

Sri Lanka Institute of Information Technology



Lab Submission
<Lab Sheet 6>

<IT24104049>

<Hewa V S S >

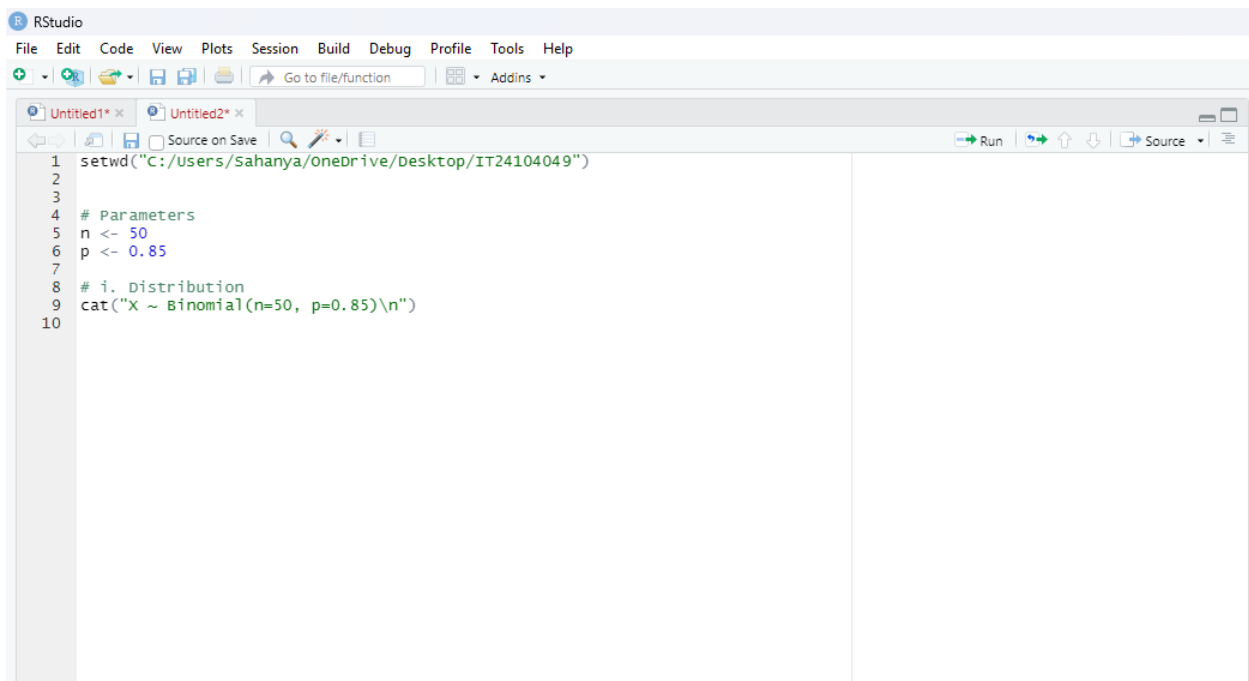
Probability and Statistics - IT2120

B.Sc. (Hons) in Information Technology

Exercise

1)

(i)



The screenshot shows the RStudio interface with two untitled files. The active file, 'Untitled1', contains the following R code:

