1. unusual

multiplicity: u=3, n=1, s=1, a=1, l=1

number of unique subsets:

$${}_4C_4 + {}_4C_3 + {}_4C_2$$

number of different strings:

$$5! + {}_4C_3\left(\frac{5!}{2!}\right) + {}_4C_2\left(\frac{5!}{3!}\right)$$

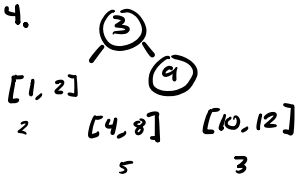
2. $${}_{13}C_2 \cdot {}_4C_2 \cdot {}_4C_2 \cdot 44$$

$\nearrow$ 2 ranks; $\nearrow$ 2 suits; $\nearrow$ 2 suits; $\nearrow$ last card of diff rank

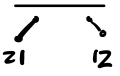
3. $$\binom{16-1+6}{6} + \binom{15-1+6}{6}$$

$\nearrow$ no songs for angry couple; $\nearrow$ 1 song for angry couple

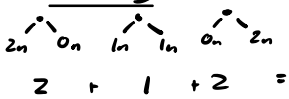
4. On, In : 1 possible



2 nodes



3 nodes

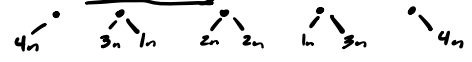


$2 + 1 + 2 = 5$

4 nodes

$5 + 2 \cdot 1 + 1 \cdot 2 + 5 = 14$

5 nodes



$14 + 5 \cdot 1 + 2 \cdot 2 + 1 \cdot 5 + 14 = 42$

$2 \cdot 42 \cdot 5$

$= 420$

5.

7 1 1 1

6 2 1 1 5 3 1 1 4 4 1 1

5 2 2 1 4 3 2 1 3 3 3 1

4 2 2 2

3 3 2 2

8 1 1

7 2 1 6 3 1

6 2 2 5 4 1

5 3 2

4 4 2

16 ways