

## CSCI-10.4 Lab 9

Q1. 21 friends, 7 CS, 14 non-CS

① There <sup>are</sup> ~~is~~ in total of  $C_5^{21}$  ways to select 5 friends

② There are  $C_1^7 \cdot C_4^{14}$  ways to select 5 friends with only one CS-major friend

③  $C_5^{14}$  <sup>ways</sup> to select 5 friends (all of them are non-CS major).

$$\therefore \text{Answer} = C_5^{21} - C_1^7 \cdot C_4^{14} - C_5^{14}$$

$$= 21 \times 19 \times 3 \times 17 - 7 \times 7 \times 13 \times 11 - 14 \times 13 \times 11$$

$$= 11340$$

$$Q2. C_{23}^{32} = C_9^{32} = 28048800$$

$$Q3. P_2^7 = \frac{7!}{2!} = 42$$

Q4. 11 letters in total: 1 B, 2 Os, 2 ks, 3 es,  
1 P, 1 r, 1 S

$\therefore$  There are  $2 \times 2 \times 3 = 12$  ways to have  
the same arrangement.

$$\therefore \text{Answer} = \frac{11!}{12}$$

If S must follow R, then there're 10 letters or  
positions that can be freely rearranged:  $\frac{10!}{12}$ .

Q5.  $n = 5, r = 30$

$$\binom{5-1+30}{30} = \binom{34}{30} = \frac{34!}{30!4!} = 46376$$