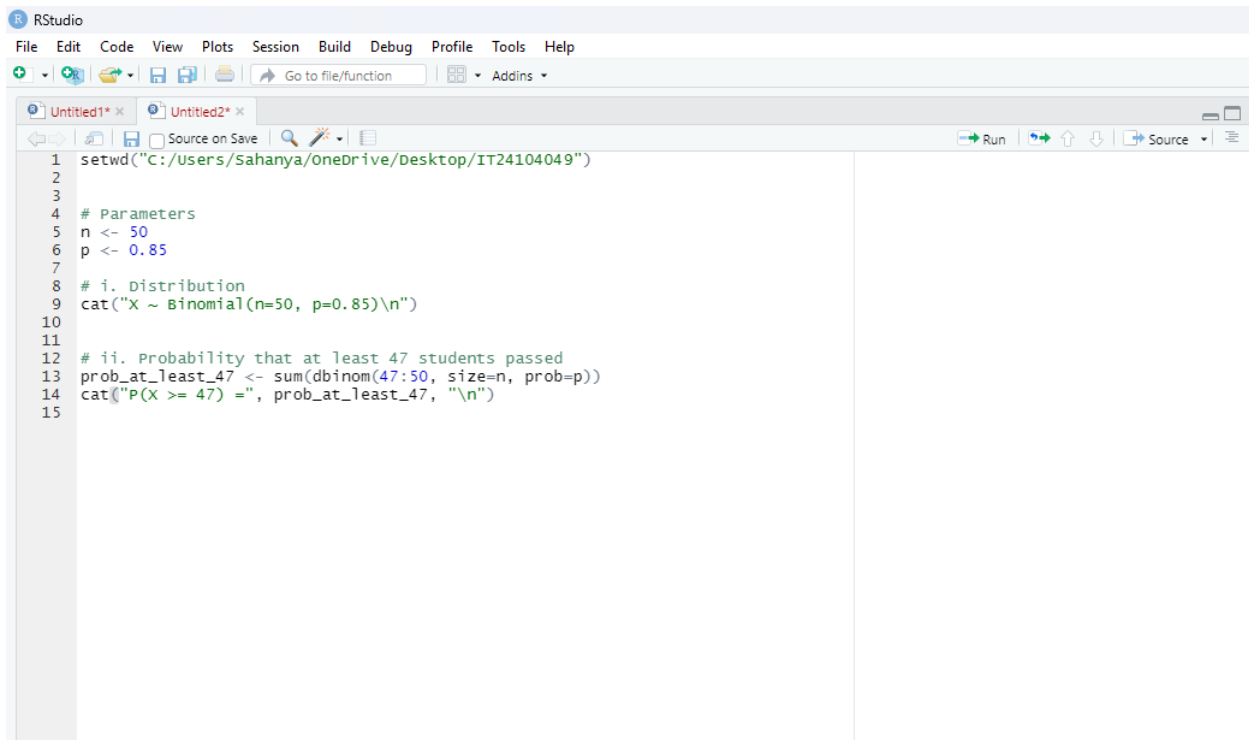
```
1 setwd("C:/Users/Sahanya/OneDrive/Desktop/IT24104049")
2
3
4 # Parameters
5 n <- 50
6 p <- 0.85
7
8 # i. Distribution
9 cat("X ~ Binomial(n=50, p=0.85)\n")
10
```



The screenshot shows the RStudio console with the following output:

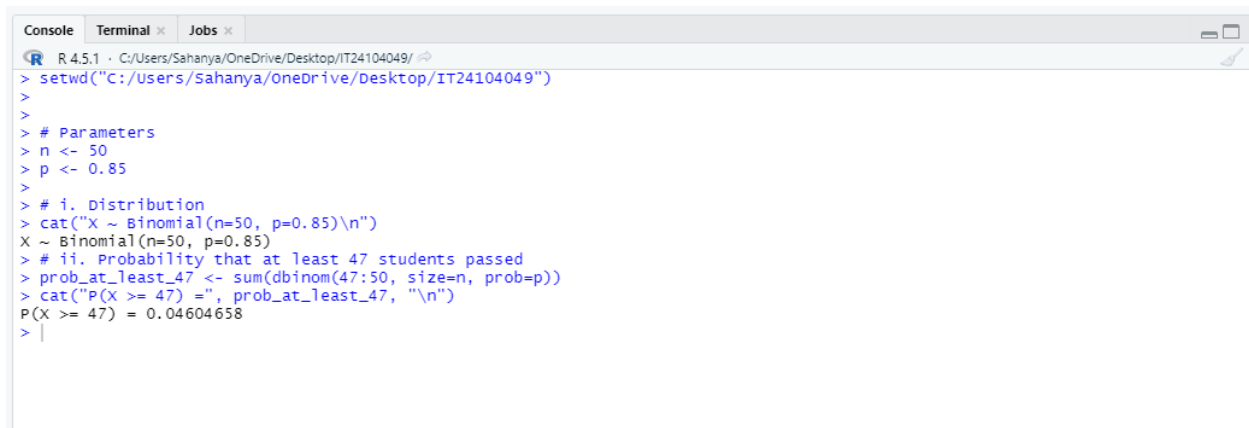
```
R 4.5.1 - C:/Users/Sahanya/OneDrive/Desktop/IT24104049/
> setwd("C:/Users/Sahanya/OneDrive/Desktop/IT24104049")
>
> # Parameters
> n <- 50
> p <- 0.85
>
> # i. Distribution
> cat("X ~ Binomial(n=50, p=0.85)\n")
X ~ Binomial(n=50, p=0.85)
> |
```

