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Week 2: Challenge Problems 2

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About These Problems

- **This will not be graded. And it's not mandatory or necessary to do these problems.**
- You should focus on homework and lectures to do well in this class.
- These are merely meant to be supplementary challenge problems for those who want them.
- Consult Andrew Lizarraga: andrewlizarraga at g.ucla.edu for question or solutions.

2.1   Welcome back challenger! Ready for more?

Problem 1 (Bag Of Cards): A bag contains 3 cards. One card is black on both sides, another card is white on both sides, and the third card is black on one side while being white on the other side. The cards are mixed up in the bag. Then a single card is selected and placed on a table so that the visible side of the card is black. What is the probability of the other side of the card being white?

Problem 2 (In Between): I take three samples uniformly from the unit interval $[0, 1]$ and denote them A, B, C. What is the probability that $A < B < C$?

Problem 3 (An Obscuring Object?): A man in a gallery is asked about a portrait depicting a man with an object obscuring his face. He responds, 'Brothers and sisters I have none, but that man's father is my father's son.' What is the object obscuring the face of the man in the portrait?

Problem 4 (Three Slips):

Three different numbers are chosen at random, and one is written on each of three slips of paper. The slips are then placed face down on the table. If you choose the slip with the largest number you win!

Rules:

1. Initially, you can turn over any slip of paper and view the number written on it.

2. You may choose to keep the initial slip.

3. If unhappy with your first choice, you may discard your it and view another slip. You can choose to keep your second choice or discard it.

4. If you discard the second slip, then you must keep the third slip

5. You win if the slip you keep has the largest number out of all 3 slips.

What is the optimal strategy to increase your odds of winning?