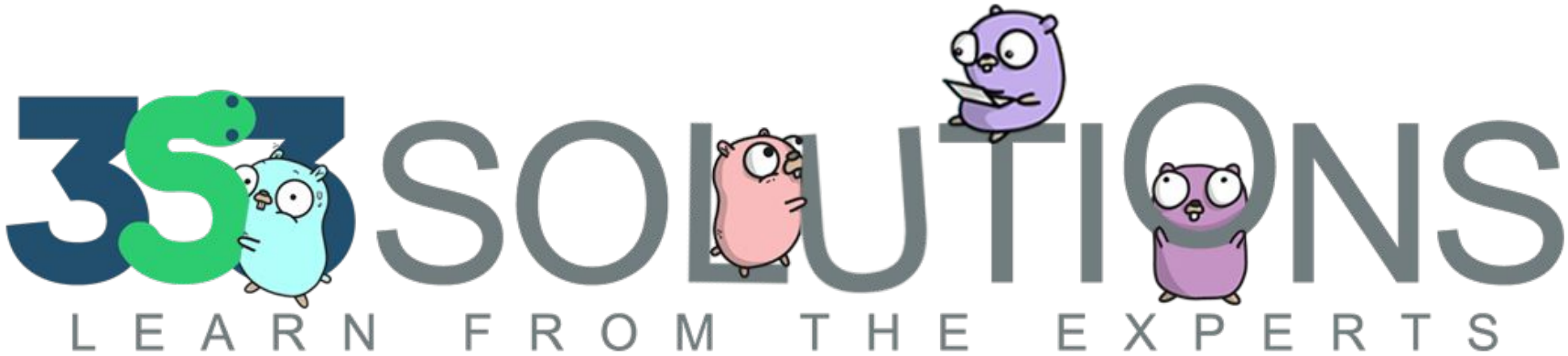
Simulations

For the Mathematically Challenged

Miki Tebeka



$$P(A|B) = \frac{P(B|A)P(A)}{P(B)}$$

$$z = \frac{x - \mu}{\sigma}$$

$$\rho_{X,Y} = \frac{cov(X,Y)}{\sigma_X \sigma_Y}$$

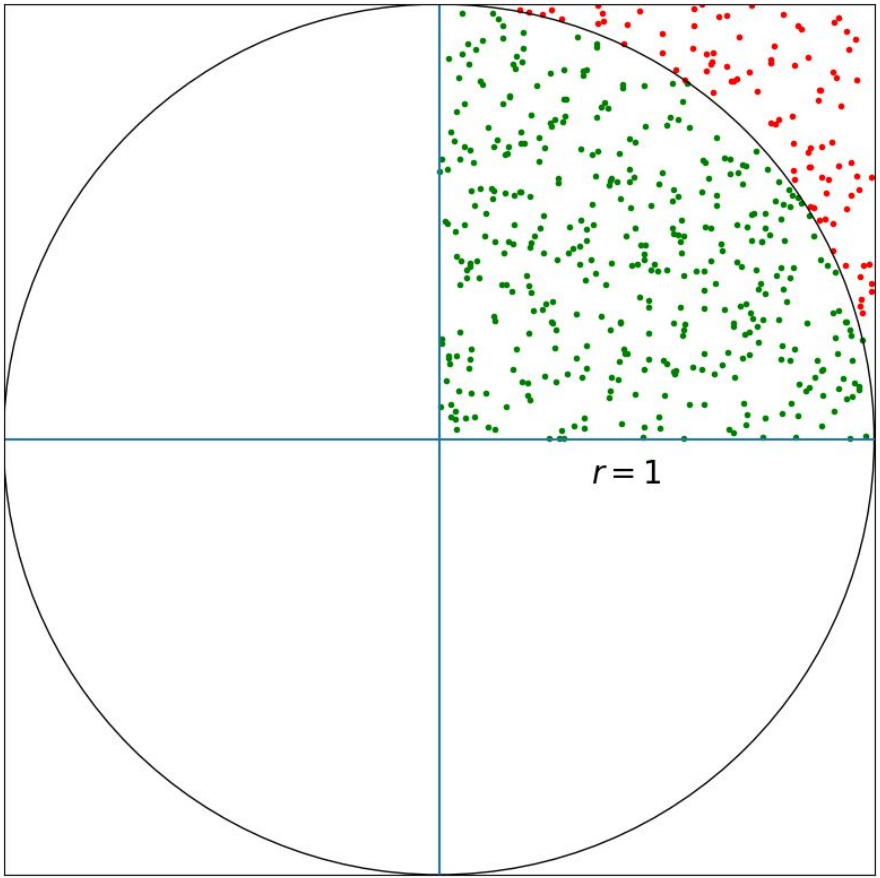
If you can write a for-loop, you can do statistics.