(ii)



The image shows the RStudio interface with a script editor containing the following code:

```
1 setwd("C:/Users/Sahanya/OneDrive/Desktop/IT24104049")
2
3
4 # Parameters
5 n <- 50
6 p <- 0.85
7
8 # i. Distribution
9 cat("X ~ Binomial(n=50, p=0.85)\n")
10
11
12 # ii. Probability that at least 47 students passed
13 prob_at_least_47 <- sum(dbinom(47:50, size=n, prob=p))
14 cat("P(X >= 47) =", prob_at_least_47, "\n")
15
```

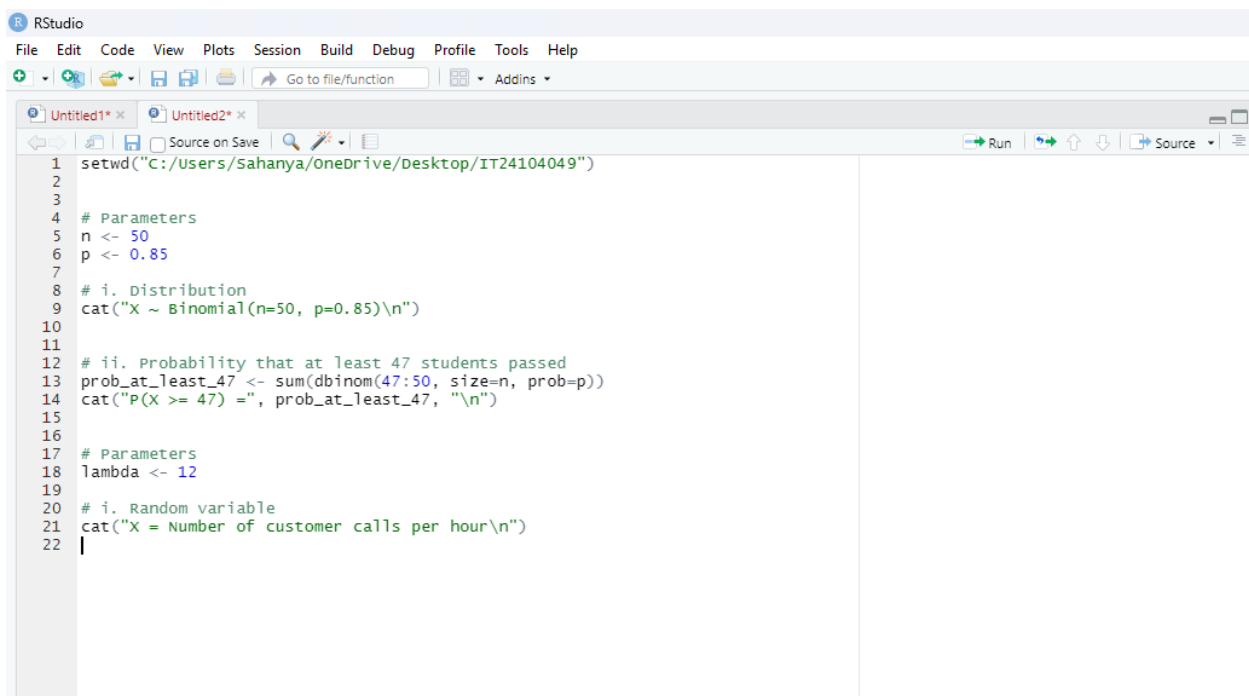


The image shows the RStudio console output for the script above. The output is as follows:

```
