

DUPUY – MATH 1077 – LIST OF STORIES

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Here is a list of stories I want to tell.

1. COUNTING

- (a) More people will have the same birthday than you would expect.
- (b) $1 + 10^{-16} = 1$ on Calculators.
- (c) The number of sandwiches you can create is on the scale of the number of particles in the universe.
- (d) How many ways are there to rewrite the word “BANANA”?
- (e) Galton Board Demonstration/Plinko on *The Price Is Right*.

2. 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; p -value hacking, its bad and its everywhere.
- (c) *Let’s Make a Deal* and The Monty Hall Problem. (Your intuition about probability is broken.)
- (d) Utility Functions: why if you never miss a plane you are probably doing it wrong.
- (e) Things I want to do but haven’t in the past: Biased Sampling; Berkson’s Fallacy, Survivor Bias and the Baltimore Stock Broker; Statistical-Logic and Logic-Logic are not the same; Cointossing is a microcosm for everything; How the Allies calculated the number of German tanks in World War 2.

3. VOTING

- (a) Voting theory, ranked choice voting.
- (b) Ross Perot, Ralph Nader, and RFK Jr. (the guy who dumped a dead bear in Central Park).
- (c) Slime Molds use ranked choice voting to make decisions.
- (d) Burlington’s 2009 Mayoral Election.
- (e) No perfect voting system exists.

4. GRAPHS AND NETWORKS

- (a) The Seven Bridges of Koenigsburg Puzzle [and the House Walking Puzzle].
- (b) The Traveling Salesman Problem (and what keeps your credit card information safe).
- (c) The Three Houses and Three Utilities Puzzle.
- (d) How many colors do you need to make a world map?

5. SYMMETRY

- (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