Quiz Sample

Please show your work.

1. X is a random variable, where X follows a Bernoulli distribution with success probability p $Bernoulli(p)$. Find $E(X+X)$ and $Var(X+10)$:

   solution: Since X follows a Bernoulli distribution with success probability p, $E(X)=p$ and $Var(X)=p*(1-p)$. $E(X+X)=E(X)+E(X)=2E(X)=2p$.

   Since 10 is constant, $Var(X+10)=Var(X)=p*(1-p)$

2. X_1 and X_2 are independent random variables, and both of them follows exponential distribution with parameter 2. Find $Var(\frac{X_1+X_2}{2})$

   solution: $Var(\frac{X_1+X_2}{2})=(\frac{1}{2})^2 Var(X_1+X_2)$.

   Since X_1 and X_2 are independent, $Var(X_1+X_2)=Var(X_1)+Var(X_2)$

   Since X_1 and X_2 follow exponential distribution with parameter 2, $Var(X_1)=Var(X_2)=1/4$

   Hence,

   $$Var(\frac{X_1+X_2}{2})=(\frac{1}{2})^2 Var(X_1+X_2)=(\frac{1}{2})^2(\frac{1}{4}+\frac{1}{4})=\frac{1}{8}$$

   .

3. In python, if I run the following code what is the output?

```
counter = 0
for i in [1,2,4] :
    counter += 1

print(counter)
```

   The output is 3.