IT2120 - Probability and Statistics

Lab Sheet 10

IT24103576

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.

```
1   setwd("C:\\Users\\IT24103576\\Desktop\\IT24103576_lab10")
2
3
4   #Q1(i)
5   #H0 = probability of the customers choose each snack will be 0.25.
6   #H1 = At least one snack exists such that the probability of the customer choose
7   #will be different from 0.25
8   observed <- c(120,95,85,100)
9   prob <- c(0.25,0.25,0.25,0.25)
10
11  #(ii)
12  chisq.test(x=observed, p=prob)
13
14  #Consider 5% level of significance for the test.
15
16  #Rejection Region: If the p value for the test is less than 0.05,
17  #Reject the null hypothesis at 5% level of significance.|
18
19  #(iii)
20  #Conclution: Since the p value(0.08966) is greater than 0.05,do not  reject null hypothesis at 5%
21  #level of significance. therefore we can conclude that there is a significant association between
22  #snack and type
```

```
> observed <- c(120,95,85,100)
> prob <- c(0.25,0.25,0.25,0.25)
> chisq.test(x=observed, p=prob)

        Chi-squared test for given probabilities

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