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STAT107 Data Science Discovery

Lab: Simulation

Man Fung (Heman) Leung

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University of Illinois at Urbana-Champaign

- 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

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.

Comment: GPA

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- Reflections
  - having full score does not imply I agree with you
  - but some reflections are really insightful! I would love to give you extra credit if I can :P
- Common/potential mistakes
  - forgot to normalize the frequency for density histogram
  - hardest $\neq$ lowest average GPA
  - overwrote useful variables (e.g., `df`) in the middle
- Running the test cases successfully do not imply full score
  - some puzzles' output cannot be tested
  - but failing a test case does imply point lost

Today's lab: Simulation

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- Main page
- Retrieve the lab using git
- Complete the notebook
  - Avengers: Infinity War
  - hints are available by double clicking the question cells
- Submit your work. Feel free to:
  - ask us questions
  - leave whenever you finish the lab

Estimating π via simulation

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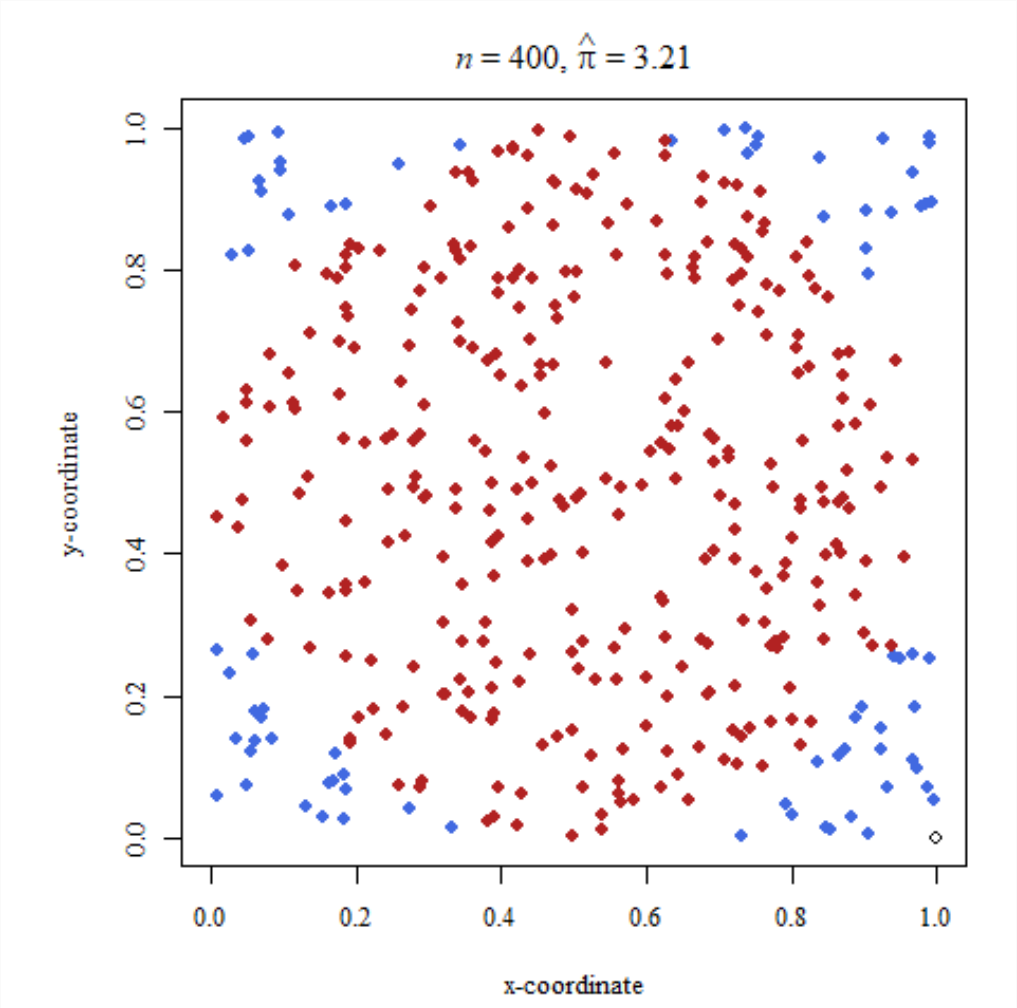
1. Generate random dots on a unit square with a circle inscribed.
2. The ratio of dots inside the circle to the total number of dots $\approx \pi/4$; see Puzzle 4.2.



Checking completion

Default total number of cells: 42

- 0.1–0.4 in cell 5, 7, 9, 11 (completed)
- 1.1 in cell 13
- 1.2 in cell 15
- 2.1 in cell 18
- 2.2 in cell 20
- 2.3 in cell 22
- 3.1 in cell 25
- 3.2 in cell 27
- 3.3 in cell 29
- 3.4 in cell 32 (reflection)
- 4.1 in cell 35
- 4.2 in cell 37
- 4.3 in cell 40 (reflection)