Random Variables - Project 1

BASUNDHARA DEY

NID #: ba407257

**Q1: Generate 1000 samples for each of the following discrete random variable:**

a) Binomial distribution with n=30, p=0.6, and distr. with n=60, p=0.5



b) Geometric distribution with p=0.6 and distr. with p=0.4



b) Poisson distribution with Lambda=3 and Lambda=10



In addition, calculate the mean value and variance of generated samples for each distribution.

|  |  |  |
| --- | --- | --- |
| **Distribution** | **Mean Value** | **Variance** |
|  |  |  |
| **Binomial Distribution** | np | np(1-p) |
| **n=30 , p=0.6** | =18 | =7.2 |
| **n=60 ,p=0.5** | =30 | =15 |
|  |  |  |
| **Geometric Distribution** | **1/p 🡺 {1, 2, 3…**  **(1-p)/p 🡪{0, 1...}** | **(1-p)/p^2** |
| **p=0.6** | 1/p=1.67  (1-p)/p=0.67 | =1.11 |
| **P=0.4** | (1-p)/P=1.5  1/P=2.5 | =3.75 |
|  |  |  |
| **Poisson Distribution** | **λ** | **λ** |
| **Λ=3** | 3 | 3 |
| **Λ=10** | 10 | 10 |

**Q2: Generate 1000 samples for each of the following continuous random variables:**





The calculation of the mean value and variance of generated samples for each distribution.

|  |  |  |
| --- | --- | --- |
| **Distribution** | **Mean Value** | **Variance** |
|  |  |  |
| **Exponential distribution** |  |  |
| **Λ=1.4** | =0.71 | =0.51 |
| **Λ=2.8** | =0.38 | =0.13 |
|  |  |  |
| **Normal distribution** | **µ** | **2** |
| **µ =10, 2 =5** | 10 | 5 |
| **µ=1, 2 =10** | 1 | 10 |
|  |  |  |