

CHAPMAN University
 Department of Computational and Data Sciences
 CS501 Introductory Computation for Scientists
 Fall 2019
 Homework#8

Date Given: Oct 9, 2019

Due Date: Oct 15, 2019

Problem#1

- a. If you toss a fair coin 5 times, what is the theoretical probability of getting 5 consecutive tails? Write Python code that computes this probability. (Answer $P(5cT) = 0.03125$)
- b. Write Python code that simulates 5 tosses of a coin and then counts the number of tails in the experiment.
`Trial#1: Toss a coin 5 times, compute the number of tails.`
- c. Write Python code that repeats step (b) 100 times. How many times we get 5 consecutive tails?
`Repeat Trial#1 100 times`
- d. Write Python code that repeats step (b) 10,000 times. How many times (percentage) we get 5 consecutive tails? Your computed result obtained by simulation should be approximately equal to the theoretical probability computed in step (a) ($P(5cT) = 0.03125$).
`Repeat Trial#1 10,000 times`
- e. Let us estimate the variation of $P(5cT)$ metric. In step 'c' we tossed a coin 5 times and repeated this experiment 100 times, and then we counted the number of 'tails'. Write Python code that repeats this experiment of step 'c' 10,000 times. Generate a histogram of $P(5cT)$ metric.
`Trial#2: Repeat Trial#1 100 times`
`Repeat Trial#2 10,000 times and plot the histogram of this distribution`

Difference between step (d) and step (e).

- In step (d) we repeat the experiment 10,000 times.
- In step (e) we repeat the experiment 100 times and reset the counters. We repeat the same experiment 10,000 times.

Your histogram in step (e) should look as follows.

