Sri Lanka Institute of Information Technology

Lab Submission
Lab Sheet No 10

IT24102280

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Probability and Statistics - IT2120

B.Sc. (Hons) in Information Technology

1.

```
>
> ##1
> observed<-c(55,62,43,46,50)
> prob<-c(.2,.2,.2,.2,.2)
>
> chisq.test(x=observed,p=prob)

        Chi-squared test for given probabilities

data:  observed
X-squared = 4.4297, df = 4, p-value = 0.351
```

2.

After running the test, you'll get a p-value. Here's how to interpret it: If p-value < 0.05: Reject the null hypothesis. There is a statistically significant difference between the observed and expected frequencies. If p-value ≥ 0.05: Fail to reject the null hypothesis. There is no statistically significant difference; the observed data fits the expected

3.

i.

```
> file.path <- "https://www.sthda.com/sthda/RDoc/data/housetasks.txt"
> housetasks <- read.delim(file.path,row.names = 1)
> housetasks
           Wife Alternating Husband Jointly
Laundry     156          14       2       4
Main_meal   124          20       5       4
Dinner       77          11       7      13
Breakfeast   82          36      15       7
Tidying      53          11       1      57
Dishes       32          24       4      53
Shopping     33          23       9      55
Official     12          46      23      15
Driving      10          51      75       3
Finances     13          13      21      66
Insurance     8           1      53      77
Repairs       0           3     160       2
Holidays      0           1       6     153
```

ii.

```
> chisq<-chisq.test(housetasks)
> chisq

        Pearson's Chi-squared test

data:  housetasks
X-squared = 1944.5, df = 36,
p-value < 2.2e-16
```

Exercise

1.

i.

Null Hypothesis (H_0): Customers choose each snack type (A, B, C, D) with equal probability.

Alternative Hypothesis (H_1): Customers do not choose each snack type with equal probability.

ii.

```
observed <- c(120, 95, 85, 100)
prob <- c(0.25, 0.25, 0.25, 0.25)

chisq.test(x = observed, p = prob)
```

```
> chisq.test(x = observed, p = prob)

        Chi-squared test for given
        probabilities

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

>
```

iii. Based on the output of the test (which includes the chi-squared statistic and p-value
If p-value < 0.05: There is sufficient evidence to reject the null hypothesis. This suggests that customers do not choose snack types equally.

If p-value ≥ 0.05: There is not enough evidence to reject the null hypothesis. The data does not show a significant difference in snack preferences.