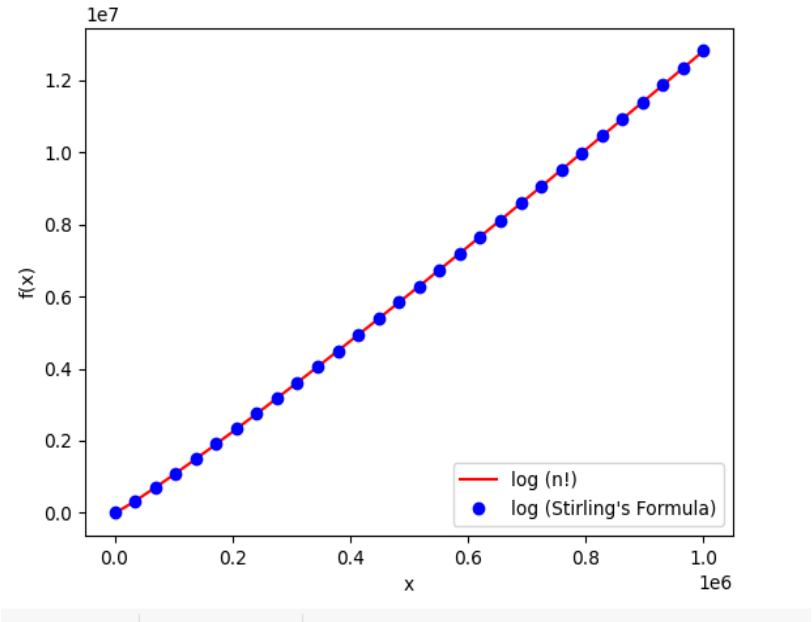
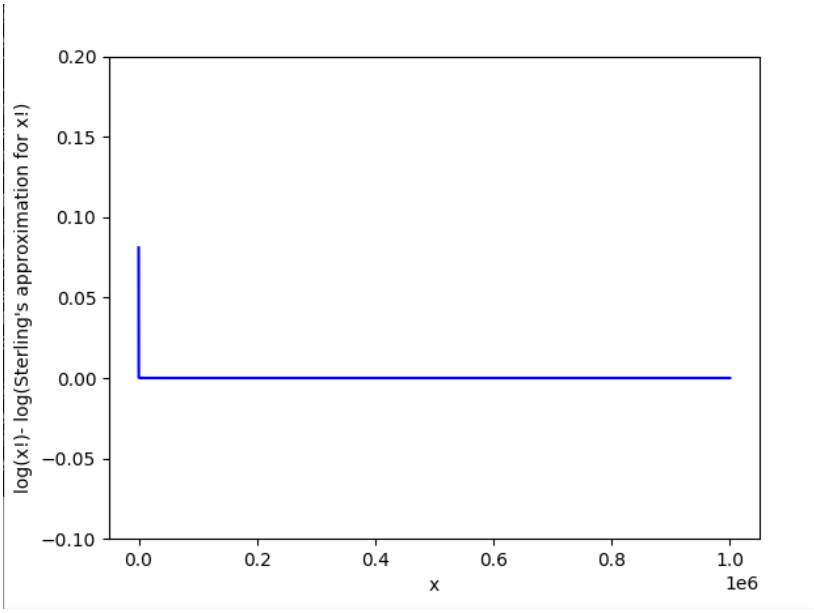
Computational Methods and Applications
Assignment 1: Monte Carlo Method

Yukta Salunkhe
112001052

Q1. Factorial and Sterling's Approximation:

