(notes on slides)

CS1800 Fall 2026

How many ways are there... ?

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$|L| = 3, |T| = 2$

How many ways to spend an evening at Strangehouse if we watch one Laney show and then one Tom show?

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$|L| = 3$, $|T| = 2$

How many ways to spend an evening at Strangehouse if we watch one Laney show **and** then one Tom show?

$|L| \cdot |T| = 3 \cdot 2 = 6$

How many ways are there...?

|L| = 3, |T| = 2

How many ways to spend an evening at Strangehouse if we watch one Laney show **and** then one Tom show?

$$3 * 2 = 6$$

How many ways are there...?

$|L| = 3, |T| = 2$

How many ways to spend an evening at Strangehouse if we watch one Laney show and then one Tom show, **or** one Tom show and then one Laney show?

$|L| \cdot |T| + |T| \cdot |L| \quad = 6 + 6 = 12$

How many ways are there...?

$|L| = 3, |T| = 2$

It's a shorter evening! How many ways to watch a Laney show **or** a Tom show?

$3 + 2 = 5$

How many ways are there...?

|L| = 3, |T| = 2

How many ways to watch two *different* Laney shows or two *different* Tom shows?

Ex:

- *archer,fg (Tom)*
- *matlock,wednesday (Laney)*
- *matlock,rookie (Laney)*

$3 \cdot 2 + 2 \cdot 1$

L1 L2 T1 T2

$6 + 2 = 8$

How many ways are there...?

$|L| = 3, |T| = 2$

How many ways to watch a Laney show and then a Tom show and then a *different* Laney show?

Ex:

- *matlock,fg,rookie*
- *rookie,archer,wednesday*
- *rookie,fg,wednesday*

$\underset{L1}{3} \cdot \underset{T1}{2} \cdot \underset{L2}{2} = 12$

How many ways are there...?

|L| = 3, |T| = 2

How many ways to watch a Laney show and then a Tom show and then a Laney show (same show ok!)?

Ex:

- *matlock,fg,matlock*
- *rookie,archer,wednesday*
- *rookie,fg,rookie*

$3 \cdot 2 \cdot 3 = 18$

L1 T1 L2

How many ways are there...?

|L| = 3, |T| = 2

How many ways to watch two *different* Laney shows and one Tom show, in any order?

Ex:

- *laney,laney,tom* → $3 \cdot 2 \cdot 2 = 12$ OR
- *laney,tom,laney* → $3 \cdot 2 \cdot 2 = 12$ OR
- *tom,laney,laney*. → $2 \cdot 3 \cdot 2 = 12$

$12 + 12 + 12$

$= 12 \cdot 3$

$= 36$

How many ways are there...?

|L| = 3, |T| = 2

How many ways to watch two Laney shows (same show ok!) and a Tom show, in any order?

L L T
L T L
T L L

3 · 2 · 3 = 18

18 + 18 + 18 = 54

How many ways are there...?

Creating bibs for a 5k: A capital letter following by a positive integer ≤ 100.

How many bibs exist?



chatgpt

task 1: choose letter (26)

task 2: choose number (100)

2nd

$26 \cdot 100 = 2600$

How many ways are there...?

535 people run that 5k

How many ways to have a first place, second place, and third place finisher?

task 1: choose 1st place — 535

task 2: choose 2nd place — 534

task 3: choose 3rd place — 533

$535 \cdot 534 \cdot 533 = 152,272,770$

How many ways are there...?

535 people run a 5k; 100 non-binary runners, 200 women, 235 men

How many ways to have a first place, second place, and third place finisher in all three categories?

$(100 \cdot 99 \cdot 98)$ non binary $*$ $(200 \cdot 199 \cdot 198)$ women $*$ $(235 \cdot 234 \cdot 233)$ men

2:36

How many passwords can you make?

(under certain rules)
security = restrictions so you have to make it complicated, but not SO restrictive you have too few

Password Restrictions

1. 5, 6, or 7 characters
2. Alpha (lowercase) or numeric (0-9)
3. Repeats allowed

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How many passwords are there...

- of length 5?
- of length 6?
- of length 7?