Stats100A **Summer 2024**

Week 1: (Ungraded) Challenge Problems 1

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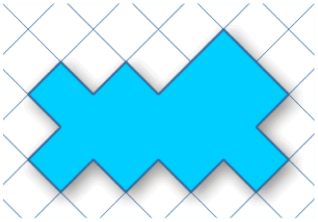
1.1 About These Problems

- **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.

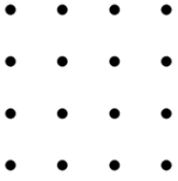
1.2 Are you ready?

Problem 1 (Thinking Outside the Box): Given the 3×3 grid below, place your pencil at any point. Then, without lifting your pencil you must draw four straight lines to cross out all the 9 dots.

Problem 2 (One Cut - Two Shapes): Given the shape below and using a single curve to cut the shape (the curve can be angled or have as many bends as you wish), cut the shape into two identically shaped pieces.



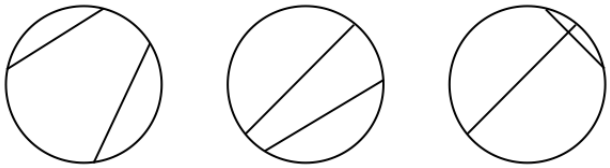
Problem 3 (Dots and Rectangles): Given a 4×4 grid of dots, how many rectangles can be formed by connecting 4 of the dots, such that the sides of rectangle are parallel to the sides of the grid?



Problem 4 (A Biased Coin): I give you a coin that is biased in favor of heads. What can you do in order to make it into a fair coin?

Problem 5 (Half your Height): At what age do you expect the average person to be half of their (full-grown) height. Without looking up a statistic on this, can you come up with a plausible way to deduce this answer?

Problem 6 (A Circle and Two Chords): I have a unit circle and draw two chords at random. What is the probability that the chords intersect? (Third circle below depicts two chords intersecting).



Problem 7 (HH vs. HT): I can choose to flip a fair coin until I see two heads in a row, denoted HH. Or I can choose to flip the coin until I see a heads followed by a tail, i.e. HT. On average should it take more flips to see HH or more flips until you see HT? Or should we expect roughly the same number of flips?