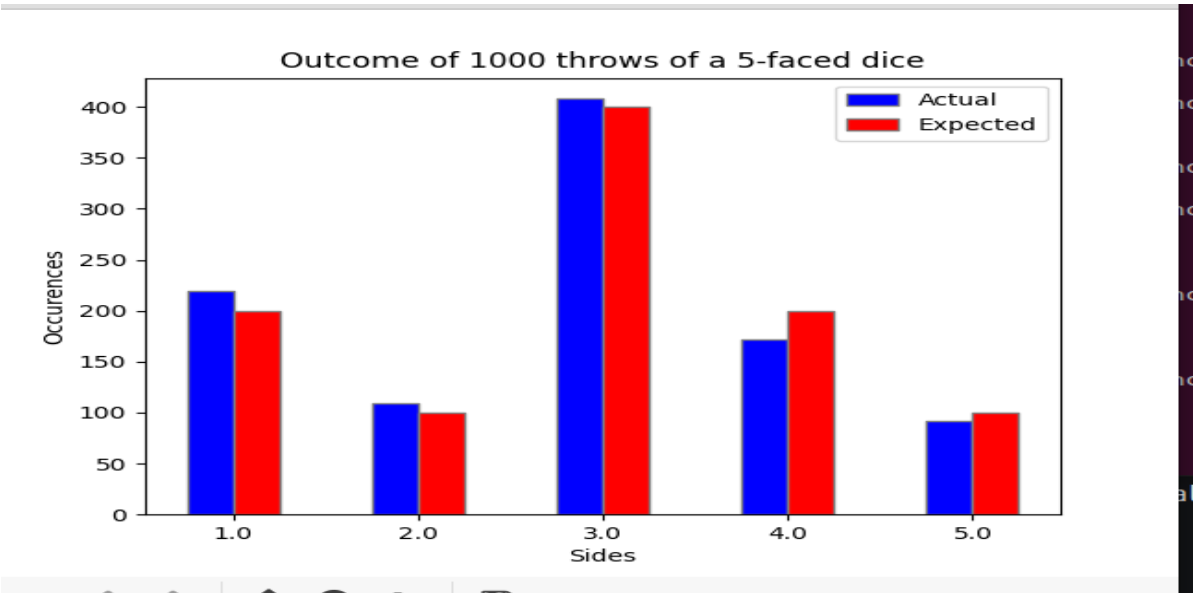


Since plotting x! would be very large computation wise, we have plotted log(x!) and log(Sterlings Approximation for x!). The 2 plots overlap with each other. Hence this approximation is accurate, even for small values of x as can be seen from plots.

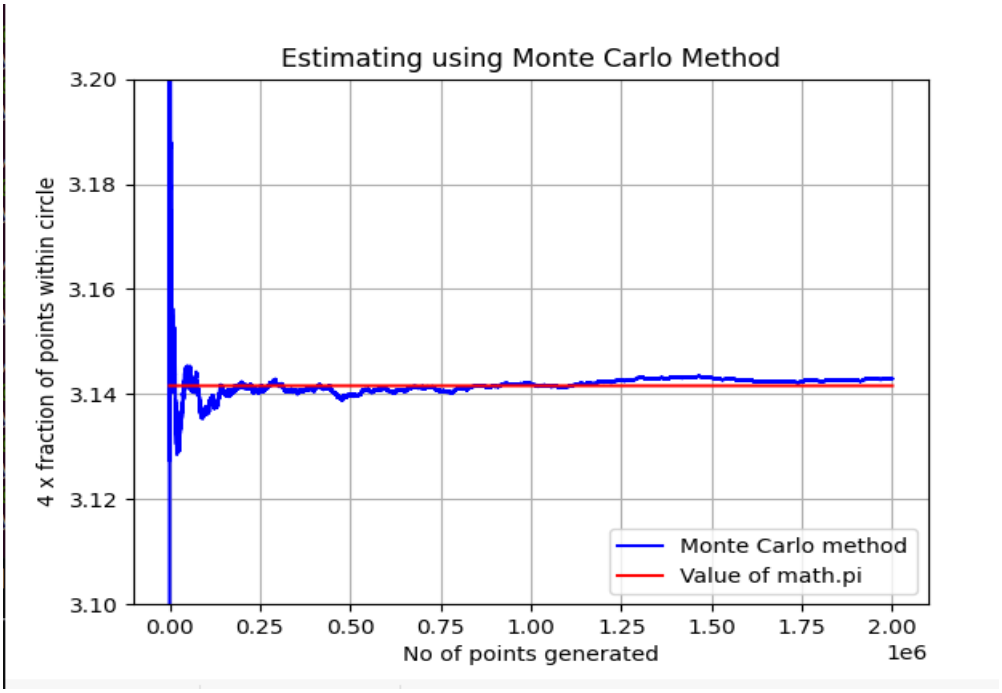


The difference between the two plots for varying x is plotted in this graph. It's clearly visible that the approximation of x! Is similar to the actual value of x! (here we are considering log of these functions)

Q2. Output for 5 faced dice with probabilities -() thrown 1000 times :



Q3. Simulation for pi value estimation:
Approach: commented in code.



It's clear that for a large number of random values the number of points lying within a shape is proportional to the area of that shape.

Q4. Approach-commented in code.