What to Expect?

1) What is the expected value of grades in a class where engagement is 20%, exams are 50% and projects are 30% if the current averages are 85, 90, and 70, respectively?

1. ~ 81.7
2. 83
3. 85
4. 100
5. other

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The grading scale is: $A \geq 93; 90 \leq A- < 93; 87 \leq B+ < 90$...

The WORLD FACTBOOK

2) In "The WORLD FACTBOOK," the CIA lists Swaziland (a small landlocked country in southern Africa) as having the highest "percentage of adults (aged 15–49) living with HIV/AIDS" (`https://www.cia.gov/library/publications/the-world-factbook/rankorder/2155rank.html`) as follows: 27.20% of that population and 220,000 people living with HIV

First solve $27.20\%P = 220,000$ to find the total population P this statistic is meant to represent (round to the nearest whole person) and then calculate how many people are HIV negative?

1. 60
2. 199,940
3. 588,824
4. 808,824
5. other

Decision Matrix/Payoff Matrix

	Contestant 2: Friend	Contestant 2: Foe
Contestant 1: Friend	\$7500//\$7500	0//\$15000
Contestant 1: Foe	\$15000//0	0//0

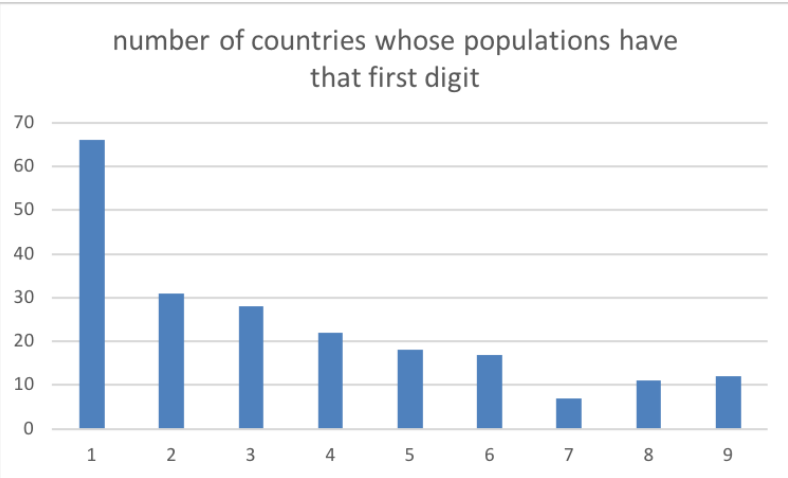
	Test+	Test-
Person is HIV +	HIV+ people $\times$ probability they test +	
Person is HIV -		
Total		

Would you support legislation for mandatory HIV testing?

Benford's Law?

3) Below is country population data from 2018. Does it satisfy Benford's Law?

1. it fits perfectly
2. this proves it is fraudulent data and should lead to arrests
3. we should use a larger data set to have a better fit
4. what's a Benford's Law?
5. other