R 4.5.1 - C:/Users/Sahanya/OneDrive/Desktop/IT24104049/
> setwd("C:/Users/Sahanya/OneDrive/Desktop/IT24104049")
>
>
> # Parameters
> n <- 50
> p <- 0.85
>
> # i. Distribution
> cat("X ~ Binomial(n=50, p=0.85)\n")
X ~ Binomial(n=50, p=0.85)
> # ii. Probability that at least 47 students passed
> prob_at_least_47 <- sum(dbinom(47:50, size=n, prob=p))
> cat("P(X >= 47) =", prob_at_least_47, "\n")
P(X >= 47) = 0.04604638
> |
```

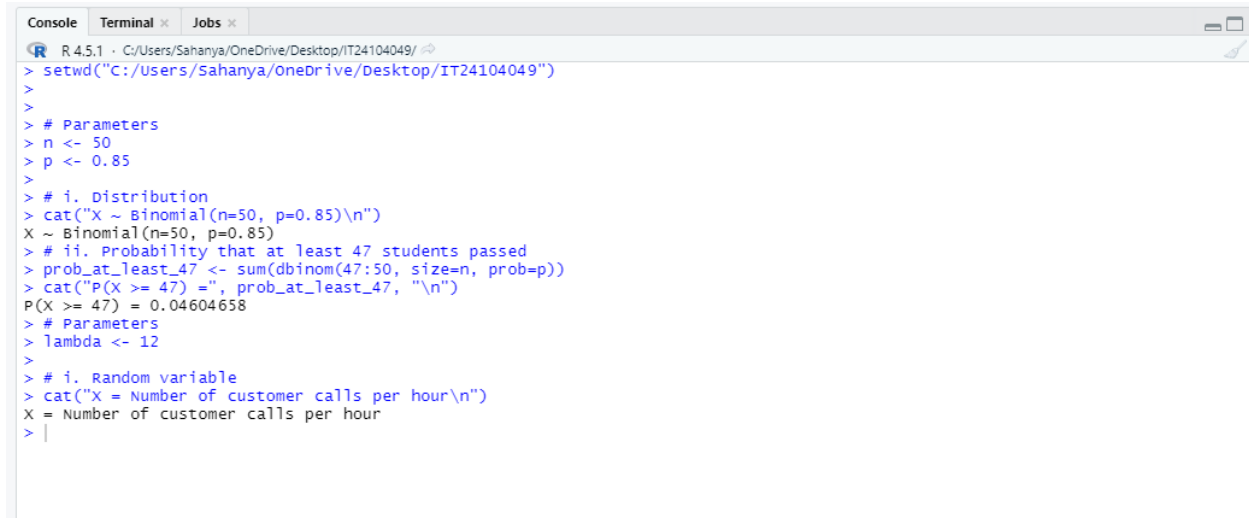
2)

(i)



The screenshot shows the RStudio interface with two untitled files. The active file 'Untitled1*' contains the following R code:

