Distributions and Curves

Since Akshat has an idea of grading statistics for the upcoming courses beforehand but the others don't so he is planning to do RG right from the start : (So Please help others by providing them with the stats and do not let Akshat achieve his cunning plan.

Problem: You are given the following grading stats (taken from ASC) for different courses in the 4th semester of the Computer Science Dept in the form of a JSON file. Your task is to create a function that takes in argument as a dictionary (having keys as grades and values as their frequency) and plots a single graph of (PMF and CDF) and prints the mean, median, and standard deviation of the data. Note that you need to use subplots to plot the graphs for each Course in the same figure. (Look up for json.loads() in python)

JSON file:-
https://drive.google.com/file/d/1MHhMQ_j_mFGXGIWPflapfeuNTQm_wQBN/view?usp=sharing

Steps you have to follow:

1. Load the JSON file given in the form of a dictionary.
2. This dictionary contains **keys** as Course names and **values** as another dictionary that has the statistics of that individual course. (i.e the grade and their corresponding frequency).
3. The function that you need to create would take in this dictionary (having statistics of a single course) and then for every course in the total dictionary you need to call this function.

Submission: You need to submit (1) a python file named **Grades.py** having the function name **Coursestat** and (2) an Image of the plots on a link which would be provided later.

Your submission image should look like this:
https://drive.google.com/file/d/130FkJsG8RZ7qz5eYkEq0LpeJwU7WifNY/view?usp=share_link

We hope that you complete this assignment soon and help others to not get RGed by Akshat : D

Random Walkers

A very brilliant yet selfish scientist Ayush wanted to observe the behavior of different people when they are under influence of alcohol. In order to observe this, he tricked 100 people into drinking alcohol just to get his observations. Can you simulate what would he have got?

Problem: Simulate $\mathbf{N = 10^2}$ independent random walkers along the real line, each walker starting at the origin, and each walker taking $\mathbf{n = 10^3}$ steps each of length $\mathbf{\Delta z = 10^{-3}}$ either to his left or right from the current position in a unit of time. Plot space-time curves that show the path taken by each walker.

Steps you have to follow:

1. Generate a random number that can take 2 values. One represents the left step and the other the right step.
2. Find the final location after i^{th} step by adding all the previous steps and taking into account the length of each step.
3. Now plot the graph of location vs the time for each of the **N** walkers.

Submission: You need to submit (1) a python file named **walkers.py** (2) an Image of the plot on a link which would be provided later.

Your plot should look similar to this:
https://drive.google.com/file/d/1J6WIEAWQgm0NRj2vvUFu2zGYbuHUj81o/view?usp=sharing