

# STAT107 Data Science Discovery

LAB: SIMULATION

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- Please work in a group of 2–4 students
  - collaboration is important in data science!
  - meet new friends and discuss :)
  - let us know if you have any questions
- Attendance form
  - you can come up if you do not want to use this form
  - submit before you leave the lab
- Midterm lab feedback
  - please fill in so I can make my labs better for you :)
- Project info
  - to be released this Friday
  - due on 4 Apr (tentative)
  - I will give some hints (to the extra credit question) after the break

## Random fact of the day

The **infinite monkey theorem** states that a monkey hitting keys at random on a typewriter keyboard for an infinite amount of time will type any given text, such as Shakespeare's Hamlet, with probability 1. Let's watch this **video** to see why.

## Practical experience of the day

Simulation can be used to price financial derivatives. It is also a key technique in risk management.

- Check email for score decomposition
- Some reflections (e.g., level of preparation, type of course, number of non-major students, subjectivity of “difficulty”, departments, instructors, etc.) are really insightful! I would love to give you extra credit if I can :P
- 2.1: you may use sorting instead of `nsmallest()` but you should store information in addition to course number. I let you go if you do it correctly in 2.2
- 2.3: Joe's claim is what I know about university course codes. Before I added this question last semester, this lab assumed  $\text{difficulty} \uparrow = \text{average gpa} \downarrow$ . You should be aware of the assumptions you make (implicitly) when you analyze data in practice

- 3.3: a density histogram's y-axis should be from 0 to at most 1
- 3.4: a frequency histogram is usually not meaningful because we are interested in the percentages of different grades.  
However, it is fine if you can argue that it is meaningful (e.g., the shape is similar)

- Main page
- Avengers: Infinity War
- Hints
  - Available by double clicking the question cells
  - Get at most 4 points from extra credit question
- Submit your work. Feel free to:
  - ask us questions
  - leave whenever you finish the lab

1. Generate random dots on a unit square with a circle inscribed.
2. The ratio of dots inside the circle to the total number of dots  $\approx \pi/4$ ; see Puzzle 4.2.