Assignment 1

You can use printing and handwriting together to finish your assignment. Please ensure that your name and student ID have been written on every page of your assignment file. You should hand in your assignment 1 on March 27th, 2023, during the morning class. Late submission should be unacceptable.

1. Using whatever programing language you are familiar with to do the following experiment, print your experiment results out with appropriate explanations and graphs:
2. Generate a sample with size N = 1 from a random variable following a binomial distribution with parameters n = 5, p = 0.1
3. Given the prior distribution is a uniform distribution (0,1), please calculate the posterior expectation of the estimated parameter of p and its 95% posterior interval.
4. Now, generate another 100 sampling units from the same binomial distribution and use them to update the posterior expectation of the estimated parameter one-by-one. Then draw the line of the updating process and its 95% posterior band.
5. Please answer the following questions:
6. What is the difference between confidence interval and posterior interval?
7. What is the difference between frequentist prediction and Bayesian prediction?
8. What is the difference between the likelihood function in A-1 and the posterior distribution in A-2?