1. U N U S U A L
   1 2 3

1/5 letters is U → other 4 $\binom{4}{4} = 1$

2/5 letters is U → other 3 $\binom{4}{3} = 4$

3/5 letters is U → other 2 $\binom{4}{2} = 6$

$6 + 4 + 1 = 11$

1v = $5! = 120$

2v = $\frac{5!}{2!} \times 4 = 240 = 480$

3v = $\frac{5!}{3!} \times 6 = 120$

2. $\binom{13}{2}\binom{4}{2}\binom{4}{2}\binom{44}{1} = 18 \times 6 \times 6 \times 44 = 123552$

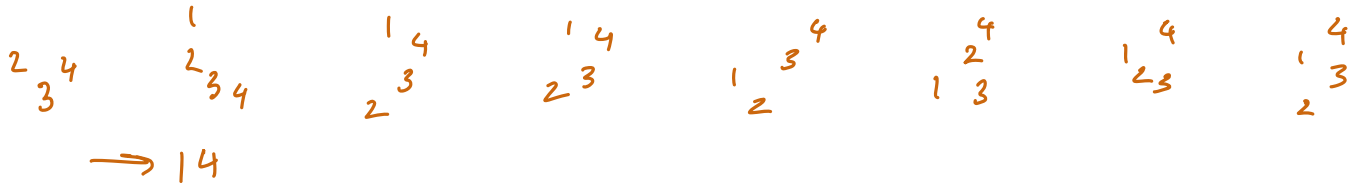
3. $\binom{21}{16} + \binom{20}{15}$ n = couples, r = songs $\binom{n+k-1}{k}$

$\binom{6+16-1}{16}\binom{21}{16} \rightarrow \binom{6+15-1}{15} = \binom{20}{15}$

4. 2 nodes: 1^2 1_2 → 2

3 nodes: 1_2^3 $1^2 3$ 1_{2^3} 1^{2^3} 1^3_2 → 5

4 nodes: $1 3_4$ $1_2 3_4$ $1^2 3_4$ $1^2 3^4$ $1^2 3 4$ $1^{2^3} 4$



→ 14

root node

1 → 3
2 → 1 and 2
3 → 2 and 1
4 → 3

5 + 2 + 2 + 5 = 14

5 nodes:

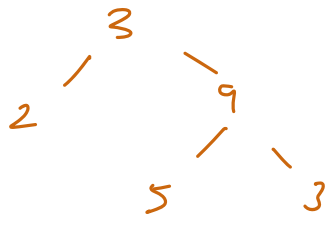
root:

1 → 4
2 → 1 3
3 → 2 2
4 → 3 3 1
5 → 4

14
5 +
4 +
5 +
14

12 nodes

root → 3



l = 2

r = 9
↓
5 (42 pos)

2 × 42 × 5 = 420

5. 4 nurses

/ \

2 cases: 3 nurses

1 8 1 1

2 7 2 1

3 6 3 1

4 6 2 2

5 5 4 1

6 5 3 2

7 4 4 2

8 4 3 3

4 nurses

1 7 1 1 1

2 6 2 1 1

3 5 3 1 1

4 5 2 2 1

5 4 4 1 1

6 4 3 2 1

7 3 3 2 2

8 3 1 3 3

9 2 2 2 4

17 different combinations