

Sri Lanka Institute of Information Technology



Lab Submission Lab Sheet 10

IT24101387

Deshani B.A.M

Probability and Statistics | IT2120

B.Sc. (Hons) in Information Technology

Question - 01

Part - 01

The screenshot shows the RStudio interface with the following components:

- Source Editor:** Contains R code for a chi-squared test.
- Environment Pane:** Displays the values of the objects created in the script.
- Console:** Shows the output of the R script execution.

```
1 setwd("C:\\Users\\Deshani\\OneDrive\\Desktop")
2
3 ##Question 01
4 #Part 01
5 observed <- c(55, 62, 43, 46, 50)
6 prob <- c(.2, .2, .2, .2, .2)
7
8 chisq.test(x=observed, p=prob)
9
10
11
12
13
14
15
16
```

Environment Pane Values:

Variable	Class	Dimensions	Values
observed	num	[1:5]	55 62 43 46 50
prob	num	[1:5]	0.2 0.2 0.2 0.2 0.2

Console Output:

```
> setwd("C:\\Users\\Deshani\\OneDrive\\Desktop")
> ##Question 01
> #Part 01
> observed <- c(55, 62, 43, 46, 50)
> prob <- c(.2, .2, .2, .2, .2)
> chisq.test(x=observed, p=prob)

      Chi-squared test for given probabilities

data:  observed
X-squared = 4.4297, df = 4, p-value = 0.351
```

Part – 02

The screenshot shows the RStudio interface with the following components:

- Source Editor:** Contains R code for a chi-squared test and its interpretation.
- Console:** Shows the output of the R script execution.

```
11 #Part 02
12 #Consider 5% level of significance for the test.
13 #Rejection Region: If the p value for the test is lesss than 0.05,
14 #Reject the null hypothesis at 5% level of significance.
15 #P value for the test got as 0.351.
16 #Conclusion: Since the p value (0.351) is greater than 0.05, do not reject
17 #level of significance. Therefore we can conclude that probability that cus
18 #each day will be same which is 0.2.
19
20
21
22
23
24
25
26
```

Console Output:

```
> #Part 02
> #Consider 5% level of significance for the test.
> #Rejection Region: If the p value for the test is lesss than 0.05,
> #Reject the null hypothesis at 5% level of significance.
> #P value for the test got as 0.351.
> #Conclusion: Since the p value (0.351) is greater than 0.05, do not reject null
> #level of significance. Therefore we can conclude that probability that custome
> #each day will be same which is 0.2.
```

Question – 02

Part – 01

The screenshot shows the RStudio interface. The R script editor on the left contains the following code:

```
##Question 02
##Part 1
file_path <- "http://www.sthda.com/sthda/RDoc/data/housetasks.txt"
housetasks <- read.delim(file_path, row.names = 1)
housetasks
```

The Environment pane on the right shows the 'housetasks' object with 13 observations and 4 variables. The 'Values' section displays the first few rows of the data:

file_path	observed	prob
"http://www.sthda.com/sthda/RDoc/data/hous..."	num [1:5] 55 62 43 46 50	num [1:5] 0.2 0.2 0.2 0.2 0.2

The Console pane at the bottom shows the output of the R script, displaying the first few rows of the 'housetasks' data frame:

```
> ##Question 02
> ##Part 1
> file_path <- "http://www.sthda.com/sthda/RDoc/data/housetasks.txt"
> housetasks <- read.delim(file_path, row.names = 1)
> housetasks
```

	Wife	Alternating	Husband	Jointly
Laundry	156	14	2	4
Main_meal	124	20	5	4
Dinner	77	11	7	13
Breakfast	82	36	15	7
Tidying	53	11	1	57
Dishes	32	24	4	53

Console	Terminal	Background Jobs
R 4.2.2 · C:/Users/Deshani/OneDrive/Desktop/		
Dinner	77	11 7 13
Breakfast	82	36 15 7
Tidying	53	11 1 57
Dishes	32	24 4 53
Shopping	33	23 9 55
Official	12	46 23 15
Driving	10	51 75 3
Finances	13	13 21 66
Insurance	8	1 53 77
Repairs	0	3 160 2
Holidays	0	1 6 153
>		