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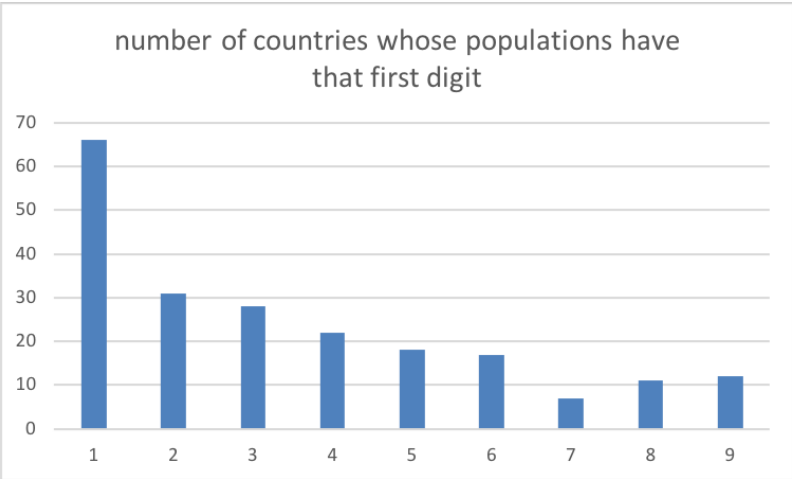
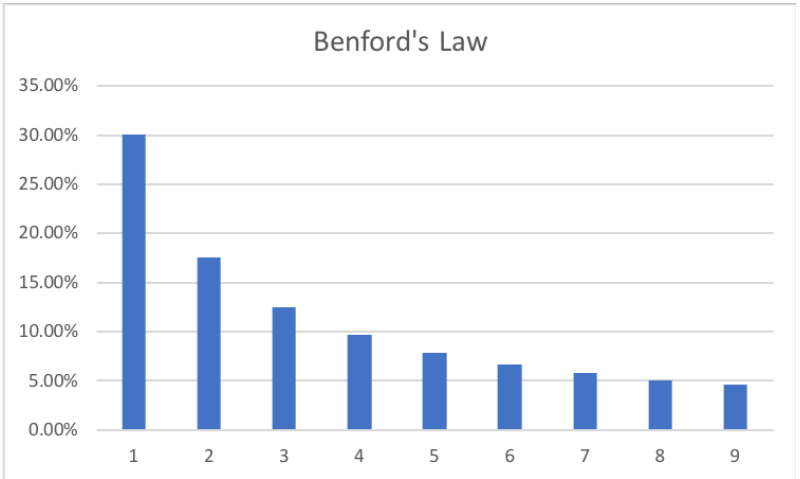
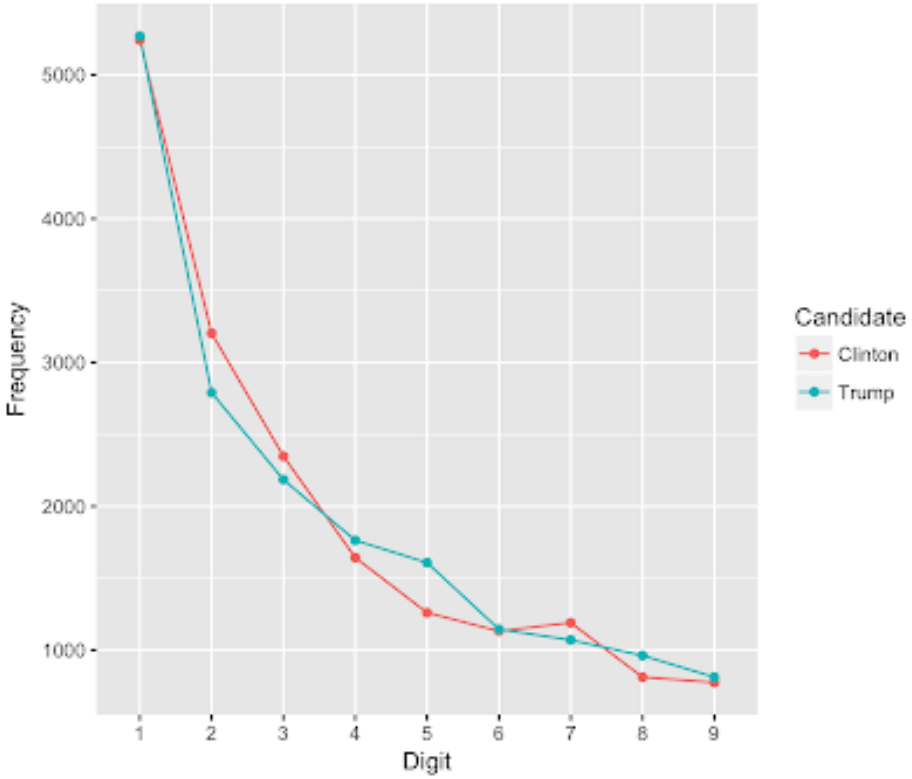
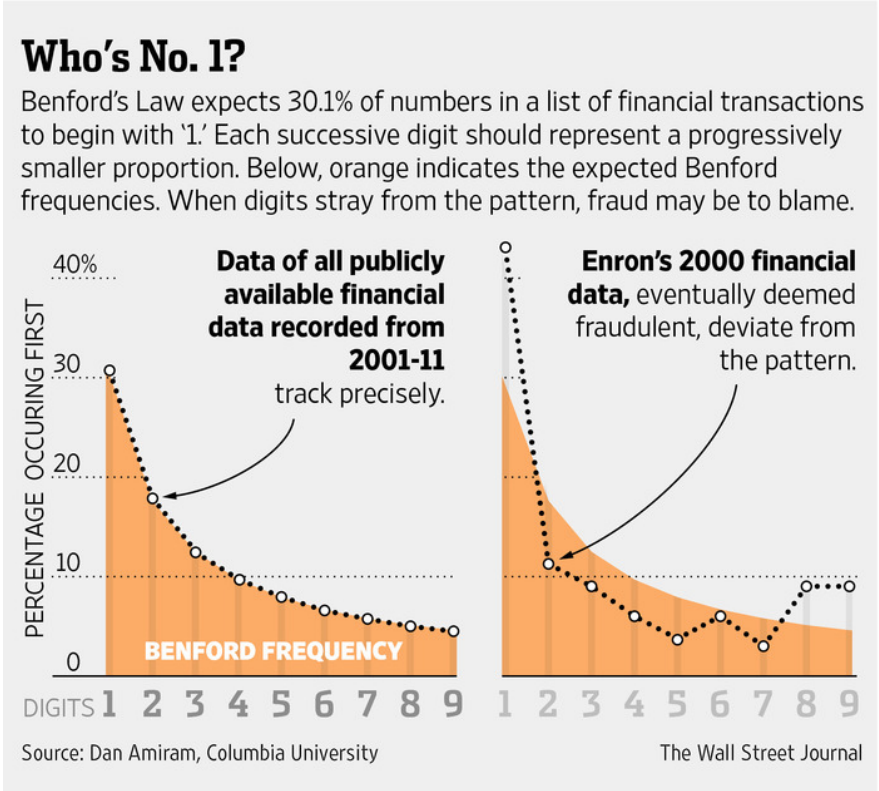




