

## CSCI-104 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~~ to select 5 friends (all of them are non-CS major).

$$\begin{aligned}\therefore \text{Answer} &= C_5^{21} - C_1^7 \cdot C_4^{14} - C_5^{14} \\ &= 21 \times 19 \times 3 \times 17 - 7 \times 7 \times 13 \times 11 - 14 \times 13 \times 11 \\ &= 11340\end{aligned}$$

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

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

Q4. 11 letters in total : 1 B, 2 O, 2 Ks, 3 Es,  
1 P, 1 R, 1 S

→ 3! ways to arrange 3 Es

2! ways for K

2! ways for O

$$\therefore \text{Answer} = \frac{11!}{3! \cdot 2! \cdot 2!}$$

If S must follow R, then there are  
10 slots that can be rearranged:

$$\therefore \text{Answer} = \frac{10!}{3! \cdot 2! \cdot 2!}$$

Q5.  $n=5, r=30$

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