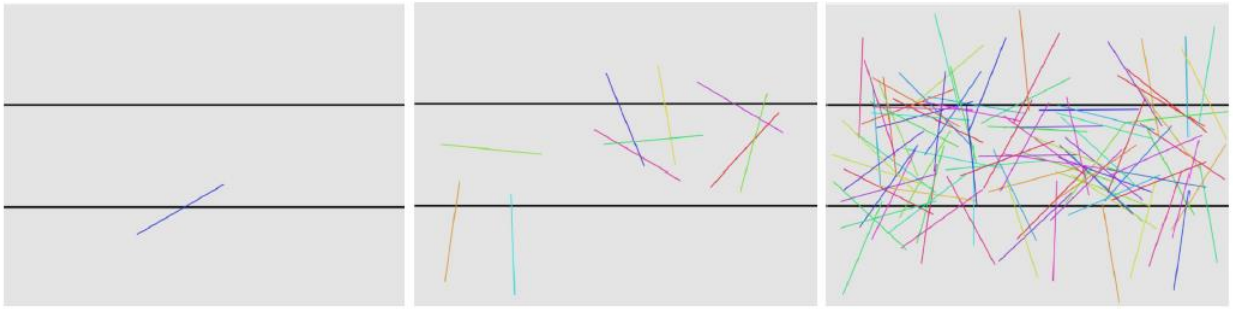
CmpE49G - Project 1

Monte Carlo Simulation: Buffon's Needle

Due Date: 2020.11.25 @ 23:59

Suppose, a needle of size L is dropped on a lined sheet of paper, where the distance between lines is D with satisfying $L < D$. We are interested in the probability of the needle crossing one of the lines on the sheet. In fact, this probability is $\frac{2L}{D\pi}$.



For investigating this probability, you are expected to do Monte Carlo simulations with at least three different D and L cases. You should simulate the system for 10^2, 10^3, 10^4, 10^5, and 10^6 needles and track the number of needles that are crossing one of the lines to evaluate the probability of crossing a line. By doing Monte Carlo simulations, you will be able to validate the probability is converging to $\frac{2L}{D\pi}$ as we increase the replication count (number of needles).

Submission:

- Submission will be done over Moodle
- You should submit a zip file with the name <stuID_prj1_name_surname.zip> and that has i) a detailed report for presenting the problem, solution approach, the results with plots and figures, and the observations/conclusion (at most 4 pages); ii) code of the simulator; iii) a readme file for the instructions to run the code with example parameters.
- You may use **any** programming language