

Problem Statement 1 : Say you are standing at the bottom of a staircase with a dice. With each throw of the dice you either move down one step (if you get a 1 or 2 on the dice) or move up one step (if you get a 3, 4 or 5 on the dice). If you throw a 6 on the dice, you throw the dice again and move up the staircase by the number you get on that second throw. Note if you are on the base of the staircase you cannot move down! What is the probability that you will reach more than 60 steps after 250 throws of the dice. Change the code so that you have a function that takes as parameter, the number of throws

Add a new parameter to the function that takes a probability distribution over all outcomes from a dice throw. For example (0.2,0.3,0.2,0.1,0.1,0.1) would suggest that the probability of getting a 1 is 0.2, 2 is 0.3 etc. How does that change the probability of reaching a step higher than 60?

Problem Statement 2 : . Generate random data for for Multiple Linear Regression, Logistic Regression, K-mean Clustering

Problem Statement 3 : Implement the following algorithms from scratch using numpy only and using the data from Question 1 “for loop”

- a. Linear Regression using Gradient Descent
- b. Logistic Regression using Gradient Descent
- c. Linear Regression with L1 and L2 Regularization
- d. Logistic Regression with L1 and L2 Regularization
- e. K-Means

Problem Statement 4 : Change code into an Object Oriented Project reusing part of the code where possible