Jake Vanderplas

```
import random
```

CODE

π



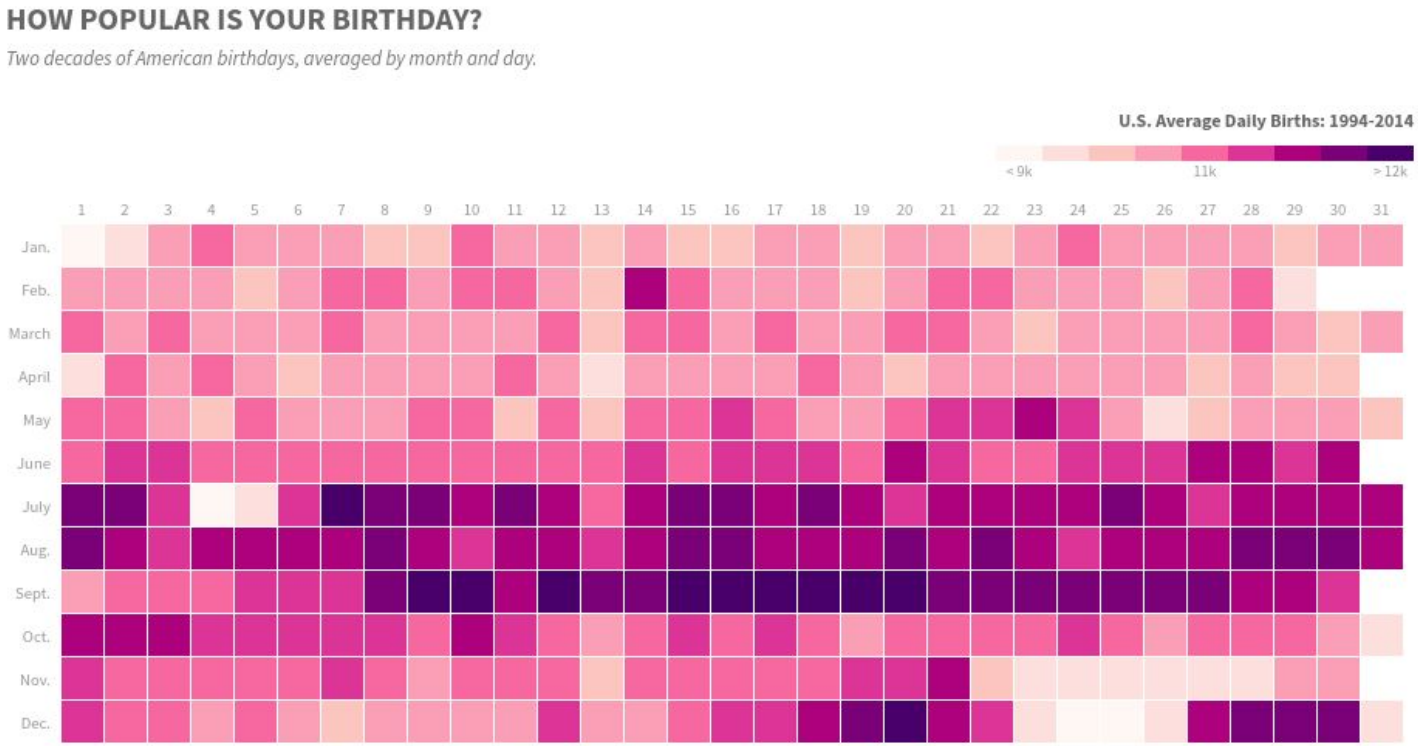
CODE

CODE

The chances of a piece of bread falling butter side down is directly proportional to the cost of the carpet.

COROLLARIES TO MISTER MURPHY...

