Probability and Statistics - IT2120

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Exercise

1. An IT company claims that their newly developed learning platform improves student performance in online tests. According to previous data, 85% of students who used the platform passed their online tests. A batch of 50 students is selected at random who have completed the course using this platform. Let X denote the number of students who passed the test out of 50 students.

    I. What is the distribution of X?

```
setwd("C:\\Users\\User\\Desktop\\PS Lab 06")

#Q01
#i. What is the distribution of X?
#Binomial Distribution
#Here, random vriable X has binomial distribution with n=50 and p=0.85.
```

```
> setwd("C:\\Users\\User\\Desktop\\PS Lab 06")
>
> #Q01
> #i. What is the distribution of X?
> #Binomial Distribution
> #Here, random vriable X has binomial distribution with n=50 and p=0.85.
```

    II. What is the probability that at least 47 students passed the test?

```
#ii. What is the probability that at least 47 students passed the test?
#Binomial distribution with n=50, p=0.85
#Probability that at least 47 students passed: P(X >= 47) = 1 - P(X <= 46)
1 - pbinom(46, 50, 0.85)
```

```
> #ii. What is the probability that at least 47 students passed the test?
> #Binomial distribution with n=50, p=0.85
> #Probability that at least 47 students passed: P(X >= 47) = 1 - P(X <= 46)
> 1 - pbinom(46, 50, 0.85)
[1] 0.04604658
```

2. A call center receives an average of 12 customer calls per hour

    I. What is the random variable (X) for the problem?

```
#Q02
#i. What is the random variable (X) for the problem?
#X is the number of customer calls received in one hour.
```

```
> #Q02
> #i. What is the random variable (X) for the problem?
> #X is the number of customer calls received in one hour.
```

II. What is the distribution of X?

```
#ii. What is the distribution of X?
#Poisson
#X follows a Poisson distribution with parameter lambda=12.
```

```
> #1. What is the distribution of X?
> #Poisson
> #X follows a Poisson distribution with parameter lambda=12.
```

III. What is the probability that exactly 15 calls are received in an hour?

```
#iii. What is the probability that exactly 15 calls are received in an hour?
#P(X=15)
#Poisson distribution with lambda=12
#Probability of exactly 15 calls: P(X=15)
dpois(15, 12)
```

(Top Level)

```
> #iii. What is the probability that exactly 15 calls are received in an hour?
> #P(X=15)
> #Poisson distribution with lambda=12
> #Probability of exactly 15 calls: P(X=15)
> dpois(15, 12)
[1] 0.07239112
```