1. "meeting"

a.

	# unique subset
$e = 0$	1
$e = 1$	C_5^4
$e = 2$	C_5^3

$$1 + C_5^4 + C_5^3 = 1 + 5 + 10$$
$$= 16$$

b.

$$\text{\# unique string} = \frac{7 \times 5 \times 4 \times 3 \times 2}{2} = 420$$

2.

a.   A   A   B   B   C

$$C_{13}^2 \cdot C_4^2 \cdot C_4^2 \cdot C_{11}^1 \cdot C_4^1 = 12355$$

choose num   choose   choose
              symbol   symbol

b. $C_{13}^2 \cdot C_4^1 \cdot C_4^1 \cdot C_{11}^1 \cdot C_4^1 = 54912$

3.   best player A and B

A in blue
B in red

or   B in blue
     A in red

           A   B
$$C_{13}^5 \cdot C_8^5$$

∴ overall : $C_{13}^{5} \cdot C_{8}^{5} \cdot 2 = 1287 \times 56 \times 2$

$$= 144144$$

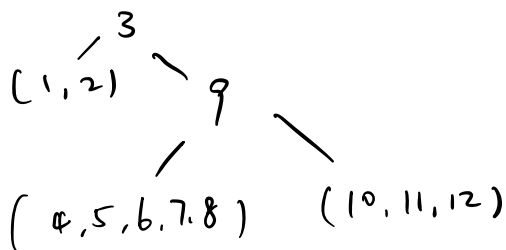4. $\begin{cases} 1 \text{ song to couple having fight} \\ 0 \text{ song to couple having fight} \end{cases}$

①

$$\binom{6-1+15}{6-1} = \binom{20}{5}$$

② $\binom{6-1+16}{6-1} = \binom{21}{5}$

$$\binom{20}{5} + \binom{21}{5} = 35813$$

5.

$(1,2) \xrightarrow{3}$ 9

$(4,5,6,7,8) \qquad (10,11,12)$

$(1,2) \qquad 2! = 2$

$(4,5,6,7,8) \qquad (5+2+2+5+5+(2 \wedge 2)+5+(5+2+2+5)) = 42$

$(10,11,12) \qquad 2!+1+2! = 5$

$$2 \times 42 \times 5 = 420$$

6. $\begin{cases} 1 \text{ of nurses break} \\ 0 \text{ of nurses break} \end{cases}$

①   3 nurse + 10 friend

     1 1 8
     1 2 7
     1 3 6
     1 4 5   8
     2 2 6
     2 3 5
     2 4 4
     3 3 4

②   4 nurse + 10 friend

     1 1 1 7
     1 1 2 6
     1 1 3 5
     1 1 4 4
     1 2 2 5   9
     1 2 3 4
     1 3 3 3
     2 2 2 4
     2 2 3 3

$8 + 9 = 17$