IT24101387_LabSheet10_PS.R x housetasks x

Filter

	Wife	Alternating	Husband	Jointly
Laundry	156	14	2	4
Main_meal	124	20	5	4
Dinner	77	11	7	13
Breakfast	82	36	15	7
Tidying	53	11	1	57
Dishes	32	24	4	53
Shopping	33	23	9	55
Official	12	46	23	15
Driving	10	51	75	3
Finances	13	13	21	66

Showing 1 to 10 of 13 entries, 4 total columns

Console Terminal Background Jobs

```
R 4.2.2 · C:/Users/Deshani/OneDrive/Desktop/
breakfast 82 36 15 7
Tidying 53 11 1 57
Dishes 32 24 4 53
Shopping 33 23 9 55
Official 12 46 23 15
Driving 10 51 75 3
Finances 13 13 21 66
Insurance 8 1 53 77
Repairs 0 3 160 2
Holidays 0 1 6 153
> view(housetasks)
> |
```

Part – 02

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

IT24101387_LabSheet10_PS.R x housetasks x

```
30 #Part 2
31 chisq <- chisq.test(housetasks)
32 chisq
33
34
35
36
37
38
39
40
41
42
43
44
45
```

Environment History Connections Tutorial

R Global Environment

Data

- chisq List of 9
- housetasks 13 obs. of 4 variables

Values

file_path	"http://www.sthda.com/sthda/RDoc/data/hous...
observed	num [1:5] 55 62 43 46 50
prob	num [1:5] 0.2 0.2 0.2 0.2 0.2

Files Plots Packages Help Viewer Presentation

Home

Name	Size	Modified
.Rhistory	1.4 KB	Sep 27, 2025, 11:08 AM
123		
Adobe		
bin		
conf		
Corel		
Corel Cloud		
Custom Office Templates		

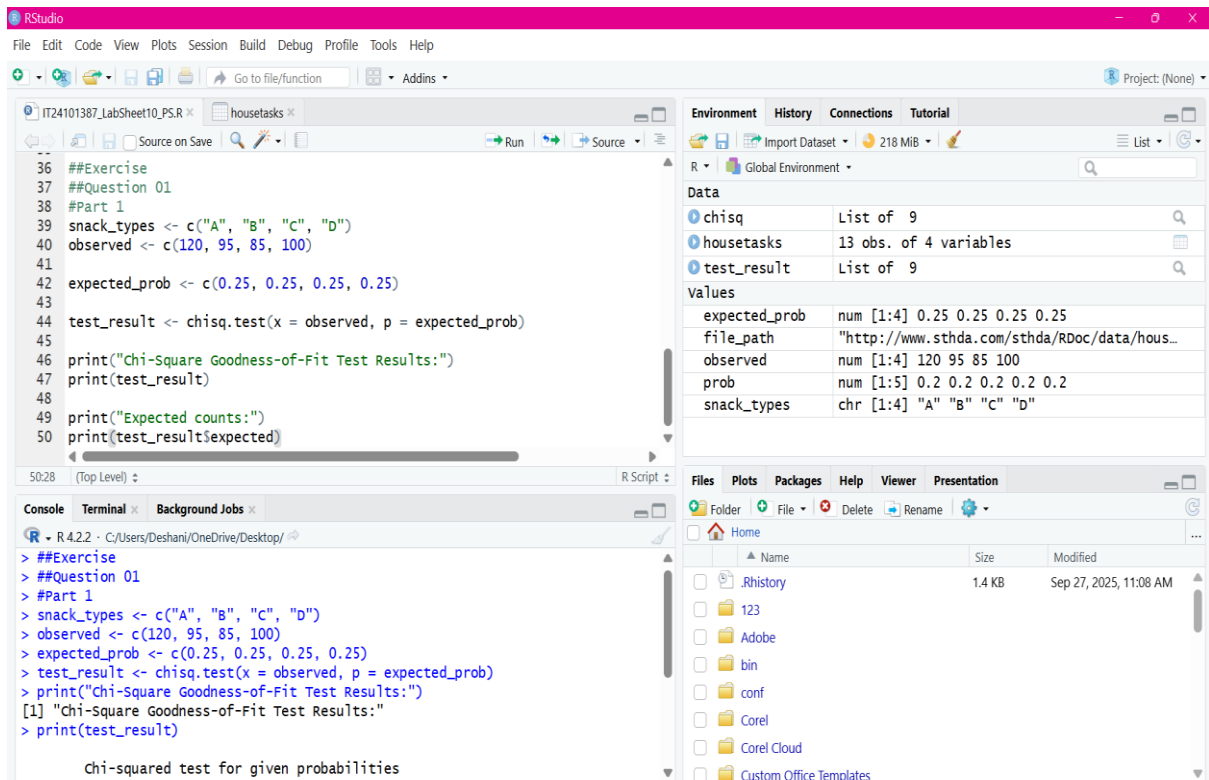
Console Terminal Background Jobs

```
R 4.2.2 · C:/Users/Deshani/OneDrive/Desktop/
> #Part 2
> chisq <- chisq.test(housetasks)
> chisq

Pearson's Chi-squared test

data: housetasks
X-squared = 1944.5, df = 36, p-value < 2.2e-16
> |
```