All models are wrong, but some are useful. - George Box

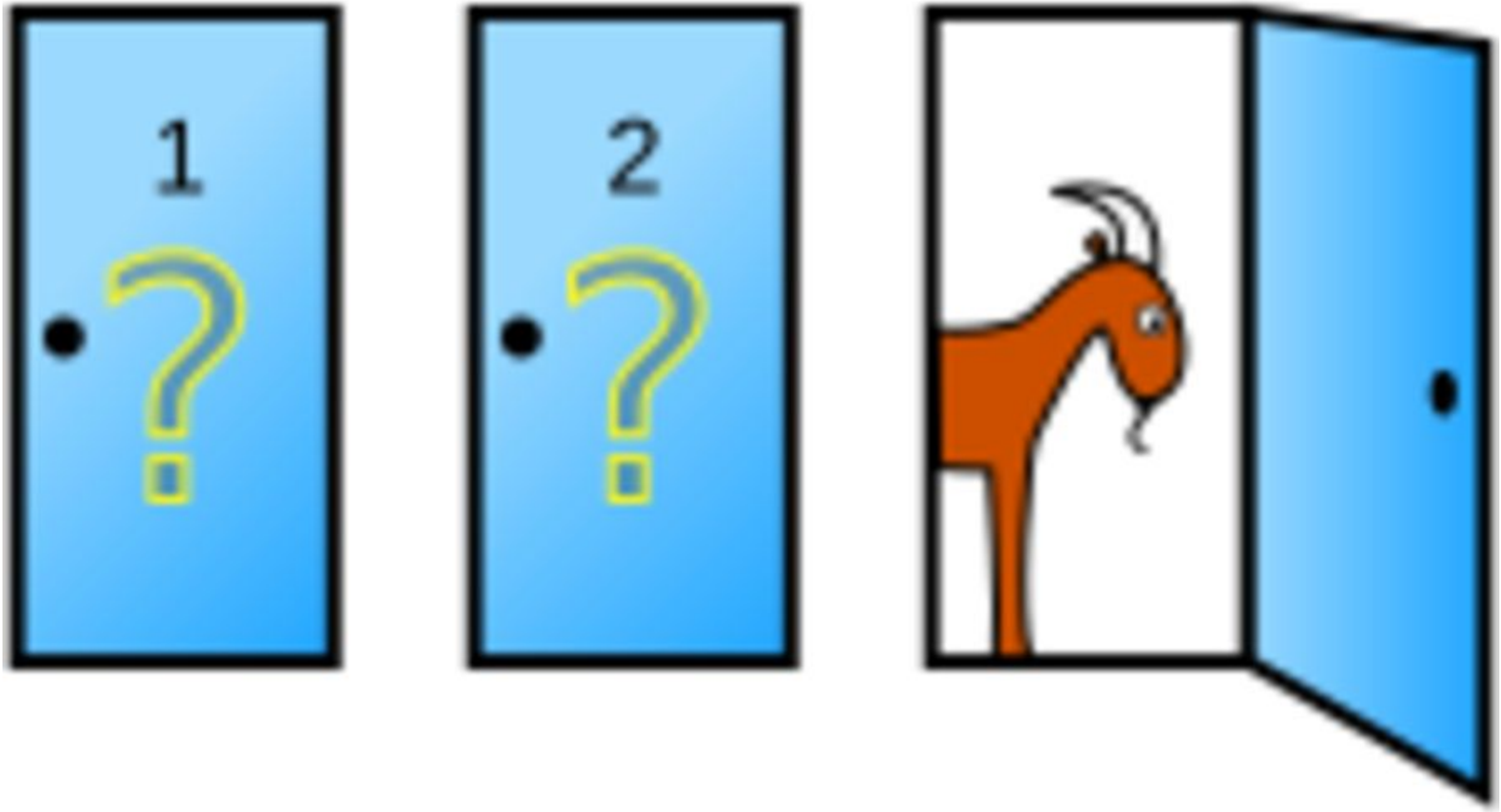


http://thedailyviz.com/2016/09/17/how-common-is-your-birthday-dailyviz/

The test of a disease presents a rate of **5% false positives**. The disease strikes **1/1000 of the population**. People are tested at random, regardless of whether they are suspected of having the disease. **A patient's test is positive. What is the probability of the patient being stricken with the disease?**

	Predicted Sick	Predicted Healthy
Actual Sick	True Positive	False Negative
Actual Healthy	**False Positive**	True Negative

CODE


1
?
2
?

CODE

More?

Statistics for Hackers

- Jake Vanderplas

Monte Carlo Simulation

- Wikipedia

SimPy

- Discrete Simulation


```
$ time python pi.py
... 99% cpu 1:02.23 total
$ time pypy3 pi.py
... 98% cpu 4.838 total
```

Thank You


PYTHON BRAIN TEASERS
EXERCISE YOUR MIND
1 class Player:
2 # Number of players in the Game
3 count = 0
4
5 def __init__(self, name):
6 self.name = name
7 self.count += 1
8
9
10 p1 = Player('Parzival')
11 print(Player.count)
WHAT WILL THIS CODE PRINT?
30 MIND BENDING TEASERS & SOLUTIONS
MIKI TEBEKA