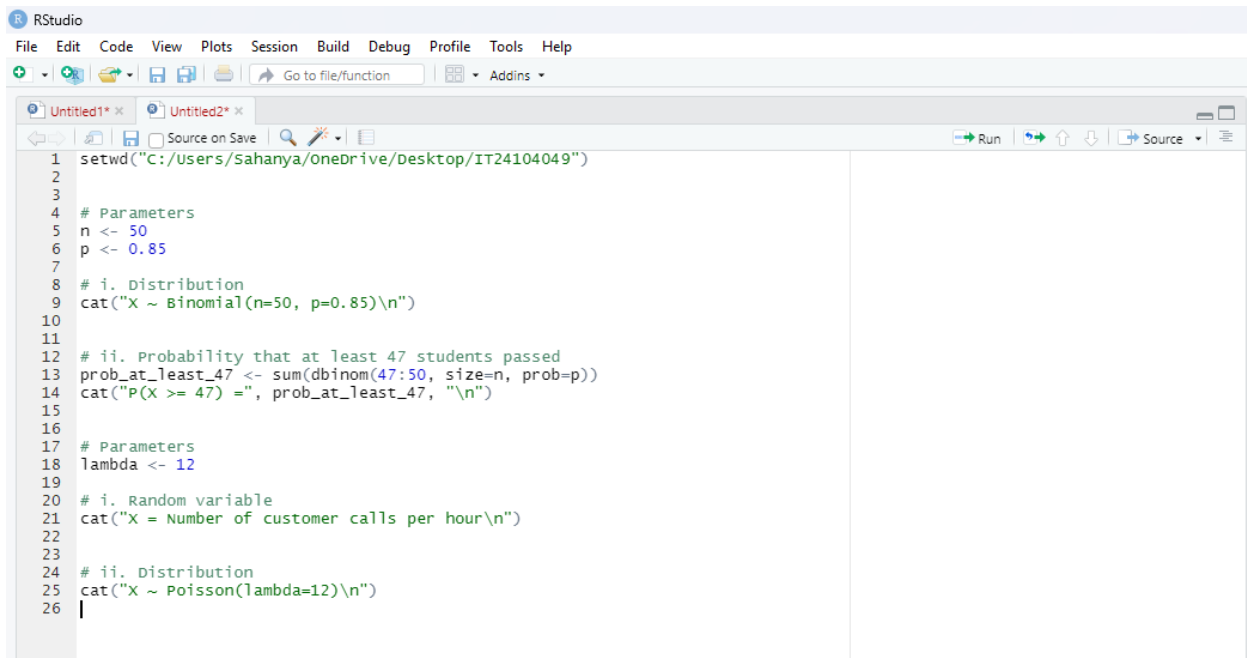
```
1 setwd("C:/Users/Sahanya/OneDrive/desktop/IT24104049")
2
3
4 # Parameters
5 n <- 50
6 p <- 0.85
7
8 # i. Distribution
9 cat("X ~ Binomial(n=50, p=0.85)\n")
10
11
12 # ii. Probability that at least 47 students passed
13 prob_at_least_47 <- sum(dbinom(47:50, size=n, prob=p))
14 cat("P(X >= 47) =", prob_at_least_47, "\n")
15
16
17 # Parameters
18 lambda <- 12
19
20 # i. Random variable
21 cat("X = Number of customer calls per hour\n")
22 |
```



The screenshot shows the RStudio console with the following output:

