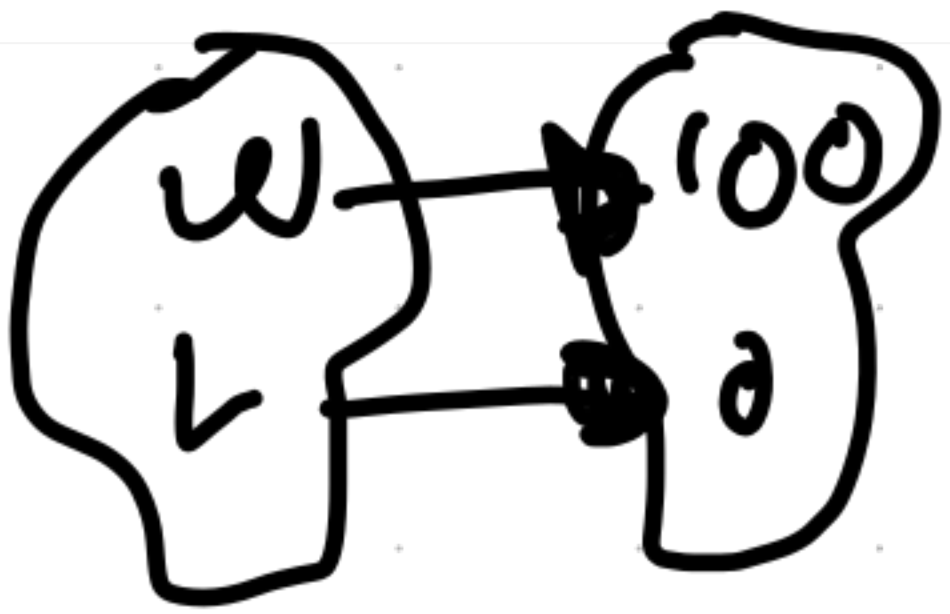
$$E[X] = \sum_{x_i \in X} p(x_i)\, X_i$$

x is a r.v.

