IT2120 - Probability and Statistics

Lab Sheet 10

IT24103526 - Senaratne P.A.R.T.

Exercise

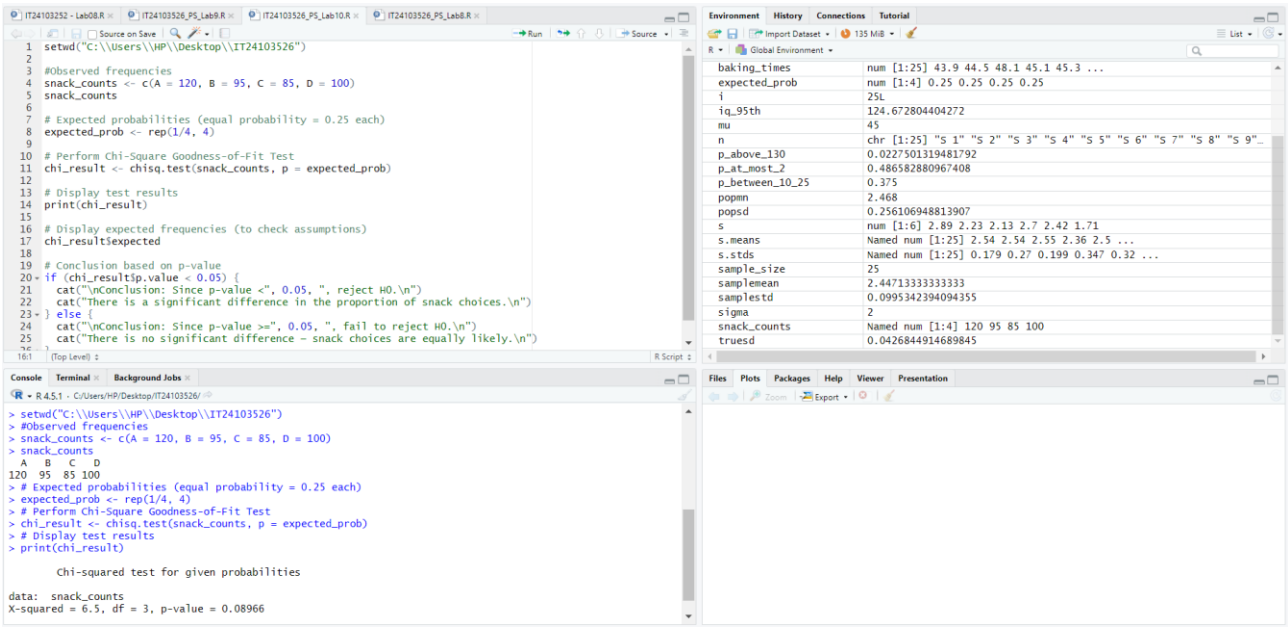
1. A vending machine owner claims that customers choose the four snack types (A, B, C, D) with equal probability. To test this claim, a researcher records the number of purchases for each snack type during one week and results are given below.

