Probability and Statistics Simulation Report

1. Coin Toss Simulation (10,000 tosses):

   - Heads Probability: 0.4973

   - Tails Probability: 0.5027

2. Dice Roll (Two Dice, Sum = 7):

   - Probability of sum 7: 0.1696

3. At Least One '6' in 10 Rolls of Die:

   - Probability: 0.8375

4. Conditional Probability (Bayes' Theorem Simulation):

   - P(Red | Previous was Blue): 0.261

5. Discrete Random Variable Simulation:

   - P(X=1)=0.25, P(X=2)=0.35, P(X=3)=0.40

   - Mean: 2.191

   - Variance: 0.6225

   - Std Deviation: 0.7890

6. Exponential Distribution (Mean = 5):

   - Simulated 2000 samples and visualized using histogram and PDF curve.

7. Central Limit Theorem:

   - 10,000 uniform values generated.

   - 1000 sample means (sample size=30) computed and visualized.

- Sample mean distribution appears approximately normal, demonstrating CLT.