Selina Martinez

Counting

① unusual → 3 'u' letters

Since a set cannot have duplicates, only one subset exists:

{U, N, S, A, L}

From these 5 letters, $5!$, or 120 different strings can be made.

② 5-card hand with 2 pairs (ie pair of one val, pair of second val, and 5th card)

-13 different #s: $_{13}C_2 = \frac{13!}{2!11!}$ = choosing 2 different values to create pairs

$$\frac{13!}{2!11!} \cdot \frac{4!}{2!2!} \cdot \frac{4!}{2!2!} \times 44 = 123{,}552 \text{ different ways}$$

choose 2 cards for first pair

choose 2 cards for second pair

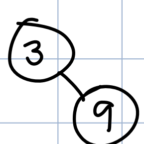
44 cards left (can't choose the 4 cards you already chose plus the other suits with those values since you would then have a 3 of a kind)

③ Address the fighting couple first. Any of the 16 songs can be played to them. → 16

Now 15 songs and 6 couples left. $_{15}C_6 : \frac{15!}{6!(15-6)!}$

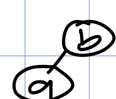
$$\# \text{ of ways} = 16 \times \frac{15!}{6!(15-6)!} = 80{,}080 \text{ ways}$$

④ BST w/ 12 nodes



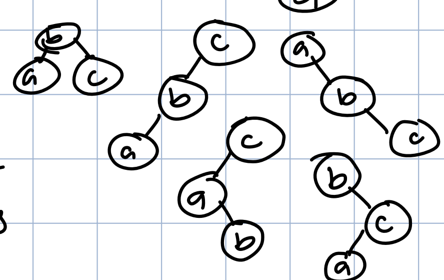
2 node BST:

or



2 ways

3 node BST:



5 ways

2 values left of 3 = 2 nodes = 2 ways

5 values in between 3 and 9 = 5 nodes $= \frac{2n!}{(n+1)!n!} = \frac{10!}{6!5!}$ = 42 ways

3 nodes right of 9 = 3 nodes = 5 ways

Total ways: (2)(42)(5) = 420 ways

(5)

___ | ___ | ___ | ___

Nurse 1 Nurse 2 Nurse 3 Nurse 4

· 3 bars = r
· 10 stars (the patients)

$$\binom{13}{3} = {}_{13}C_3 = 286 \text{ ways}$$

If one nurse is on her break: · 2 bars = r 10 stars (the patients

$$\binom{12}{2} = {}_{12}C_2 = 66 \text{ ways}$$

$$286 + 66 = 352 \text{ different combinations}$$