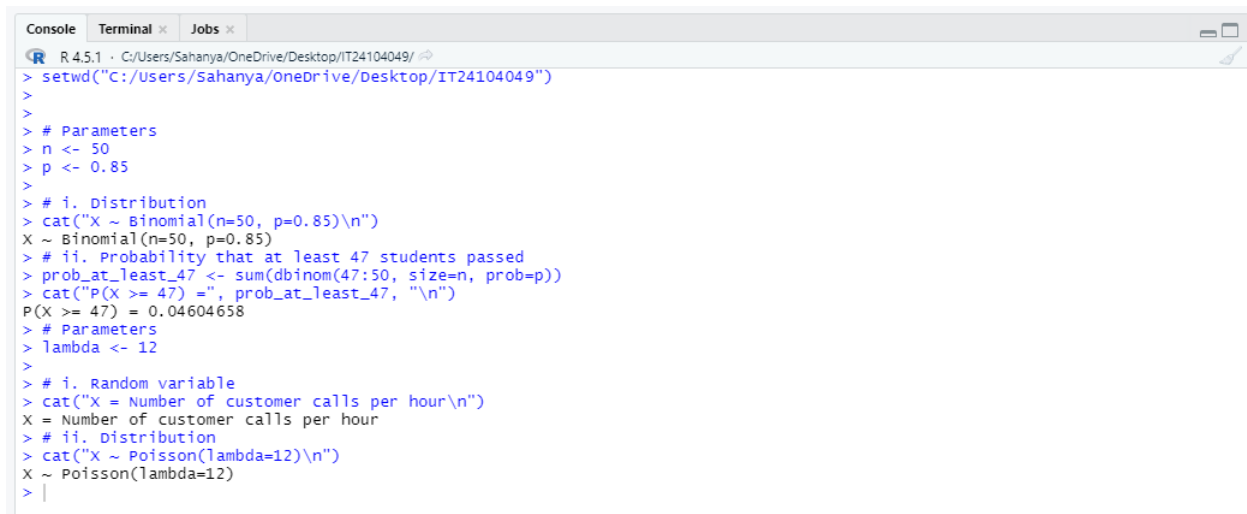
```
R 4.5.1 - C:/Users/Sahanya/OneDrive/Desktop/IT24104049/
> setwd("C:/Users/Sahanya/OneDrive/Desktop/IT24104049")
>
>
> # Parameters
> n <- 50
> p <- 0.85
>
> # i. Distribution
> cat("X ~ Binomial(n=50, p=0.85)\n")
X ~ Binomial(n=50, p=0.85)
> # ii. Probability that at least 47 students passed
> prob_at_least_47 <- sum(dbinom(47:50, size=n, prob=p))
> cat("P(X >= 47) =", prob_at_least_47, "\n")
P(X >= 47) = 0.04604658
> # Parameters
> lambda <- 12
>
> # i. Random variable
> cat("X = Number of customer calls per hour\n")
X = Number of customer calls per hour
> |
```

(ii)



The image shows the RStudio interface with two untitled files. The first file contains R code for a binomial distribution problem, and the second file contains R code for a Poisson distribution problem. The code includes setting the working directory, defining parameters, and calculating probabilities.

