CSCI-104 Lab 9

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

① There are 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} ways to select 5 friends (all of them are non-CS major)

∴ 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. $C_{23}^{32} = C_{9}^{32} = 2804880$

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

Combination! 2 from 7!! Because it doesn matter what order G was put into

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

→ 3! ways to arrange 3 Es
2! ways for K
2! ways for O

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

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

∴ Answer = $\frac{10!}{3!2!2!}$

30 indistinguishable students into 5 distinguishable breakout rooms:

Q5. $n = 5,\ r = 30$

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

If students are distinguishable, then # = 5^30:
30 students in total, each student can be assigned to 1-5 breakout room. Each stud
has 5 possible ways of being assigned, and thus 5*5*5*5*5… = 5^30