$X : \Omega \to \mathbb{R}$ $\quad = .6 \cdot 100 + .4 \cdot 0 = 60$



$p(W) = .6 \qquad X_i = 100$

$p(L) = .4 \qquad x_i = 0$

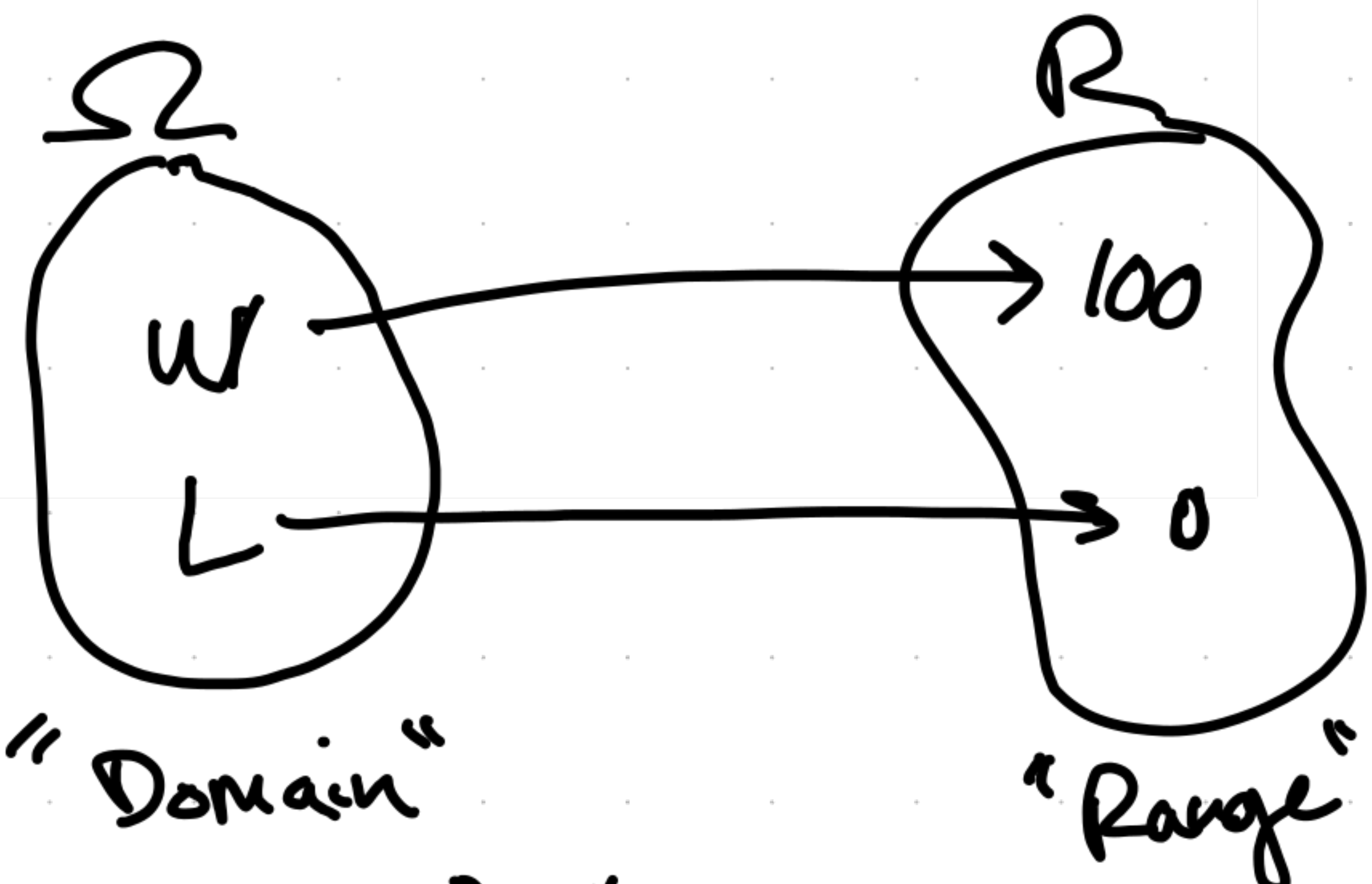
r.v. X is a function

$X: \Omega \longrightarrow \mathbb{R}$

$X_i = L \in \Omega$

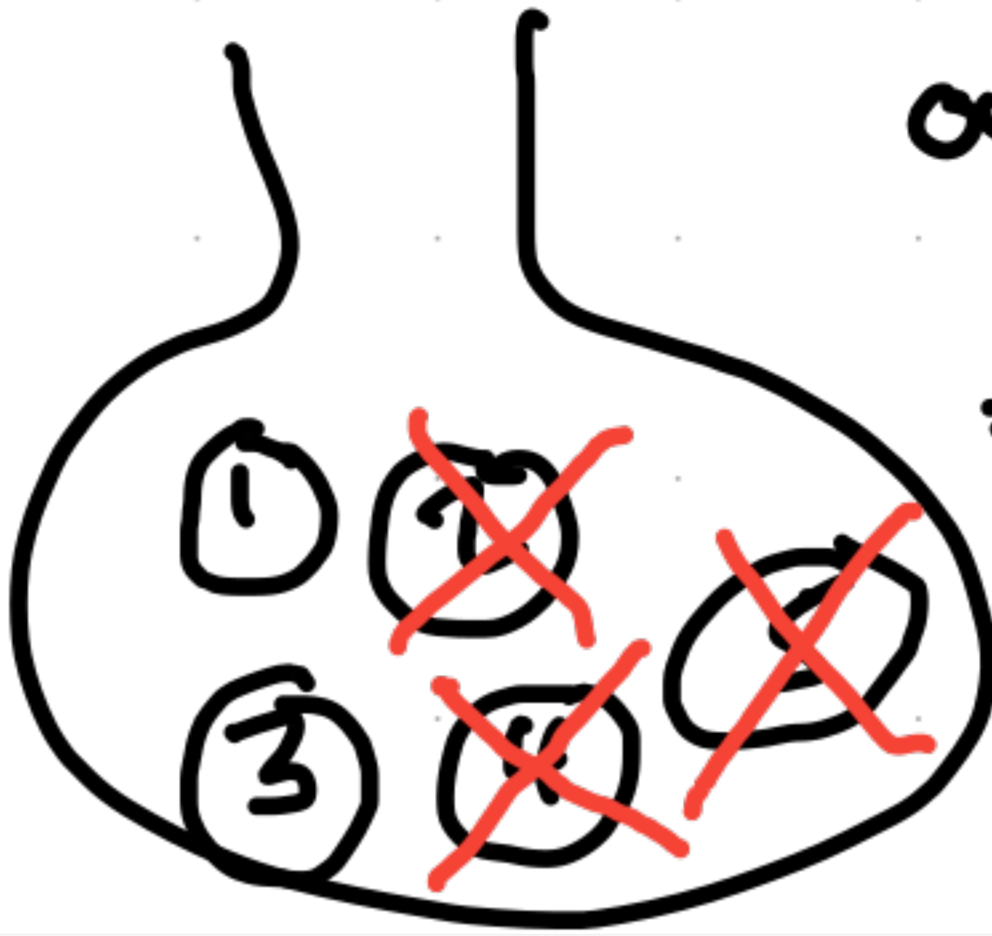
