Sri Lanka Institute of Information

Technology



Lab Submission

Lab sheet No 10

**IT24101896**

**Abeywickrama J B**

**Probability and Statistics | IT2120**

B.Sc. (Hons) in Information Technology

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.

A table of black and white text

Description automatically generated

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

Null Hypothesis (H₀):

* The vending machine owner claims that customers choose each of the four snack types (A, B, C, D) with equal probability. Therefore, the null hypothesis is:
  + The probability of choosing snack A = The probability of choosing snack B = The probability of choosing snack C = The probability of choosing snack D = 0.25 (equal probability for all snack types).

Alternative Hypothesis (H₁):

* The alternative hypothesis is that the probabilities of selecting each snack type are not equal (i.e., at least one snack type is chosen with a different probability than the others).

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

A screenshot of a computer

Description automatically generated



A screenshot of a computer code

Description automatically generated

A screenshot of a computer

Description automatically generated

iii. Give your conclusions based on the results.

Since the p-value (0.08966) is greater than 0.05, we fail to reject the null hypothesis at the 5% level of significance.

This means there is not enough statistical evidence to conclude that customers prefer some snack types over others. Therefore, we accept the vending machine owner's claim that customers choose the four snack types (A, B, C, D) with equal probability.