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1. unusual — string length = 5

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5-elt subsets 1+4+6=1

1 us: 5!

2 us: $\frac{5!}{2!2!}$

3 us: $\frac{5!}{3!2!}$ or $\frac{5!}{3!}$

$5! \cdot \frac{5!}{2!} \cdot \frac{5!}{3!} = 200$

2.

5 cards AABBC 1–13

$\binom{13}{2} \cdot 11 \cdot 6 \cdot 6 \cdot 4 = 123,552$

X_{11} = #sums

3. 7 tables 16 seats

for tables 1, ... 7

$x_1 + x_2 + \dots + x_7 = 16 \quad x_i \geq 0, \ x_i \leq 1$

$x_1 = 0$

$n = 16 \ r = 6$

$\binom{n+r-1}{r-1}$

$= \binom{21}{6} +$

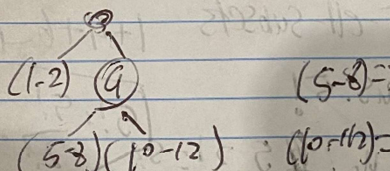
$x_1 + x_2 + \dots + x_7 + 1 = 16$

$n = 15 \ r = 6$

$\binom{n+r-1}{r-1}$

$\binom{20}{6}$

4.



(5-8)=X

(10-12)=Y

total combos: 2XY

potential subtrees = 5

5 nodes: $\frac{(2 \cdot 5)!}{5!6!} = 42$

total combos = 2(42)(5) = 420

#5 case: 4 nurse

(7,1,1,1) (6,2,1,1) (5,3,1,1) (5,2,2,1) (4,4,1,1) (4,3,2,1)

(4,2,2,2) (3,2,2,3) (3,3,3,1) : 9

case 3 nurse

(8,1,1) (7,2,1) (6,3,1) (6,2,3) (5,4,1) (5,3,2)

(4,4,2) (3,3,4) : 8

8 + 9 = 17