Exercise



RStudio interface showing the initial state of an R script. The script defines variables for snack types, observed counts, and expected probabilities, then performs a chi-square test. The Environment pane shows the data objects created.

```
##Exercise
##Question 01
#Part 1
snack_types <- c("A", "B", "C", "D")
observed <- c(120, 95, 85, 100)

expected_prob <- c(0.25, 0.25, 0.25, 0.25)
test_result <- chisq.test(x = observed, p = expected_prob)

print("Chi-Square Goodness-of-Fit Test Results:")
print(test_result)

print("Expected counts:")
print(test_result$expected)
```

Environment pane shows the following data objects:

Object	Type	Value
chisq	List of 9	
housetasks	13 obs. of 4 variables	
test_result	List of 9	

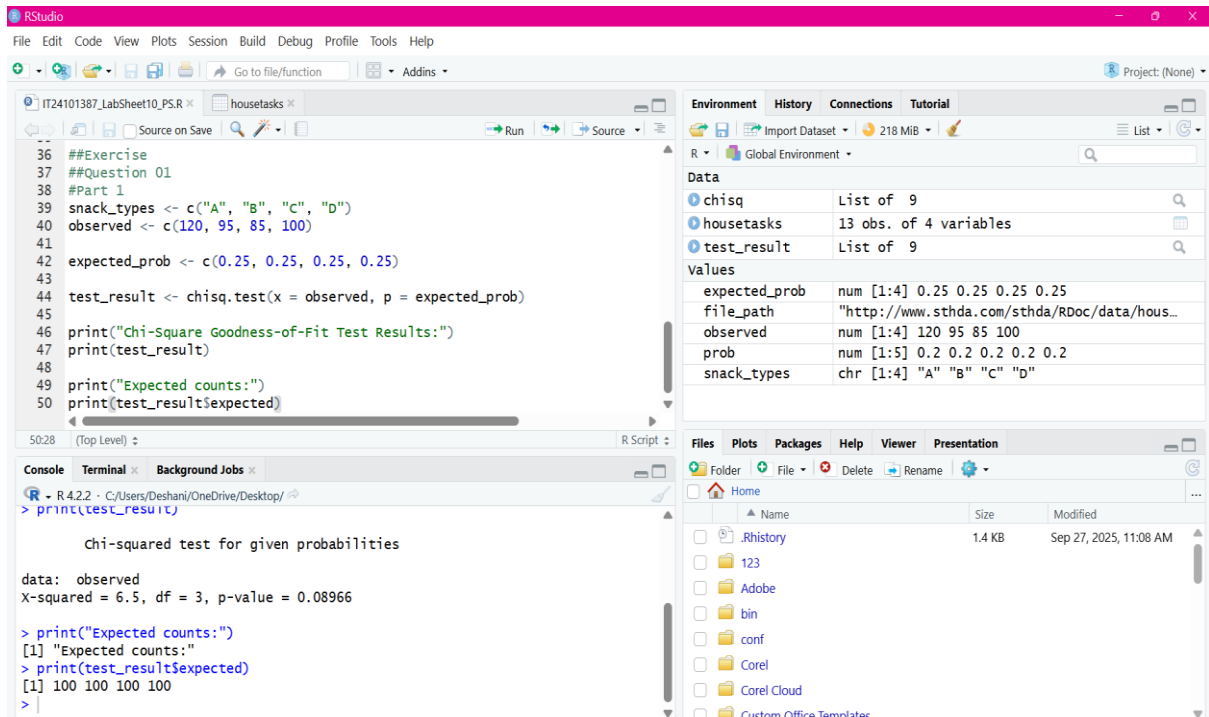
Values pane shows the following data:

