

# PERMUTATIONS INVOLVING IDENTICAL OBJECTS

- PERMUTATION OF  $n$  OBJECTS WHEN SOME ARE ALIKE.
- THE NUMBER OF PERMUTATIONS OF  $n$  OBJECTS OF WHICH " $a$ " OBJECTS ARE ALIKE, ANOTHER " $b$ " OBJECTS ARE ALIKE, ANOTHER " $c$ " OBJECTS ARE ALIKE AND SO ON IS:

$$\frac{n!}{a!b!c! \dots}$$

EX A BUZZER HAS 3 HOME DESIGNS (MODEL " $a$ ", " $b$ ", " $c$ "). HE HAS SOLD 3 MODEL " $a$ ", 4 " $b$ " AND 2 " $c$ ".

How many ways can he arrange them on the street.

Soln ORDER IS IMPORTANT, SOME OBJECTS ALIKE

TOTAL # OF HOMES IS 9  $\therefore n = 9$

3	MODEL	a	$\therefore a = 3$
4	MODEL	b	$\therefore b = 4$
2	MODEL	c	$\therefore c = 2$

$$\frac{9!}{3!4!2!} = 1260$$

Q How many permutations of the word PARALLEL

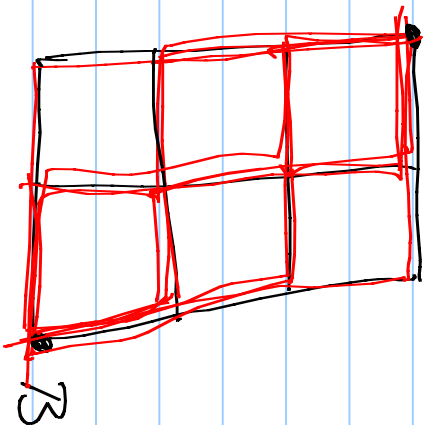
Soln

$$\frac{8!}{2!3!} = 3360$$

PATHWAYS.

DE

A



How many ways

From A to B only

going right and down.

Solve

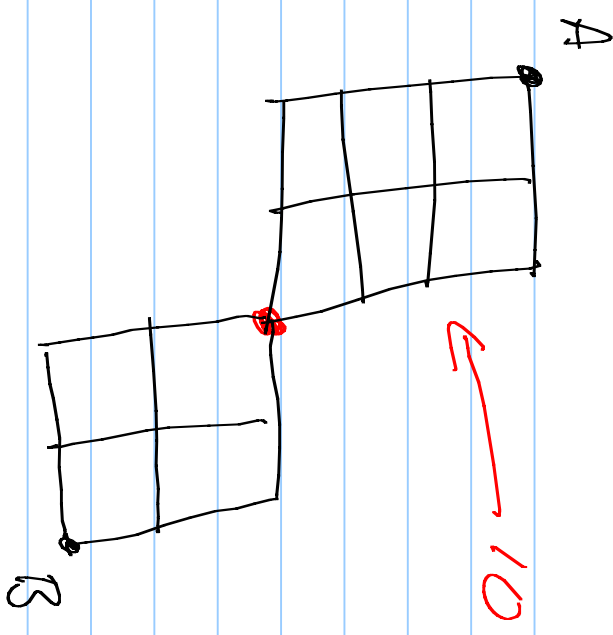
$$n = 5$$

$$\text{RIGHT} = 2$$

$$\text{Down} = 3$$

$$\frac{5!}{2!3!} = 10$$

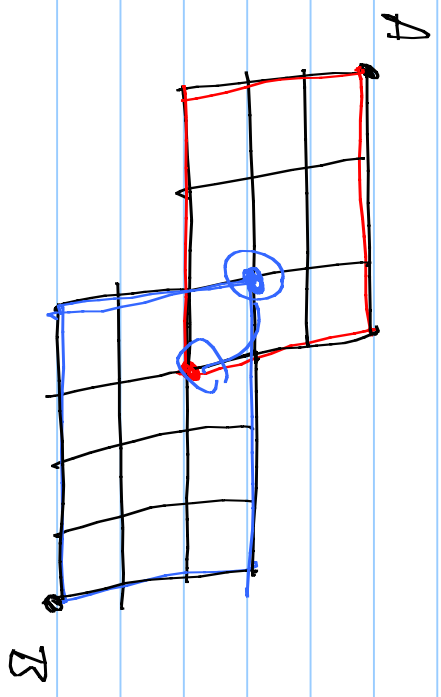
DE



$$\frac{4!}{2!2!} = 6$$

$$10 \times 6 = 60 \text{ ways}$$

DE



$$\frac{6!}{3!3!} \times \frac{7!}{4!3!} \div 2 = 350$$

H/W SECTION 7.3 Pg 49

#1-6