Lab Sheet 06

IT2120

IT24103397

Exercise

Instructions: Create a folder in your desktop with your registration number (Eg: "IT....."). You need to save the R script file and take screenshots of the command prompt with answers and save it in a word document inside the folder. Save both R script file and word document with your registration number (Eg: "IT....."). After you finish the exercise, zip the folder and upload the zip file to the submission link.

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?

```
> # Exercise 1
> n <- 50
> p <- 0.85
>
> # i. Distribution
> cat("X ~ Binomial(50, 0.85)\n")
X ~ Binomial(50, 0.85)
```

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

```
> # ii. P(X ≥ 47)
> prob_geq_47 <- 1 - pbinom(46, n, p)
> cat("P(X ≥ 47) =", prob_geq_47, "\n")
P(X ≥ 47) = 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?

```
> # Exercise 2
> lambda <- 12
>
> # i. Random variable
> cat("X = Number of calls per hour\n")
X = Number of calls per hour
```

   ii. What is the distribution of X?

```
> # ii. Distribution
> cat("X ~ Poisson(12)\n")
X ~ Poisson(12)
```

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

```
> # iii. P(X = 15)
> prob_15 <- dpois(15, lambda)
> cat("P(X = 15) =", prob_15, "\n")
P(X = 15) = 0.07239112
```