or

$X_i = W \in \Omega$



$P(W) = .6 \quad p(L) = .4$

Pemutations



out 4 2 5 $\neq 524$

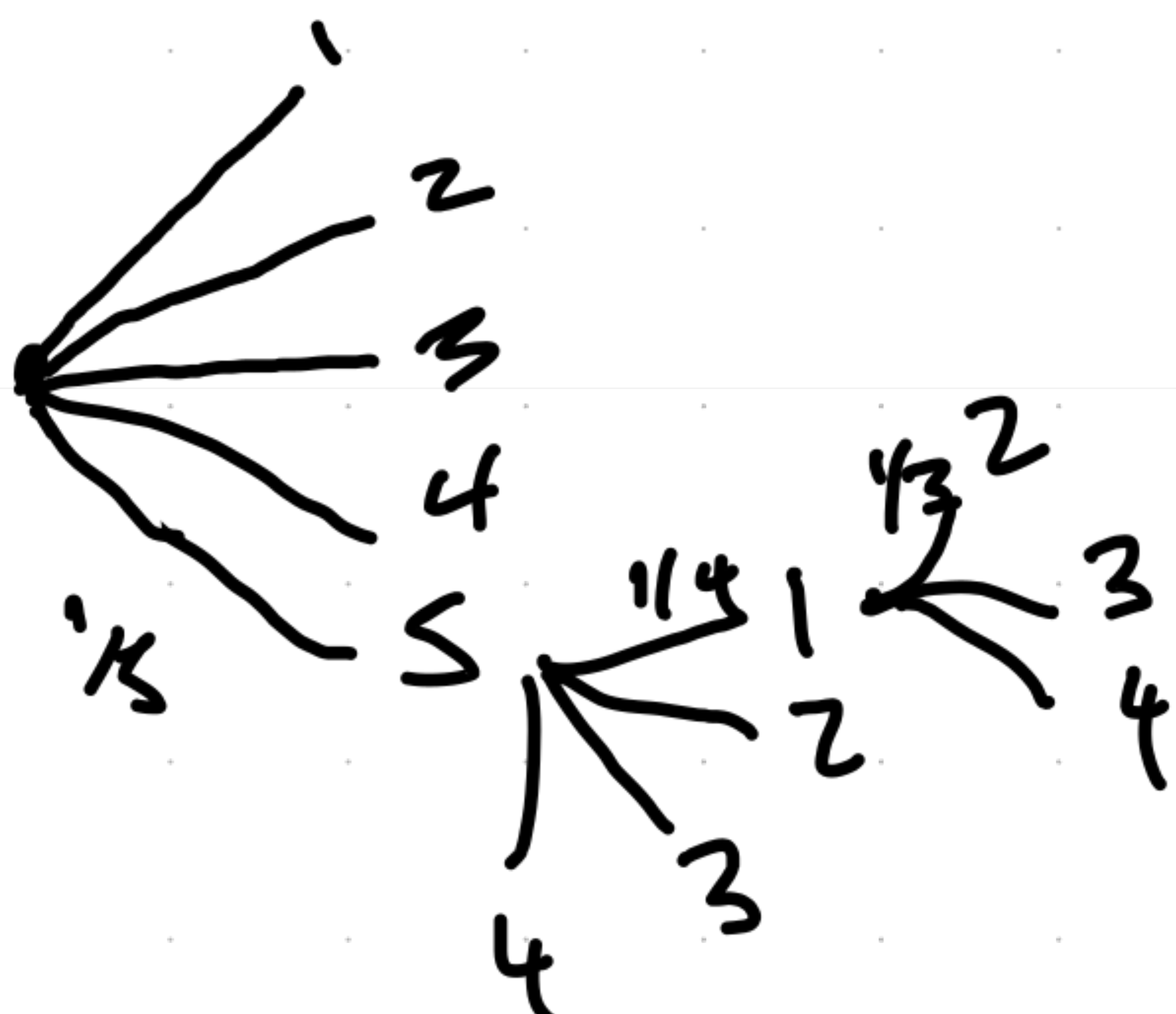
options 5 4 3

How many possible ways are there to draw 3 items from 5? $5 \cdot 4 \cdot 3$

1000 ticket holders

How many different #s can we form?

