

Semester in Review

Fall 2017

Brainteaser

Problem:

- 100 people are in line, boarding an airplane with 100 seats, one at a time.
- They are in no particular order. The first person has lost his boarding pass, so he sits in a random seat.
- The second person does the following:
 - Goes to his seat (the one it says to go to on the boarding pass).
 - If unoccupied, sit in it.
 - If occupied, find a random seat to sit in.
- Everyone else behind him does the same. What is the probability that the **last person** sits in his correct seat?

Brainteaser

Solution:

- 50%
- Let's say that there are only two seats, yours and mine. If I sit in my own seat, you win. If I sit in your seat, you lose. So you have a 50% chance of winning.
- Now back to 100 seats. You have a 50% chance of winning if we only consider your seat and mine. Now if I sit anywhere else, I'm just postponing the decision. Let's say I sit in the seat of the person who's 13th in line. Persons 2 through 12 will sit in their own seats, then when person 13 comes in he can either sit in my original seat (and you win) or yours (and you lose). Or of course he could sit anywhere else and postpone the decision again.

$$f(n) = \frac{1}{n}1 + \frac{n-2}{n}f(n-1) + \frac{1}{n}0$$

Market Update