Sec: 2.4 : Permutations with Identical Objects

Ex

5 Math books, 2 science, & 3 English.
Each subject being the same book.

MMMMMSSEEE

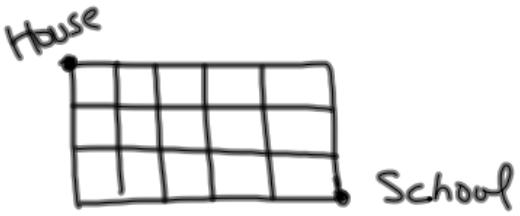
$$P = \frac{n!}{a!b!c!\ \text{etc.}}$$

$\frac{\text{total \#!}}{a!\,b!\,c!}$ → cancelling out repeats

$$\Rightarrow \frac{10!}{5!2!3!} = 2520 \text{ ways}$$

Route Problems

pg. 102 Ex. 3



How many ways can be taken to get to school?

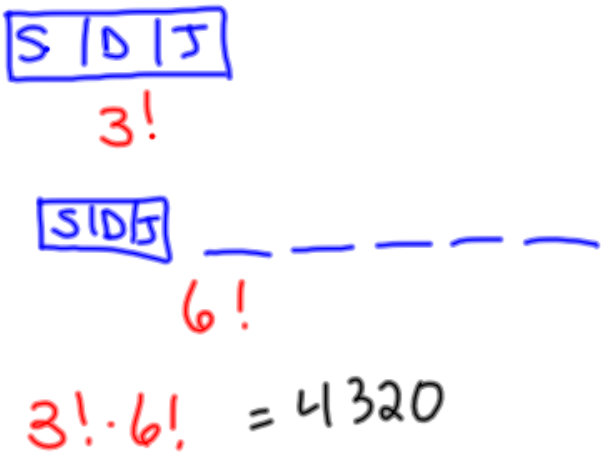
EEEEESSS

* Permutation with like objects $\frac{n!}{a!b!c!\ldots}$

$$\frac{8!}{5!3!} = 56 \text{ ways}$$

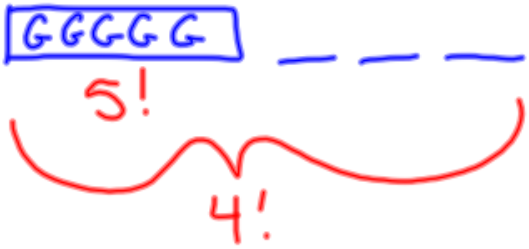
Permutations continued

1) a) 8 people in a row, but Susan, Dave + Jack must be together



$3! \cdot 6! = 4320$

b) 5 girls must be together



Permutations with Cases

Given the digits 9018562, how many ways can you make a number with 5 or 4 digits? No repetition.

5 digits: $7 \cdot 6 \cdot 5 \cdot 4 \cdot 3$ = 2520

4 digits: $7 \cdot 6 \cdot 5 \cdot 4$ = 840

Total: 2520 + 840 = 3360

$_7P_5 + {}_7P_4 = 3360$

↑ choose 5 digits from 7

↑ choose 4 digits from 7.