**1. Coin Toss & Dice Roll Simulation**

* **(a)** Simulate 10,000 coin tosses using random.choice(['H', 'T']).
* **(b)** Roll two dice, count how often their sum is 7 out of 10,000 trials.

**2. At Least One '6' in 10 Die Rolls**

* Simulate rolling a die 10 times, for 10,000 trials.
* Count how often **at least one 6** appears.
* Estimate the probability from these trials.

**3. Conditional Probability & Bayes’ Theorem**

* 5 red, 7 green, 8 blue balls = 20 total.
* Simulate drawing a ball 1000 times with replacement.
* Track when previous draw is blue → what is chance current draw is red.
* Estimate and compare with Bayes’ theorem formula.

**4. Discrete Random Variable (Empirical Mean/Variance)**

* Sample 1000 values where:
  + P(X=1) = 0.25
  + P(X=2) = 0.35
  + P(X=3) = 0.40
* Use numpy.random.choice and compute mean, variance, std.

**5. Exponential Distribution**

* Simulate 2000 values from np.random.exponential(scale=5)
* Plot:
  + Histogram
  + Overlay PDF using scipy.stats.expon.pdf

**6. Central Limit Theorem**

* Generate 10,000 values from Uniform[0, 1]
* Take 1000 samples of size 30
* Compute mean of each sample
* Plot histogram of:
  + Uniform distribution
  + Sample means (which should look Normal)