Sri Lanka Institute of Information Technology

Lab Submission
<Lab sheet 10>

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Probability and Statistics | IT2120

B.Sc. (Hons) in Information Technology

Exercise

1)

i.

```
> # Exercise
> # (i) – Hypotheses & data setup
> # H0: Snack choices are equally likely (pA = pB = pC = pD = 0.25).
> # H1: At least one snack's probability differs from 0.25.
>
> counts <- c(A = 120, B = 95, C = 85, D = 100)
> sum(counts); counts
[1] 400
  A   B   C   D
120  95  85 100
>
```

ii.

```
> # Exercise
> # (ii) – Chi-square goodness-of-fit test
> counts  <- c(A = 120, B = 95, C = 85, D = 100)
> p_equal <- rep(1/4, 4)
>
> test_ex <- chisq.test(counts, p = p_equal)
>
> # Output
> test_ex
```

```
        Chi-squared test for given probabilities

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

> test_ex$expected
  A   B   C   D
100 100 100 100
> test_ex$statistic
X-squared
      6.5
> test_ex$p.value
[1] 0.0896625
```

iii.

```
> # Exercise
> # (iii) - Conclusion
> counts  <- c(A = 120, B = 95, C = 85, D = 100)
> p_equal <- rep(1/4, 4)
>
> test_ex <- chisq.test(counts, p = p_equal)
>
> alpha <- 0.05
> cat("p-value =", test_ex$p.value, "\n")
p-value = 0.0896625
```

```
> if (test_ex$p.value < alpha) {
+   cat("Conclusion (Exercise): Reject H0 - snack choices are NOT equally likely.\n")
+ } else {
+   cat("Conclusion (Exercise): Do not reject H0 - choices are consistent with equal probabilitie
s.\n")
+ }
Conclusion (Exercise): Do not reject H0 - choices are consistent with equal probabilities.
>
```