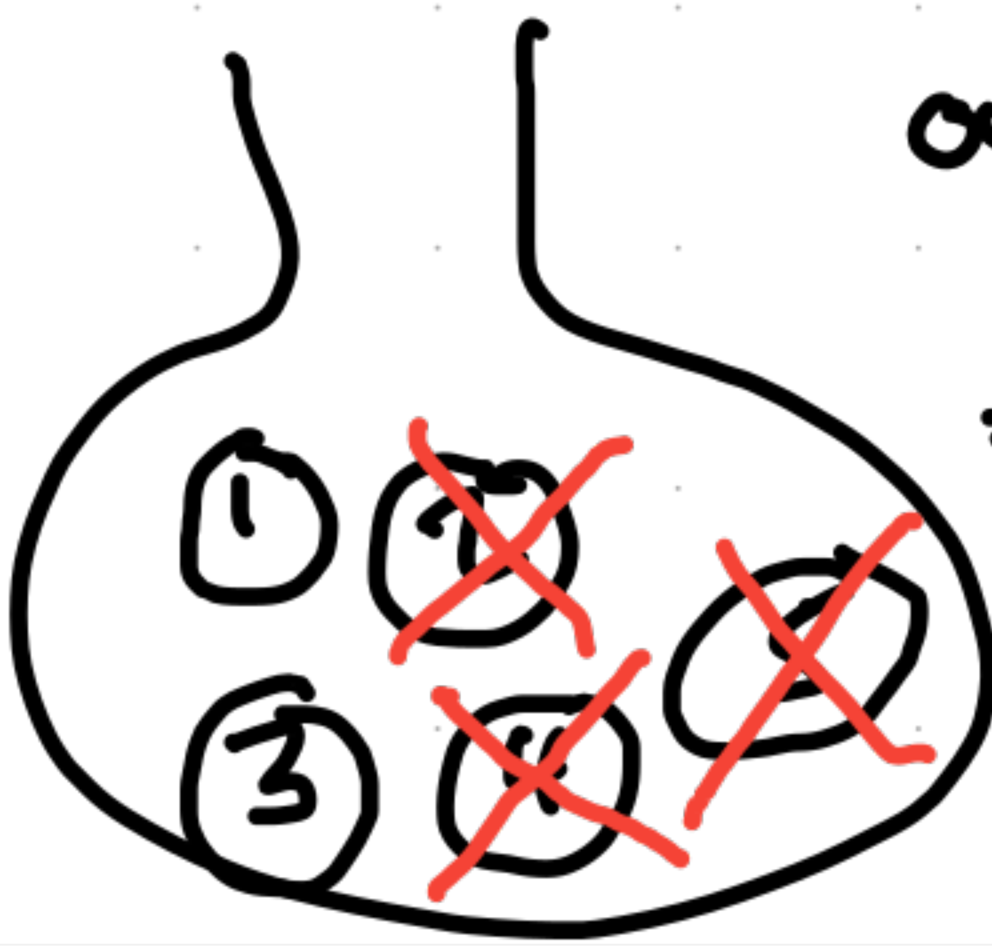
Pemutations



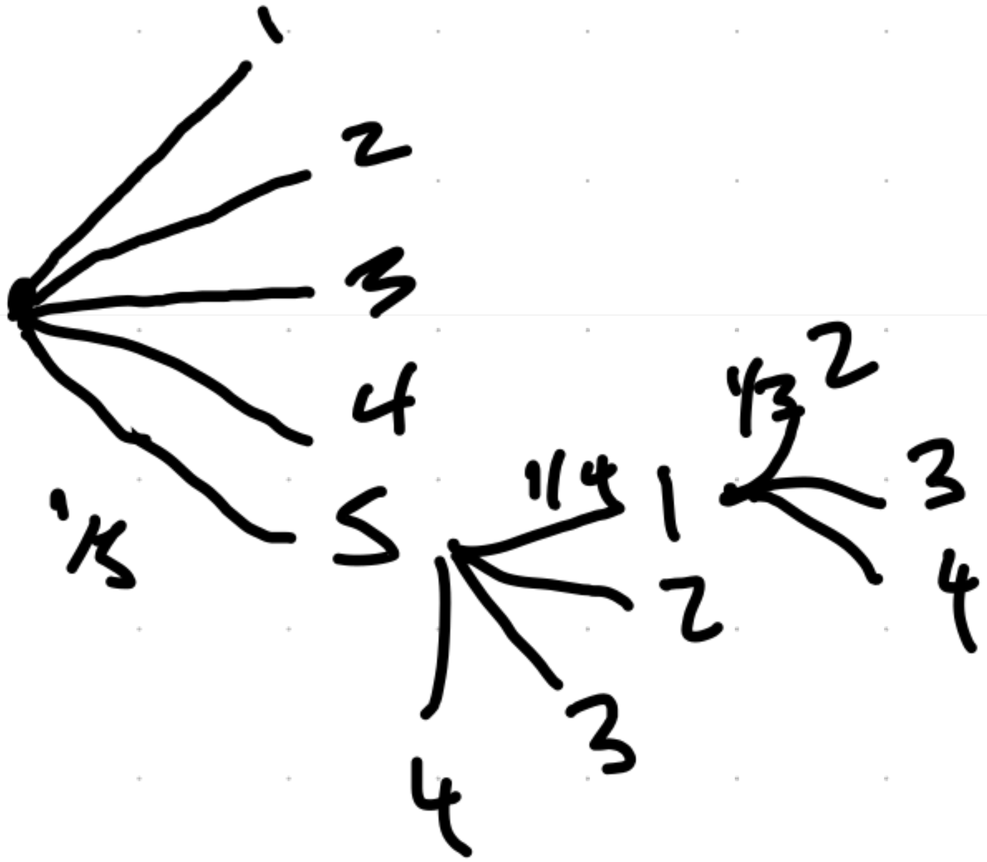
out (4) (2) (5) ≠ 524

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 diffent #5 can be form?

