Stats100A **Summer 2024**

Week 3: (Ungraded) Challenge Problems 3

Author: Andrew Lizarraga

3.1 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.

3.2 Welcome back challenger! I wasn't expecting you ...

Problem 1 (Poker Dice): I have five fair dice, each with the following faces: $9, 10, J, Q, K, A$. When rolling these 5 dices, what's the probability of 2 pairs?

Problem 2 (The Trapped Miner): A miner is trapped in a mine containing three doors. The first door leads to a tunnel that takes him to safety after 2 hours of travel. The second door leads to a tunnel that returns him to the mine after 3 hours of travel. The third door leads to a tunnel that returns him to the mine after 5 hours of travel. Assuming the miner at any time is equally likely to choose any door, what is the expected amount of time until the miner reaches safety?

Problem 3 (The First Ace): You are given a well-shuffled standard deck of 52 cards. You start at the top of the deck and turn a card over one-at-a-time. What is the expected number of cards that will be turned over before you see the first Ace?

Problem 4 (Dot Joining): There are 2024 dots lying in a circle. Suddenly, each dot either forms an edge to a dot on its left or to it right or forms no edge whatsoever (equal chances of each event occurring). About how many isolated dots are there?

Problem 5 (A Dodecahedral Traversal): The image below depicts the planar graph representation of a dodecahedron. Start at any point. Can you traverse this graph (meet every vertex not necessarily every edge) without retracing your steps or intersecting your path and end up at the same point?