Outline: Applications of Finite Mathematics

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Here is a list of stories I want to tell.

1. Counting and Probability

- (a) Cash WinFall aka Jerry and Marge Go Large aka The MIT Lottery Kids.
- (b) You don't know how to fake a cointoss.
- (c) The Birthday Problem.
- (d) Cointossing is a microcosm for everything.
- (e) Galton Board demonstration.
- (f) How the Allies Calculated the Number of German Tanks in World War 2 (how Statisticians beat spies).
- (g) You really don't know how probability works and you will be mad about it: *Let's Make a Deal* and The Monty Hall Problem.
- (h) Utility Functions: why if you never miss a plane you are probably doing it wrong.
- 2. Statistics
 - (a) *p*-value hacking. Its bad and its everywhere.
 - (b) Biased Sampling: Berkson's Fallacy, Survivor Bias and the Baltimore Stock Broker.
 - (c) Statistical-Logic and Logic-Logic are not the same.
 - (d) Everyone wants to make everything a line, but everything isn't a line (regression and the Laffer curve).
- 3. Graphs and Networks
 - (a) The Seven Bridges of Koenigsburg Puzzle [and the House Walking Puzzle].
 - (b) The Traveling Salesman Problem
 - (c) The Three Houses and Three Utilities Puzzle.
- 4. Voting
 - (a) Slime Molds and Burlington's 2009 Mayoral Election.
- 5. Symmetry and the Golden Ratio
 - (a) The Prisoner Puzzle: https://www.youtube.com/watch?v=hYSaEyPK5MQ
 - (b) The Hummer Shuffle: https://web.northeastern.edu/seigen/11Magic/Hummer/Hummer.html
 - (c) The Golden Ratio