

These notes were generated oct 13th in sections 3 & 4

Know that you guys also have the practice problem solutions, which might be a cleaner way of examining the solutions ... but I'll toss this up on the website too in case there was some note you wanted to look back on for the exam.

Good luck :)!

Prof Higger

1 ✓

2 6

3 ✓

4 10

5/6 First

7 SECOND

Counting:

use a particular example (before asking if order / repetition matter)
make your numbers smaller, draw pictures
when to add vs multiply

iii Lee has decided to give his collection of 20 unique photographs to his three children. In how many ways can he partition his photo collection among this three children where it may be that some children get no photographs?

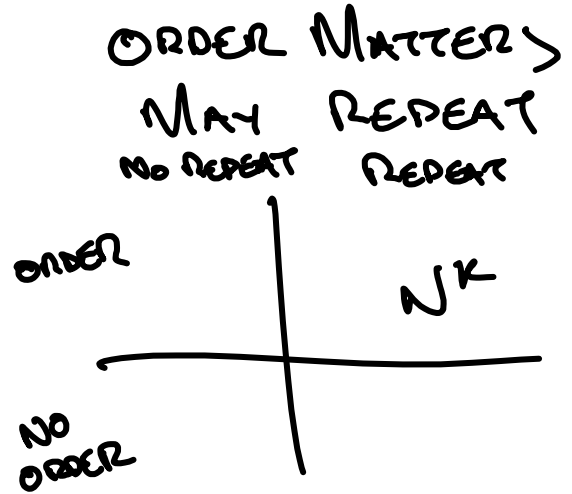
$$3^{20}$$

CHILDREN A, B



→ A
→ B

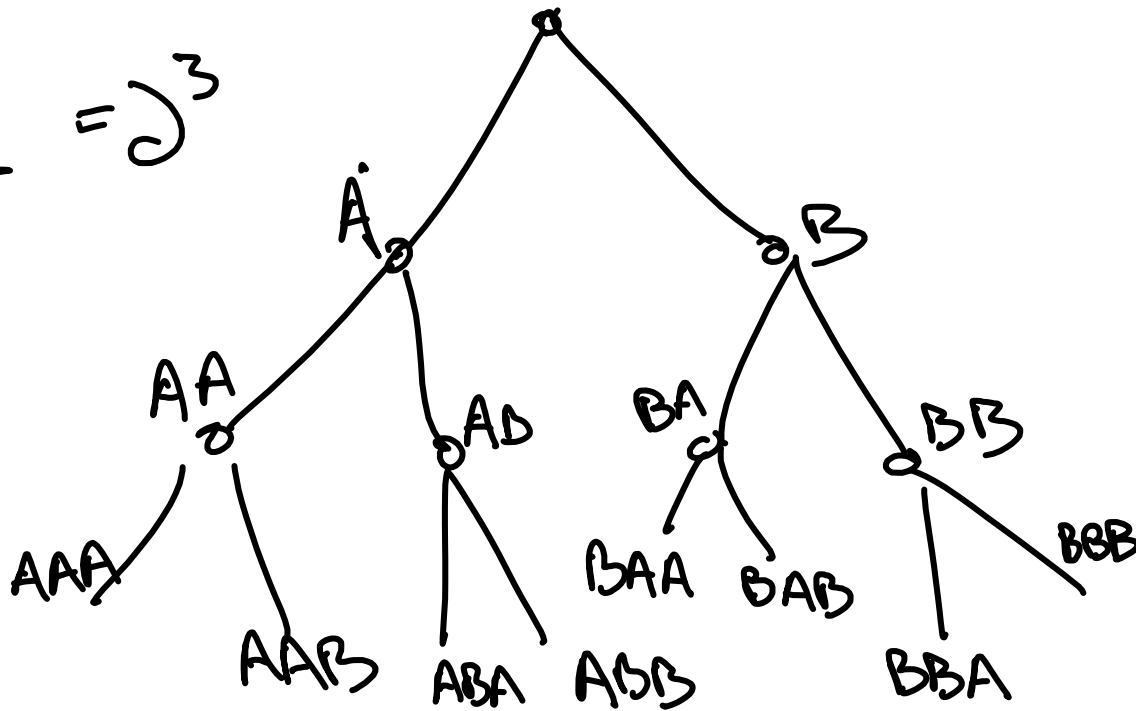
B
A
B



AAA	000
AAB	001
ABA	010
ABB	011
<hr/>	
BAA	100
BAB	101
BBA	110
BBA	111

$$\emptyset = \mathcal{D}^3$$

2 · 2 · 2 = 2³



ii How many different study groups can be formed from one student from each of the four sections?
(Four total students in the group).

