CS 8, Winter 2015
Homework Assignment #? (draft)

Assignment Overview

This assignment is for you to practice more with Turtle Graphics, loops and lists.

Assignment Specifications

Imagine a long hallway with n doors, where n is an odd number. These doors are numbered from left to right as $-(n-1)//2, -(n-1)//2+1, \ldots, -1, 0, 1, .., (n-1)//2-1, (n-1)//2$. A drunkard is placed in front of the middle door (door 0). At each instance, the drunkard can either stay put, stumble left one door, or stumble right one door. These three actions occur with equal probability of 1/3. After $(n-1)//2$ moves, theoretically, the drunkard could move all the way to the left, all the way to the right, or any door in between. The question is this: In front of which door does the drunkard most likely end up?

You probably suspect that it is not possible to state with certainty, for a particular instance, which door the drunkard will end up in front of. However, if the drunkard is to repeat the same experiment many times, then we can say with increasing certainty that the drunkard will end up in front of door 0 than in front of any other doors. This result is predicted by the Law of Large Numbers (lln).

You are to simulate this law and present the results graphically. You should implement a function called:
lawofLargeNumbers(nDoors, nTrials, penColor, fillColor)
- nDoors: number of doors in the hallway. This number should always be odd,
- nTrials: number of trials the drunkard will repeat. In each trial you will place the drunkard in front of door 0, and let the drunkard stumble through nDoors steps. Each step can be a left move, a right move, or a stay-put,
- penColor: turtle pen color for presenting the results, and
- fillColor: turtle fill color for presenting the results.

The result is table with nDoors entries, representing doors $-(n-1)//2$ to $(n-1)//2$. Each entry records the number of times the drunkard stumbles in front of the particular door. You then plot a bar chart with the height of the bar proportional to the recorded number. You should also output the number of doors and number of trials in your graph.

Assignment Deliverables

The deliverable for this assignment is the following file:

      lln.py – the source code for your Python program

Be sure to use the specified file name and submit it for grading via the **turnin** system before the project deadline.
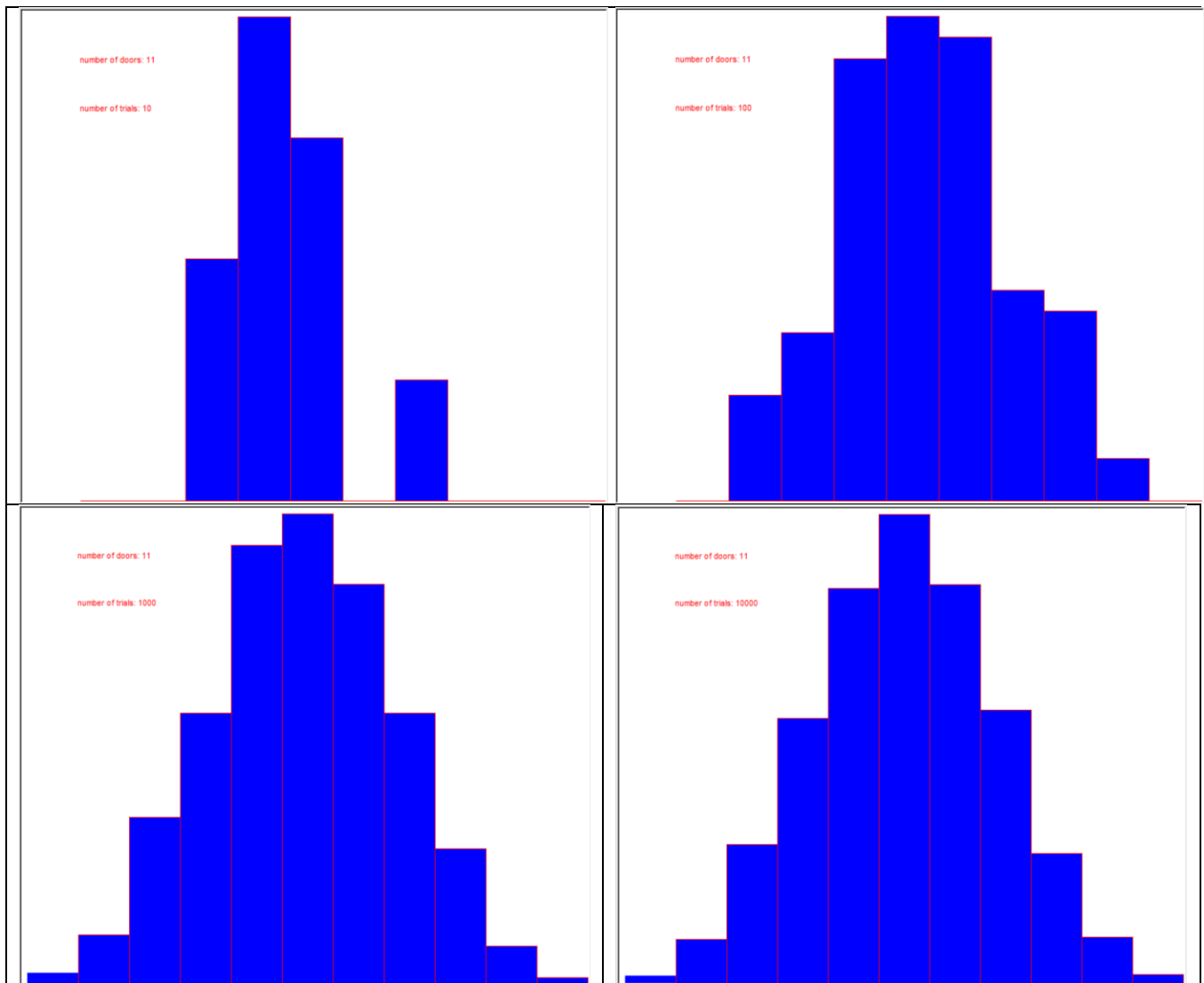
Sample Outputs

Figure 1 with 11 doors and 10, 100, 1,000, and 10,000 trials. Note that your graphs should not look exactly like the above, as random numbers are used, but should hopefully have a similar central tendency trend.