CS182 – Foundations of Computer Science

PSO sessions 1 and 2, week of April 13, 2020

PSO 1

Problem 1. How many permutations of 12345 are there that leave 3 in the third position but leave no other integer in its own position?

Problem 2. In how many ways can five distinct Martians and five distinct Jovians be seated at a circular table if no two Martians sit together.

Problem 3. Show that in a group of ten people (where any two people are either friends or enemies) there are either three mutual friends or four mutual enemies.

PSO 2

Problem 1. Prove **Vandermonde's Identity**:

$$C(m+n,r) = \sum_{k=0}^{r} C(m,r-k)C(n,k).$$

Problem 2. A doughnut shop sells 30 kinds of doughnuts. In how many ways can you *(a)* get a bag of 12 doughnuts? *(b)* get a bag of 12 doughnuts if you want at least 3 glazed doughnuts and at least 4 raspberry doughnuts?

Problem 3. Assume that you have 50 pennies and three jars, labeled A, B, and C. In how many ways can you put the pennies in the jars, assuming that the pennies are distinguishable?