Simulation Lab(MC503)
Assignment7

Try to solve all the problems

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1. The PDF and CDF of Burr type III distribution is given by

$$PDF : f(x, \alpha, \beta) = \alpha\beta x^{-(\beta+1)}(1 + x^{-\beta})^{-(\alpha+1)}; x > 0, \alpha > 0, \beta > 0.$$
$$CDF : F(x, \alpha, \beta) = (1 + x^{-\beta})^{-\alpha}$$

Use the probability integral transform to generate 2000 samples from this distribution when $\alpha = 1$ & $\beta = 1.5$. Calculate mean and Variance for the generated samples. Plot this PDF and CDF for $\alpha = 1$, $\beta = 1$, $\alpha = 1.5$, $\beta = 3$, where the range of x is $0.01 \le x \le 5$ with step-size 0.01. You can use different colours to identify the PDF and CDF for different parameter values.

2. Generate 1000 random samples from the discrete uniform distribution
The PMF is: $p(x) = \frac{1}{j-i+1}$; x=i, i+1,...,j.

Algorithm:
Simulate U $\sim$ U[0,1]. Return X= i + [(j-i+1)U].
Find its means and variance and verify the sample mean and variance from the exact distribution mean.

3. Generate 1000 random samples from the Bernoulli (p) Distribution
Algorithm:
Simulate U $\sim$ U[0,1]. If U $\le$ p, return X=1, else return X=0.

.... end ....