

# COUNTING

i) a) 1 fixed u:  $\{ \underline{u}, \underline{\quad}, \underline{\quad}, \underline{\quad} \}$   
 4 spots for  $\{n, s, a, i\}$

$$\binom{4}{1} = 4$$

2 fixed u:  $\{ \underline{u}, \underline{u}, \underline{\quad}, \underline{\quad} \}$   
 3 spots for  $\{n, s, a, i\}$

$$\binom{4}{2} = 6$$

3 fixed u:  $\{ \underline{u}, \underline{u}, \underline{u}, \underline{\quad} \}$   
 2 spots for  $\{n, s, a, i\}$

$$\binom{4}{3} = 4$$

4 spots for

b) 1 u:  $\{ \underline{u}, \underline{\quad}, \underline{\quad}, \underline{\quad} \}$   
 4 spots for  $\{n, s, a, i\}$

$$1^4 \rightarrow \frac{5!}{1!} = 120 \cdot 1 = 120$$

3 spots for

2 u:  $\{ \underline{u}, \underline{u}, \underline{\quad}, \underline{\quad} \}$   
 3 spots for  $\{n, s, a, i\}$

$$2^4 \rightarrow \frac{5!}{2!} = 60 \cdot 4 = 240$$

2 spots for  $\{n, s, a, i\}$

3 u:  $\{ \underline{u}, \underline{u}, \underline{u}, \underline{\quad} \}$

$$3^4 \rightarrow \frac{5!}{3!} = 20 \cdot 6 = 120$$

$$1 + 4 + 6 = 11 \text{ subsets}$$

$$120 + 240 + 120$$

$$= 480 \text{ strings}$$

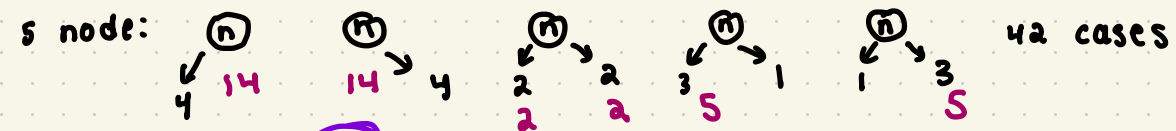
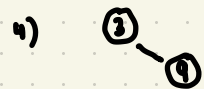
2) out of 13 values, choosing 2  $\binom{13}{2}$  · out of 4 suits, choosing 2 suits  $\binom{4}{2}$  the 1st pair · out of 4 suits, choosing 2  $\binom{4}{2}$  the 2nd pair · out of the remaining 44 cards  $(52-8)$ , choosing 1  $\binom{44}{1}$  the fifth card

$$= \binom{13}{2} \cdot \binom{4}{2} \cdot \binom{4}{2} \cdot \binom{44}{1} = 78 \cdot 6 \cdot 6 \cdot 44 = 123,552 \text{ hands}$$

3) 16 songs, 7 tables

0 songs:  $\binom{16}{5}$  16 songs for couple 6-1 = 5 couples } 4368 + 3003 = 7371

1 song for couple:  $\binom{15}{5}$  15 songs 6-1 = 5 couples }



$$2 \cdot 42 \cdot 5 = 420$$

5) 4 nurses

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

3 nurses

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

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