

# Probability and Statistics - IT2120

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The screenshot displays the RStudio environment. The script editor at the top contains R code for a Chi-squared goodness-of-fit test. The console below shows the execution of the code, including the test results and a conclusion. The environment pane at the bottom shows the variables 'observed' and 'prob' with their respective values.

```
1 #Exercise
2 setwd("C:/Users/aruni/OneDrive/Desktop/Lab10")
3
4 #Q1
5 #Part i
6 #H0: Customers choose the four snack types with equal probability (p = 0.25 for each).
7 #H1: At least one snack type has a probability different from 0.25.
8
9 #Part ii
10 observed <- c(120, 95, 85, 100)
11 prob <- c(0.25, 0.25, 0.25, 0.25)
12 # Perform Chi-Squared Goodness-of-Fit Test
13 chisq.test(x = observed, p = prob)
14
15 #Part iii
16
17 #Conclusion: Using a 5% significance level ( $\alpha = 0.05$ ):
18 #Since the p-value (0.08966) is greater than 0.05 , do not reject the null hypothesis at 5% significance level.
19 #Therefore we can conclude that the probability that the vending machine owner's claim that customers choose the
20 #four snack types with equal probability (p = 0.25 for each).
21
22
23 |
```

Console Output:

```
> prob <- c(0.25, 0.25, 0.25, 0.25)
> # Perform Chi-Squared Goodness-of-Fit Test
> chisq.test(x = observed, p = prob)

Chi-squared test for given probabilities

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

> #Part iii
>
> #Conclusion: Using a 5% significance level ( $\alpha = 0.05$ ):
> #Since the p-value (0.08966) is greater than 0.05 , do not reject the null hypothesis at 5% significance level.
> #Therefore we can conclude that the probability that the vending machine owner's claim that customers choose the
> #four snack types with equal probability (p = 0.25 for each).
> |
```

Environment Pane:

Values	
observed	num [1:4] 120 95 85 100
prob	num [1:4] 0.25 0.25 0.25 0.25