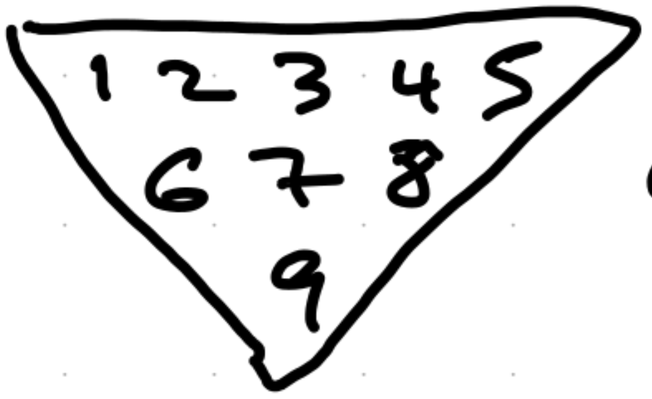


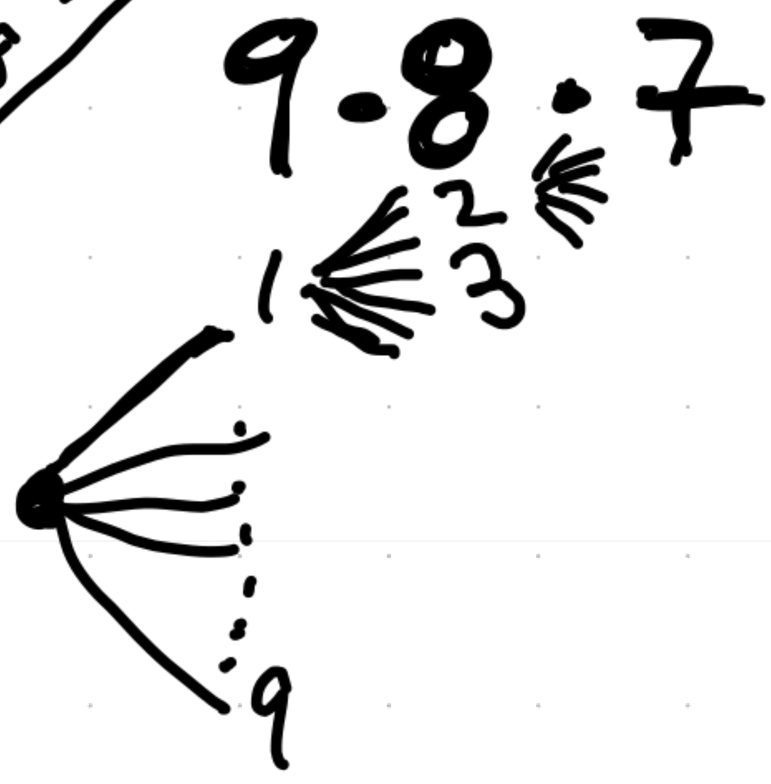
$5 \cdot 4 \cdot 3 = 60$

123
234
512
⋮