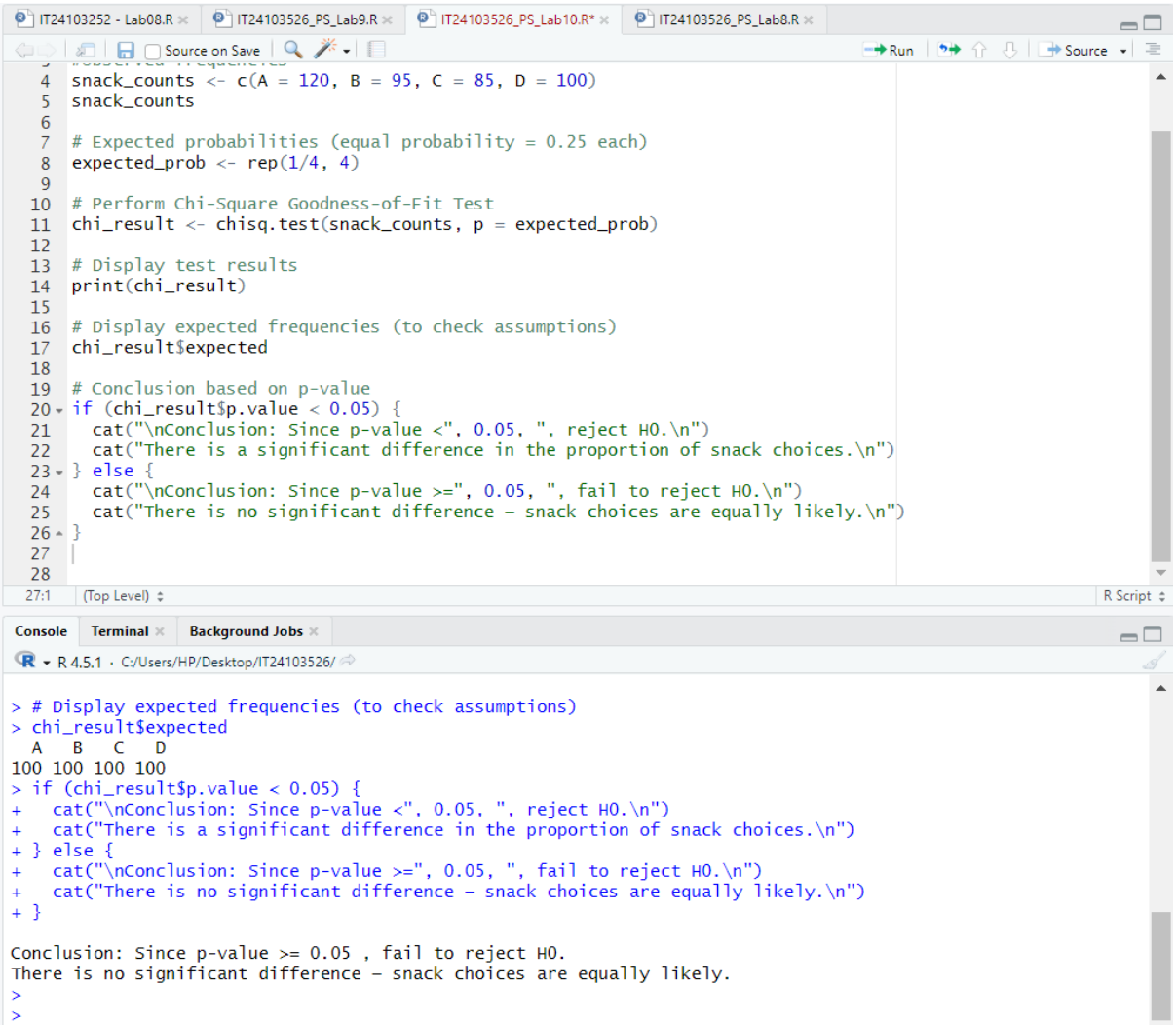
Snack_Type	Count
A	120
B	95
C	85
D	100

   i. State the null and alternative hypotheses for the test.

   ii. Perform a suitable chi-squared test to test the null hypothesis.

   iii. Give your conclusions based on the results.




IT24103252 - Lab08.R
IT24103526_PS_Lab9.R
IT24103526_PS_Lab10.R*
IT24103526_PS_Lab8.R
Source on Save
Run
Source
snack_counts <- c(A = 120, B = 95, C = 85, D = 100)
snack_counts
# Expected probabilities (equal probability = 0.25 each)
expected_prob <- rep(1/4, 4)
# Perform Chi-Square Goodness-of-Fit Test
chi_result <- chisq.test(snack_counts, p = expected_prob)
# Display test results
print(chi_result)
# Display expected frequencies (to check assumptions)
chi_result$expected
# Conclusion based on p-value
if (chi_result$p.value < 0.05) {
cat("\nConclusion: Since p-value <", 0.05, ", reject H0.\n")
cat("There is a significant difference in the proportion of snack choices.\n")
} else {
cat("\nConclusion: Since p-value >=", 0.05, ", fail to reject H0.\n")
cat("There is no significant difference - snack choices are equally likely.\n")
}
27:1
(Top Level)
R Script
Console
Terminal
Background Jobs
R 4.5.1 · C:/Users/HP/Desktop/IT24103526/
> # Display expected frequencies (to check assumptions)
> chi_result$expected
A B C D
100 100 100 100
> if (chi_result$p.value < 0.05) {
+ cat("\nConclusion: Since p-value <", 0.05, ", reject H0.\n")
+ cat("There is a significant difference in the proportion of snack choices.\n")
+ } else {
+ cat("\nConclusion: Since p-value >=", 0.05, ", fail to reject H0.\n")
+ cat("There is no significant difference - snack choices are equally likely.\n")
+ }
Conclusion: Since p-value >= 0.05 , fail to reject H0.
There is no significant difference - snack choices are equally likely.
>
>