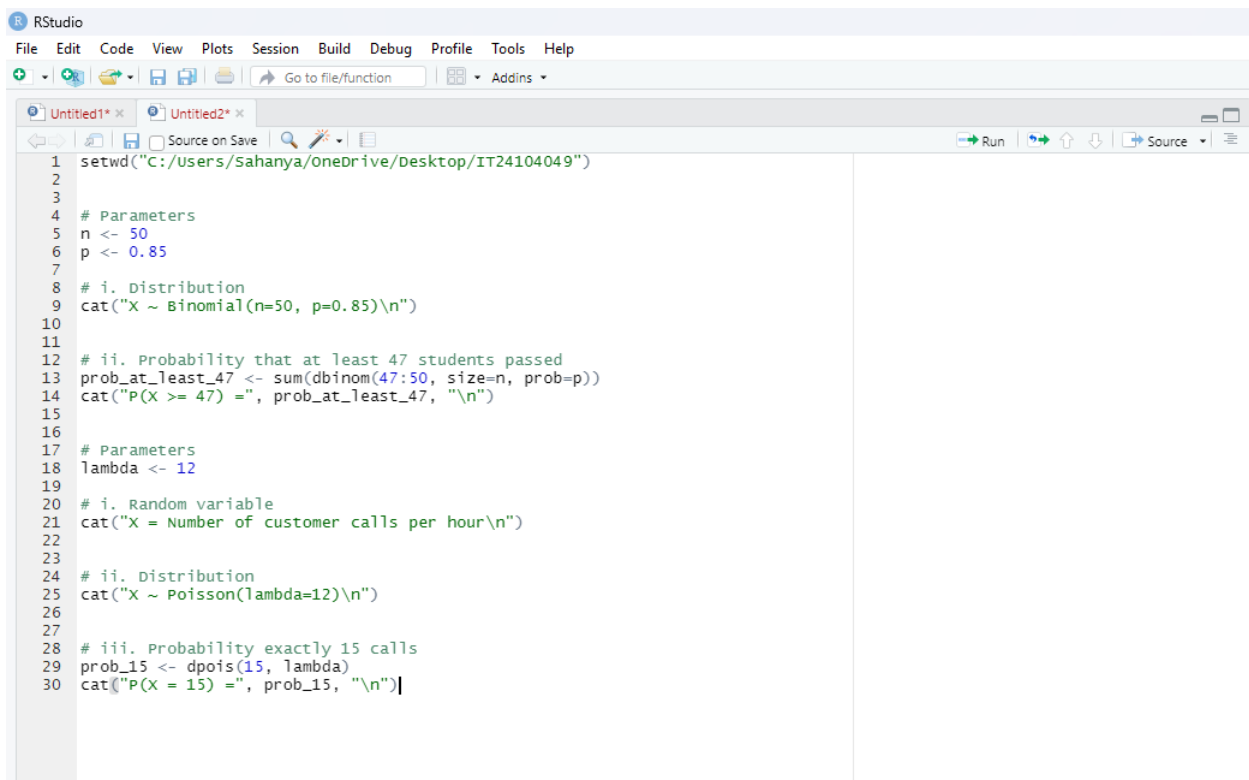
```
1 setwd("C:/Users/Sahanya/OneDrive/Desktop/IT24104049")
2
3
4 # Parameters
5 n <- 50
6 p <- 0.85
7
8 # i. Distribution
9 cat("X ~ Binomial(n=50, p=0.85)\n")
10
11
12 # ii. Probability that at least 47 students passed
13 prob_at_least_47 <- sum(dbinom(47:50, size=n, prob=p))
14 cat("P(X >= 47) =", prob_at_least_47, "\n")
15
16
17 # Parameters
18 lambda <- 12
19
20 # i. Random variable
21 cat("X = Number of customer calls per hour\n")
22
23
24 # ii. Distribution
25 cat("X ~ Poisson(lambda=12)\n")
26
```



The image shows the R console output for the code executed in the RStudio interface. The output displays the results of the calculations, including the probability of at least 47 students passing and the distribution of customer calls per hour.