Benford's Law and Fraud Detection





overall county vote totals

3,007 counties in the US

Picture credits:

`http://suehpro.blogspot.com/2016/12/election-results-vs-benfords-law-and.html`

`https://www.wsj.com/articles/accountants-increasingly-use-data-analysis-to-catch-fraud-1417804886`

Happy Birthday to You and You!

4) What is the probability to find a shared birthday in a group of 4 people? Assume independence and exclude February 29th.

1. $\sim .0164$
2. $\sim .5073$
3. $\sim .9836$
4. 4
5. other

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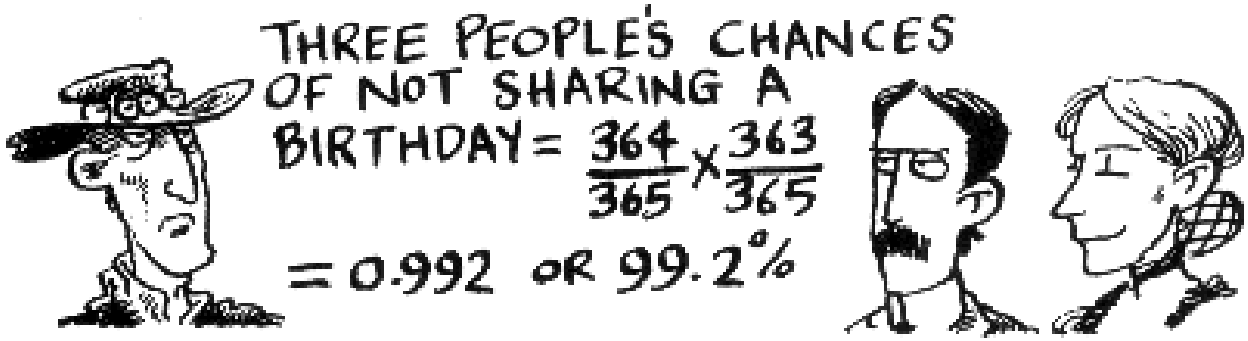


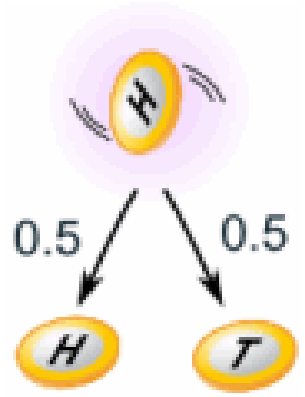
Picture credit: `http://www.murderousmaths.co.uk/books/366bday.htm`

no common birthday: $\frac{364}{365} \times \frac{363}{365} \times \frac{362}{365}$

Tossing Around

5) What is the probability of getting exactly 3 heads if you toss a fair coin 4 times? Assume independence.

1. .10
2. .25
3. .50
4. .75
5. other



Picture credit: `http://lriser03.blogspot.com/`

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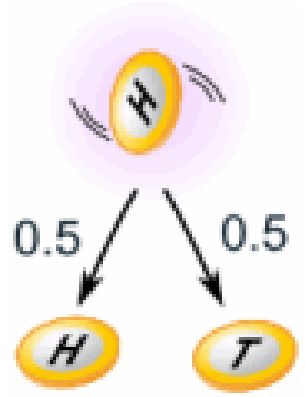

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$$\frac{\text{number of outcomes for 3 heads}}{\text{total number of equally likely outcomes for all possibilities}}$$

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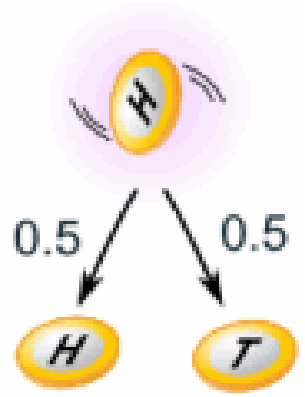

Picture credit: `http://lriser03.blogspot.com/`

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4 possibilities for 3 heads: THHH, HTHH, HHTH, and HHHT

How many possible outcomes total? 2 choices for each toss, so multiply $2 \times 2 \times 2 \times 2$