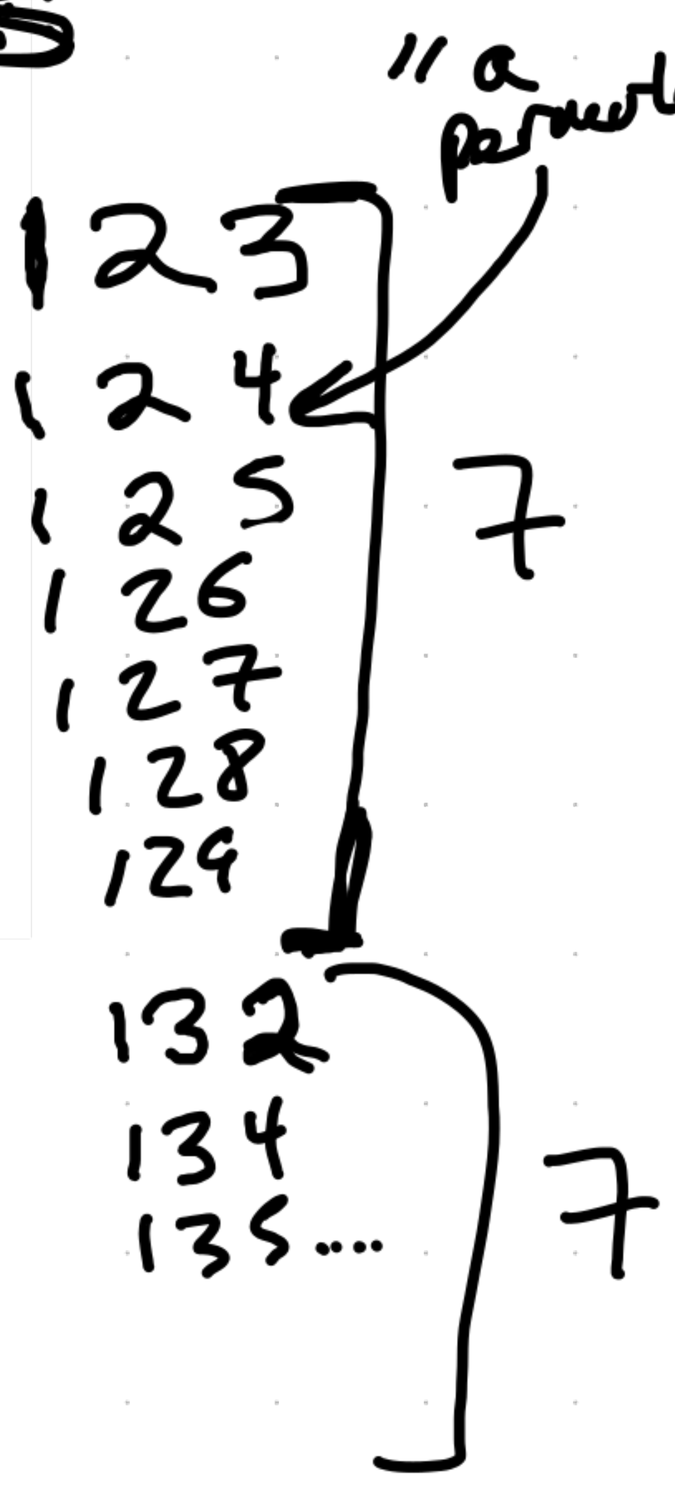
$5 \cdot 4 \cdot 3$

of permutations





9·8·7



n ~~total~~ # of things (e.g. 9 pool balls)

