

Sri Lanka Institute of Information Technology



Lab Submission
<Lab sheet - 06>

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Probability & Statistics | IT2120

B.Sc. (Hons) in Information Technology

Exercise 1

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 ?

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

```
Console Terminal × Background Jobs ×
R 4.5.1 · ~/
> # Exercise 1
> n <- 50
> p <- 0.85
>
> # i. Distribution: X has binomial distribution
> # with n=50 & p=0.85
>
> # ii. Probability at least 47 passed
> prob_geq_47 <- 1 - pbinom(46, n, p)
> prob_geq_47
[1] 0.04604658
>
```

Exercise 2

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

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

ii. What is the distribution of X ?

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

```
> # Exercise 2
> lambda <- 12
>
> # i. X = number of calls per hour
> # ii. Distribution: X has poisson distribution with lambda = 12
>
> # iii. Probability of exactly 15 calls
> prob_15 <- dpois(15, lambda)
> prob_15
[1] 0.07239112
> |
```

```
1 # Exercise 1
2 n <- 50
3 p <- 0.85
4
5 # i. Distribution: X has bionomial distribution
6 # with n=50 & p=0.85
7
8 # ii. Probability at least 47 passed
9 prob_geq_47 <- 1 - pbinom(46, n, p)
10 prob_geq_47
11
12
13 # Exercise 2
14 lambda <- 12
15
16 # i. X = number of calls per hour
17 # ii. Distribution: X has poisson distribution with lambda = 12
18
19 # iii. Probability of exactly 15 calls
20 prob_15 <- dpois(15, lambda)
21 prob_15
22 |
```