Variable	Type	Value
expected_prob	num [1:4]	0.25 0.25 0.25 0.25
file_path	chr [1:4]	"http://www.sthda.com/sthda/RDoc/data/hous..."
observed	num [1:4]	120 95 85 100
prob	num [1:5]	0.2 0.2 0.2 0.2 0.2
snack_types	chr [1:4]	"A" "B" "C" "D"

Console output:

```
> ##Exercise
> ##Question 01
> #Part 1
> snack_types <- c("A", "B", "C", "D")
> observed <- c(120, 95, 85, 100)
> expected_prob <- c(0.25, 0.25, 0.25, 0.25)
> test_result <- chisq.test(x = observed, p = expected_prob)
> print("Chi-Square Goodness-of-Fit Test Results:")
[1] "Chi-Square Goodness-of-Fit Test Results:"
> print(test_result)
```

Chi-squared test for given probabilities



RStudio interface showing the final state of the R script. The console output now includes the chi-square test results, including the test statistic, degrees of freedom, and p-value.

```
##Exercise
##Question 01
#Part 1
snack_types <- c("A", "B", "C", "D")
observed <- c(120, 95, 85, 100)

expected_prob <- c(0.25, 0.25, 0.25, 0.25)
test_result <- chisq.test(x = observed, p = expected_prob)

print("Chi-Square Goodness-of-Fit Test Results:")
print(test_result)

print("Expected counts:")
print(test_result$expected)
```

Environment pane shows the following data objects:

Object	Type	Value
chisq	List of 9	
housetasks	13 obs. of 4 variables	
test_result	List of 9	

Values pane shows the following data:

Variable	Type	Value
expected_prob	num [1:4]	0.25 0.25 0.25 0.25
file_path	chr [1:4]	"http://www.sthda.com/sthda/RDoc/data/hous..."
observed	num [1:4]	120 95 85 100
prob	num [1:5]	0.2 0.2 0.2 0.2 0.2
snack_types	chr [1:4]	"A" "B" "C" "D"

Console output:

```
> ##Exercise
> ##Question 01
> #Part 1
> snack_types <- c("A", "B", "C", "D")
> observed <- c(120, 95, 85, 100)
> expected_prob <- c(0.25, 0.25, 0.25, 0.25)
> test_result <- chisq.test(x = observed, p = expected_prob)
> print("Chi-Square Goodness-of-Fit Test Results:")
[1] "Chi-Square Goodness-of-Fit Test Results:"
> print(test_result)

Chi-squared test for given probabilities

data: observed
X-squared = 6.5, df = 3, p-value = 0.08966

> print("Expected counts:")
[1] "Expected counts:"
> print(test_result$expected)
[1] 100 100 100 100
>
```

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

```
42 expected_prob <- c(0.25, 0.25, 0.25, 0.25)
43
44 test_result <- chisq.test(x = observed, p = expected_prob)
45
46 print("Chi-Square Goodness-of-Fit Test Results:")
47 print(test_result)
48
49 print("Expected counts:")
50 print(test_result$expected)
51
52 ##Conclusion
53 #There is no significant difference in the number of
54 #purchases among the four snack types.
55 #Hence, the data supports the vending machine
56 #owner's claim that customers choose snacks equally
```

56:52 (Top Level) R Script

Console Terminal Background Jobs

```
> ##Conclusion
> #There is no significant difference in the number of
> #purchases among the four snack types.
> #Hence, the data supports the vending machine
> #owner's claim that customers choose snacks equally
>
```

Environment History Connections Tutorial

R Global Environment

Data

chisq	List of 9
housetasks	13 obs. of 4 variables
test_result	List of 9

Values

expected_prob	num [1:4] 0.25 0.25 0.25 0.25
file_path	"http://www.sthda.com/sthda/RDoc/data/hous..."
observed	num [1:4] 120 95 85 100
prob	num [1:5] 0.2 0.2 0.2 0.2 0.2
snack_types	chr [1:4] "A" "B" "C" "D"

Files Plots Packages Help Viewer Presentation

Folder File Delete Rename

Home

Name	Size	Modified
.Rhistory	1.4 KB	Sep 27, 2025, 11:08 AM
123		
Adobe		
bin		
conf		
Corel		
Corel Cloud		
Custom Office Templates		