

Sri Lanka Institute of Information Technology



Lab Submission
Lab sheet No 10

IT24102615

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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.

Snack_Type	Count
A	120
B	95
C	85
D	100

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

```
it24102615.r x
Source on Save
Run Source
1 setwd("C:\\Users\\ASUS\\Desktop\\PSLab_10\\IT24102615")
2
3 #Exercise
4 #1)
5 #i)
6 # H0:  $\pi_i = 0.25$  ( $i = 1, 2, 3, 4$ ) (Null Hypothesis)
7 # H1:  $\pi_i \neq 0.25$  (Alternative Hypothesis)
8
```

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

```
9 #ii)
10 observed <- c(50, 45, 40, 65)
11
12 chisq.test(x = observed, p = rep(1/4, 4))
```

```
Environment History Connections Tutorial
Import Dataset 143 MiB
R Global Environment
Values
observed num [1:4] 50 45 40 65
```

```
> #ii)
> observed <- c(50, 45, 40, 65)
>
> chisq.test(x = observed, p = rep(1/4, 4))

      Chi-squared test for given probabilities

data:  observed
X-squared = 7, df = 3, p-value = 0.0719
```

iii. Give your conclusions based on the results

```
14 #iii)
15 #Conclusions
16 #Significance level = 0.05
17 #p value = 0.0719 > 0.05, so we fail to reject H0
18
19 |
20
```