$$5 \cdot 4 \cdot 3 = 60$$

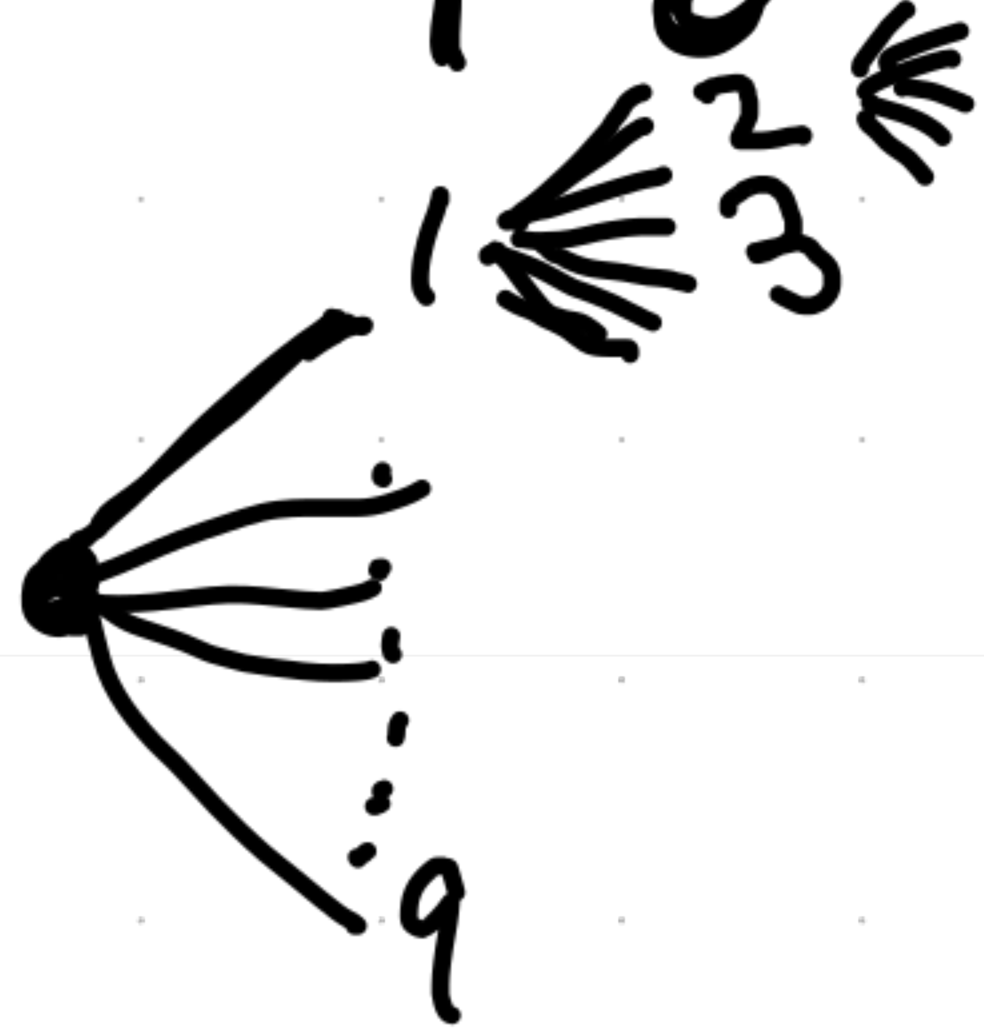


$$\left.\begin{array}{c}123\\234\\512\\\vdots\end{array}\right]\ 5\cdot 4\cdot 3$$

of permutations

1 2 3 4 5
6 7 8
9

$9 \cdot 8 \cdot 7$



$9 \cdot 8 \cdot 7$

"a permutation"

123
124
125
126
127
128
129

7

132
134
135....