{ 1.1 1.2 1.3 }
SECTION 1

{ 2.1 2.2 2.3 }
SEC 2

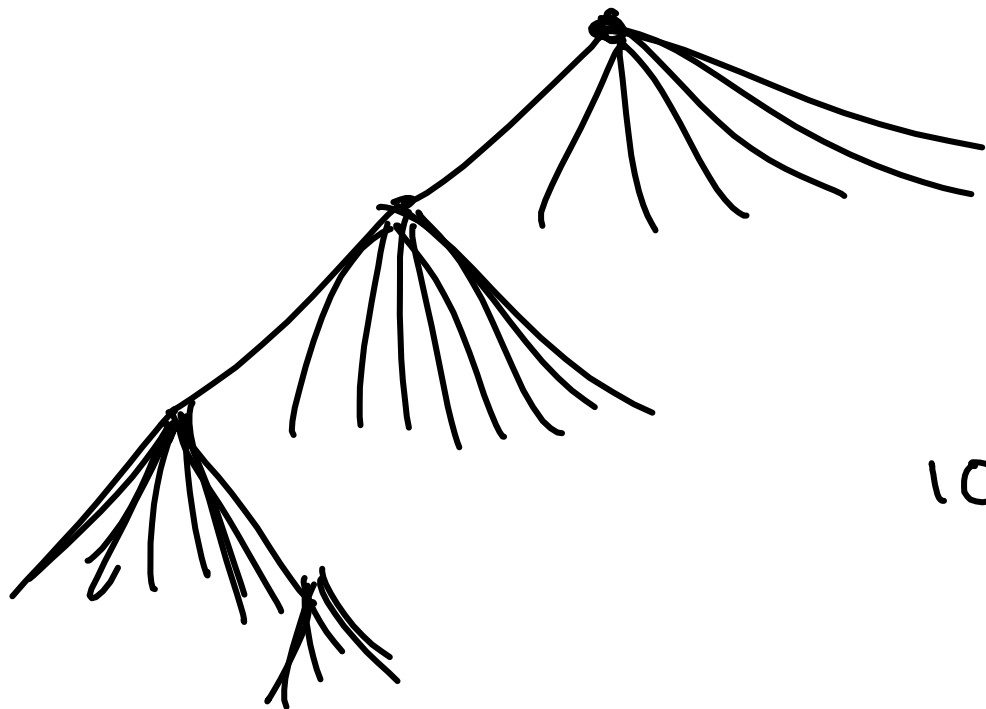
...
ORDER NOT
MATTER

1.1 2.10 3.100 4.9999

1.1 3.100 2.10 4.9999

1.1 1.1 3.100 4.9999

NO REPEATS
(COMBINATIONS)



SECTION 1	10
SECTION 2	11
3	12
4	13

10.11.12.13

Problem 6 Counting: Assorted

A course has 4 sections. Each contains 239, 243, 87 and 49 students respectively.


- i If six students from the smallest section form a study group, how many different groups could there be?
- ii How many different study groups can be formed from one student from each of the four sections? (Four total students in the group).
- iii How many ways can a particular student from the second section form a study group with two students from the first section (239 students)?
- iv She is now willing to form a group with two students from either the first *or* third sections (potentially one from each), how many different groups can she form?
- v She realizes that the two sections have different styles, so she now wishes to select the two students from either the first or third section, but not both, how many different groups can she form?

AMONG 49 STUDENTS How MANY
GROUPS OF 6

$$P(49,6) = 49 \cdot 48 \cdot 47 \cdot 46 \cdot 45 \cdot 44$$

$$C(49,6)$$

Assume
ORDER
MATTERS



239 IN 1ST SECTION

$\begin{pmatrix} 239 \\ 0 \end{pmatrix}$

Problem 5 Counting: Partition Method & Permutations

How many ways can we line up 5 people for picture, of 8 total if person 2 must be directly to the right of person 1 in every picture person 2 is included in?



$P(8, 5)$ TOTAL WAYS TO ORDER 5 OF 8

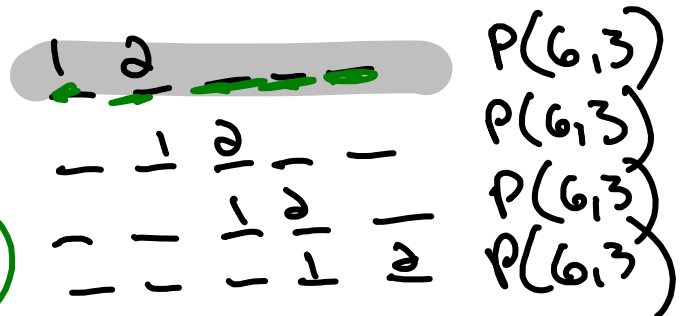
ORDER MATTERS

PERSON 2 NOT INCLUDED

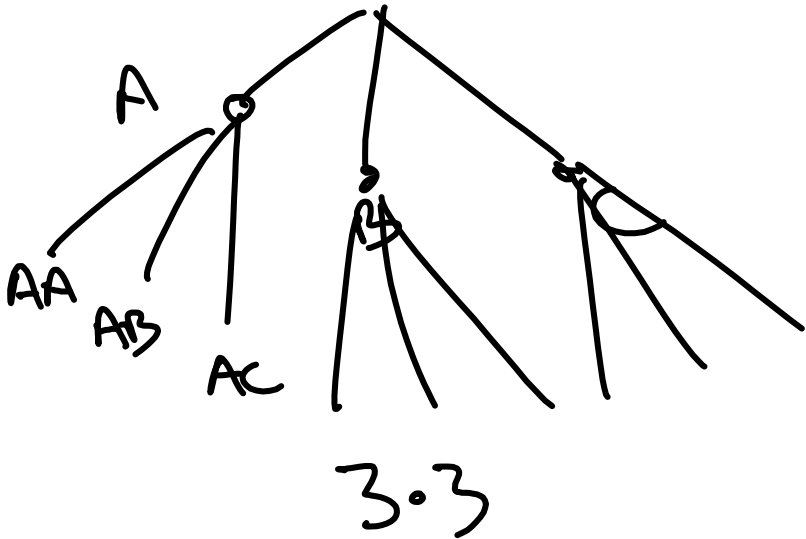
$P(7, 5)$

$P(7, 5) + 4P(6, 3)$

PERSON 2 INCLUDED



PASSWORDS LENGTH 2
MADE FROM ABC



$$\binom{20}{3} + \binom{25}{3}$$

$A_1 \quad A_2 \quad A_3 \quad A_4$

$$A_1 \times A_2 = \Sigma$$

$$|A_1| = |A_2| \times |A_3| \times |A_4|$$

12

3, 4, 5, 6, 7, 8

— — — —

$P(7, 4)$