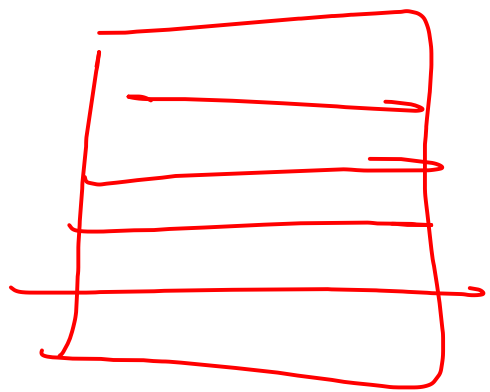
$n_2 \to 1$

$n_3 \to 1$

$n_m \to 2^n$

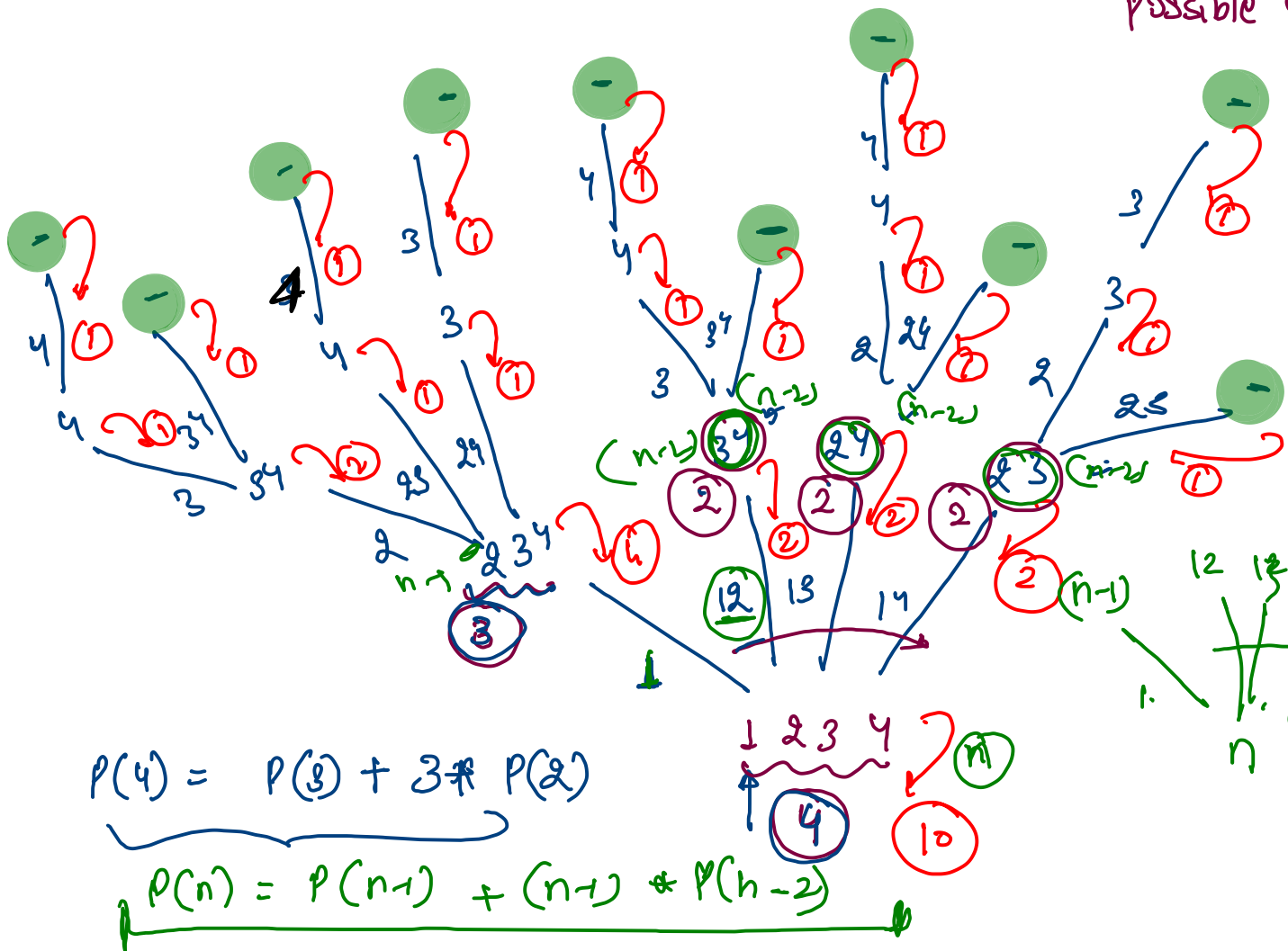






Friends Pairing →

→ Total No. of possible ways.



1-2-3-4

1-2-34

1-23-4

1-24-3

12-3-4

12-34

13-2-4

13-24

14-2-3

14-23

1 → (1) — (1)

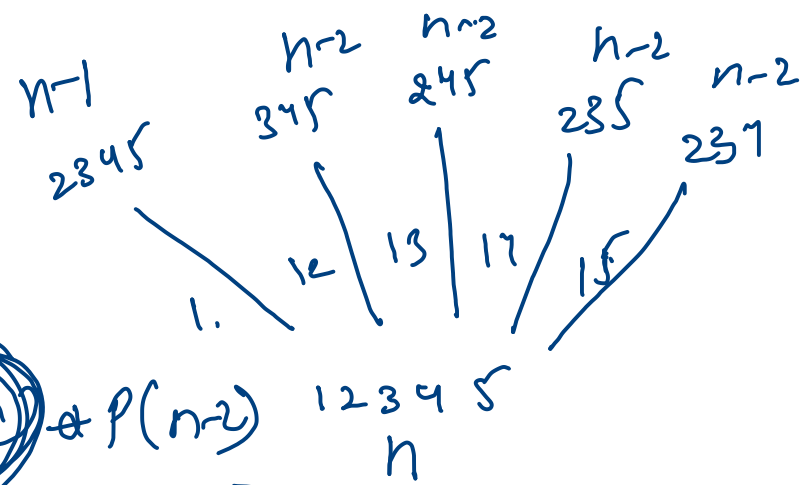
2 → 1-2, 12 (2)

$P(n) = P(n-1) + (n-1) * P(n-2)$

$P(3) = P(2) + 2 * P(1)$

3 → 2 + 2&1 = (4)

4 → 4 + 2&3 = (10)



$f(n) = P(n-1) + (n-1) * P(n-2)$