r ~~choose~~ 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

$5 \cdot 4 \cdot 3$ 

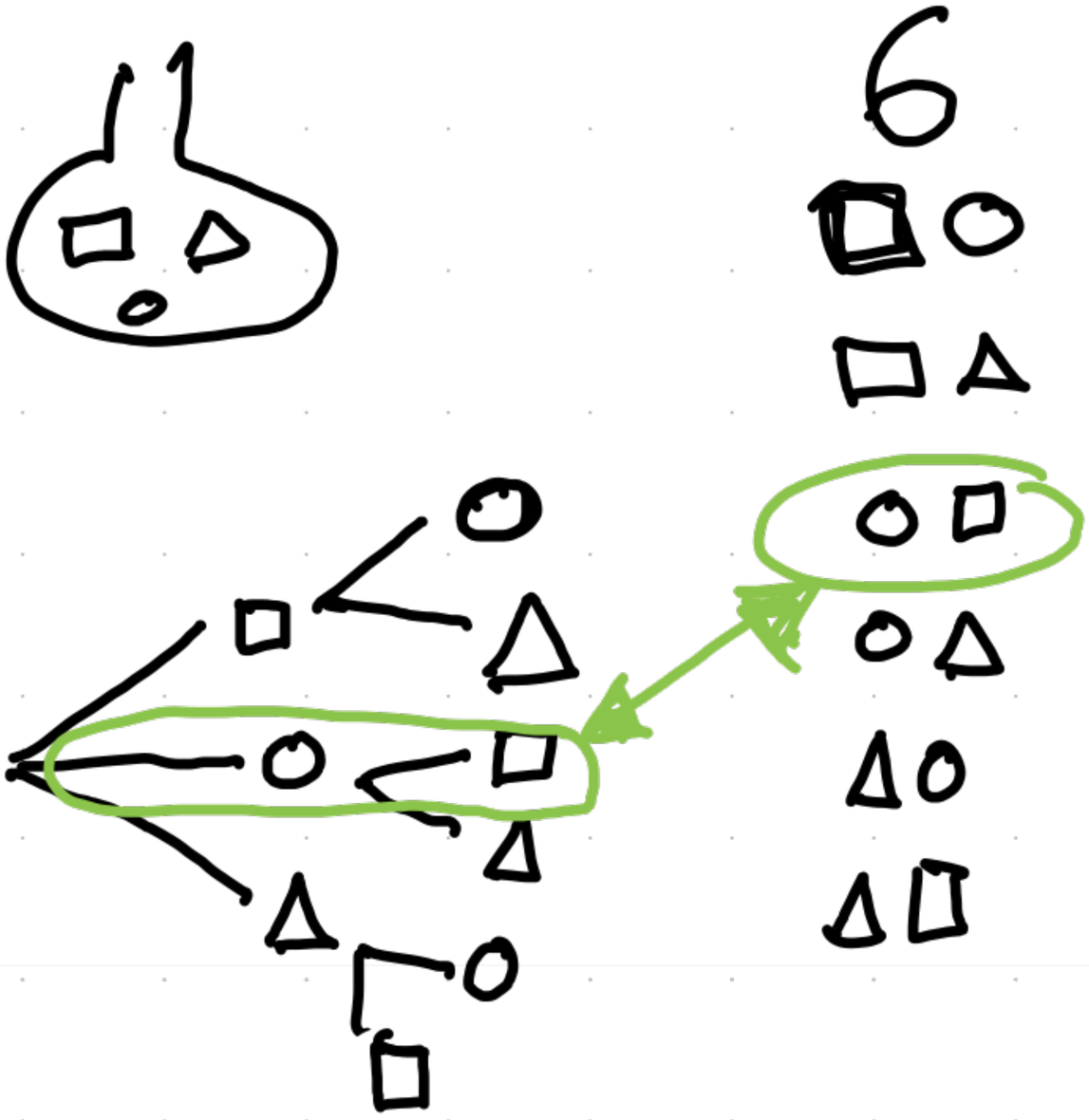
$5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$

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

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

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

$9 \cdot 8$



$$3 \cdot 2 = 6$$

$$n P_r = \begin{matrix} n=3 \\ r=2 \end{matrix}$$

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

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