7

~~total~~ of
n things (e.g. 9 pool balls)
choose
r things (e.g. 3 pool balls)

$$n(n-1)(n-2)\cdots(n-r)$$

9 things, choose 4 of them...

$$n(n-1)(n-2)(n-3)$$

$$9 \cdot 8 \cdot 7 \cdot 6$$

$(n-r+1)$

$9-4+1=6$

$5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$

5 items, choose 3, order matters

$5 \cdot 4 \cdot 3$

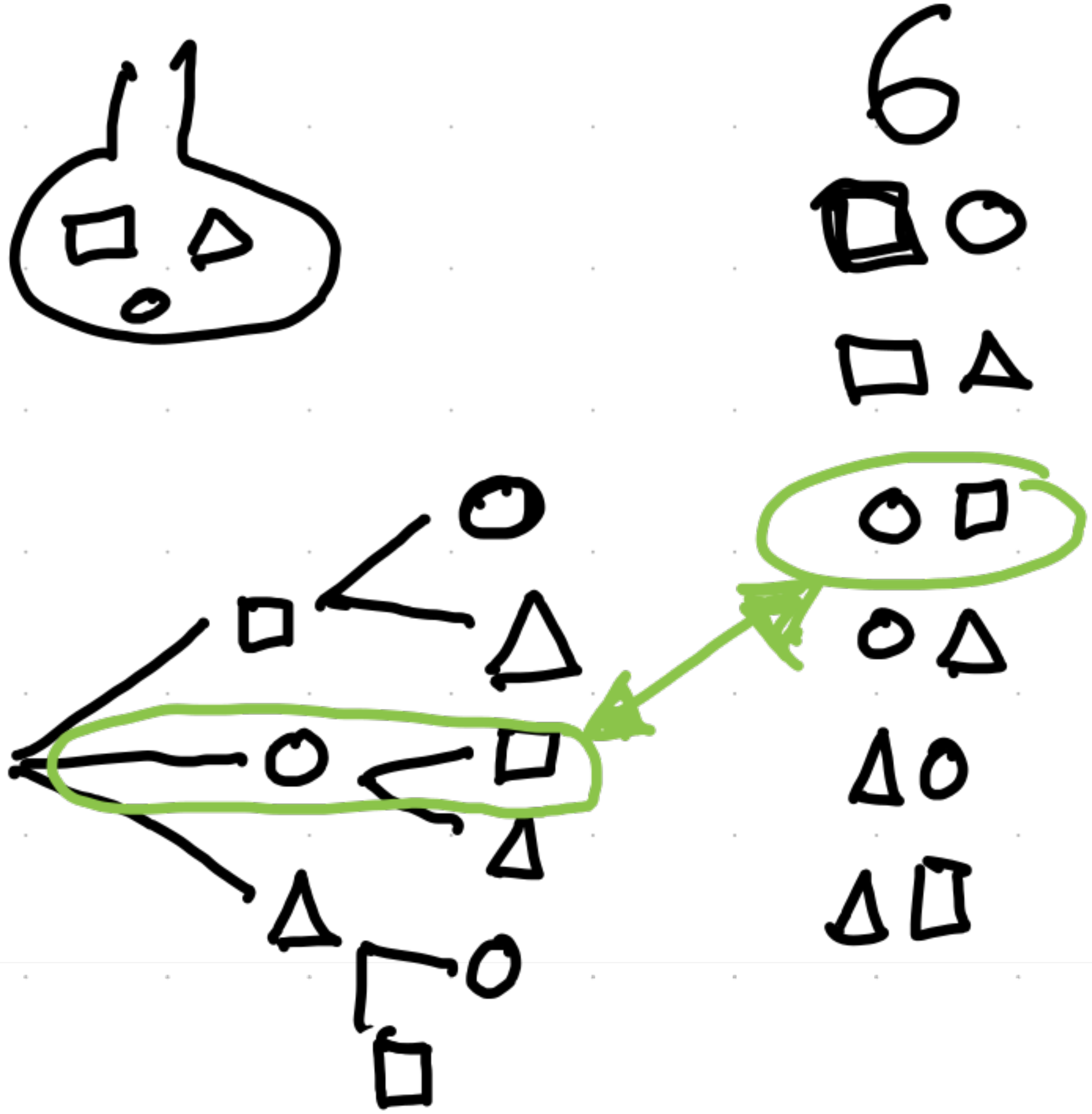
$5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$

$\boxed{{}_5P_3} = \frac{5!}{2!} = \frac{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{2 \cdot 1} = 5 \cdot 4 \cdot 3$

$${}_nP_r = \frac{n!}{(n-r!)}$$

$${}_9P_2 = \frac{9!}{(9-2)!} = \frac{9!}{7!} = 9 \cdot 8$$

$9 \cdot 8$



$$3 \cdot 2 = 6$$

$${}_nP_r = \quad n = 3, \; r = 2$$

$$= \frac{n!}{(n-r)!}$$

$$= \frac{3!}{1!} = \frac{3 \cdot 2 \cdot \cancel{1}}{\cancel{1}}$$