

CSE 312: Foundations of Computing II

Section 1: Combinatorics (Extra)

0. Weird Card Game

In how many ways can a pack of fifty-two cards be dealt to thirteen players, four to each, so that every player has one card of each suit?

1. Escape the Professor

There are 6 security professors and 7 theory professors taking part in an escape room. If 4 security professors and 4 theory professors are chosen and paired off, how many pairings are possible?

2. Names

How many ways are there to choose three initials (upper case letters) such that two are the same or all three are the same?

3. Extended Family Portrait

A group of n families, each with m members, are to be lined up for a photograph. In how many ways can the nm people be arranged if members of a family must stay together?

4. Full Class

There are 40 seats and 40 students in a classroom. Suppose that the front row contains 10 seats, and there are 5 students who must sit in the front row in order to see the board clearly. How many seating arrangements are possible with this restriction?

5. HBCDEFGA

How many ways are there to permute the 8 letters A, B, C, D, E, F, G, H so that A is not at the beginning and H is not at the end?

6. Graduation Planning

Suppose you have five quarters left and you want to take exactly two classes per quarter. You want to take CSE1, CSE2, ..., CSE10, but CSE1 and CSE2 must be taken before CSE3, which must be taken before CSE4. CSE1 and CSE2 can be taken in any order, or together. The other classes can be taken any quarter. How many different schedules can be formed (assume the two classes in a quarter are unordered)?

7. Paired Finals

Suppose you are to take the CSE 312 final in pairs. There are 100 students in the class and 8 TAs, so 8 lucky students will get to pair up with a TA. Each TA must take the exam with some student, but two TAs cannot take the exam together. How many ways can they pair up?