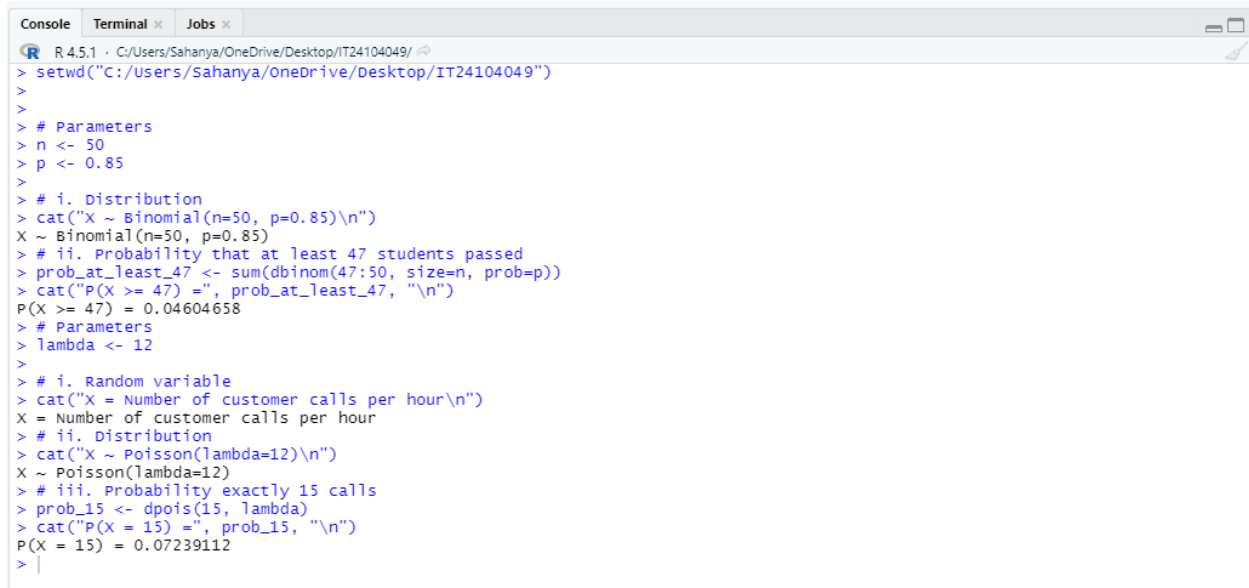
```
> setwd("C:/Users/Sahanya/OneDrive/Desktop/IT24104049")
>
>
> # Parameters
> n <- 50
> p <- 0.85
>
> # i. Distribution
> cat("X ~ Binomial(n=50, p=0.85)\n")
X ~ Binomial(n=50, p=0.85)
> # ii. Probability that at least 47 students passed
> prob_at_least_47 <- sum(dbinom(47:50, size=n, prob=p))
> cat("P(X >= 47) =", prob_at_least_47, "\n")
P(X >= 47) = 0.04604658
> # Parameters
> lambda <- 12
>
> # i. Random variable
> cat("X = Number of customer calls per hour\n")
X = Number of customer calls per hour
> # ii. Distribution
> cat("X ~ Poisson(lambda=12)\n")
X ~ Poisson(lambda=12)
>
```

(iii)



The screenshot shows the RStudio interface with two untitled files. The code in the editor is as follows:

```
1 setwd("C:/Users/Sahanya/OneDrive/Desktop/IT24104049")
2
3
4 # Parameters
5 n <- 50
6 p <- 0.85
7
8 # i. Distribution
9 cat("X ~ Binomial(n=50, p=0.85)\n")
10
11
12 # ii. Probability that at least 47 students passed
13 prob_at_least_47 <- sum(dbinom(47:50, size=n, prob=p))
14 cat("P(X >= 47) =", prob_at_least_47, "\n")
15
16
17 # Parameters
18 lambda <- 12
19
20 # i. Random variable
21 cat("X = Number of customer calls per hour\n")
22
23
24 # ii. Distribution
25 cat("X ~ Poisson(lambda=12)\n")
26
27
28 # iii. Probability exactly 15 calls
29 prob_15 <- dpois(15, lambda)
30 cat("P(X = 15) =", prob_15, "\n")
```



The screenshot shows the RStudio console with the following output:

```
R 4.5.1 - C:/Users/Sahanya/OneDrive/Desktop/IT24104049/
> setwd("C:/Users/Sahanya/OneDrive/Desktop/IT24104049")
>
> # Parameters
> n <- 50
> p <- 0.85
>
> # i. Distribution
> cat("X ~ Binomial(n=50, p=0.85)\n")
X ~ Binomial(n=50, p=0.85)
> # ii. Probability that at least 47 students passed
> prob_at_least_47 <- sum(dbinom(47:50, size=n, prob=p))
> cat("P(X >= 47) =", prob_at_least_47, "\n")
P(X >= 47) = 0.04604658
> # Parameters
> lambda <- 12
>
> # i. Random variable
> cat("X = Number of customer calls per hour\n")
X = Number of customer calls per hour
> # ii. Distribution
> cat("X ~ Poisson(lambda=12)\n")
X ~ Poisson(lambda=12)
> # iii. Probability exactly 15 calls
> prob_15 <- dpois(15, lambda)
> cat("P(X = 15) =", prob_15, "\n")
P(X = 15) = 0.07239112
>
```