Sri Lanka Institute of Information Technology

Lab Submission
Lab sheet No 9

IT24100786

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IT2120 - Probability and Statistics

B.Sc. (Hons) in Information Technology

Exercise :

1. Assume that the time taken to bake a batch of cookies is normally distributed with mean 45 minutes and standard deviation 2 minutes.

i. Generate a random sample of size 25 for the baking time.

```
getwd()

## Set directory
setwd("C:\\Users\\user\\OneDrive\\Desktop\\IT24100786")
getwd()

## ================================
## Exercise: Cookie baking time
## ================================
## Parameters
mean_time <- 45
sd_time <- 2
sample_size <- 25


## i. Generate random sample
set.seed(123)
sample_data <- rnorm(sample_size, mean = mean_time, sd = sd_time)
print(sample_data)


## ii. One-tailed t-test: H0: mean = 46, H1: mean < 46
t_test <- t.test(sample_data, mu = 46, alternative = "less")
print(t_test)
```

```
>
> ## ================================
> ## Exercise: Cookie baking time
> ## ================================
> ## Parameters
> mean_time <- 45
> sd_time <- 2
> sample_size <- 25
>
>
> ## i. Generate random sample
> set.seed(123)
> sample_data <- rnorm(sample_size, mean = mean_time, sd = sd_time)
> print(sample_data)
 [1] 43.87905 44.53965 48.11742 45.14102 45.25858 48.43013 45.92183 42.46988 43.62629
[10] 44.10868 47.44816 45.71963 45.80154 45.22137 43.88832 48.57383 45.99570 41.06677
[19] 46.40271 44.05442 42.86435 44.56405 42.94799 43.54222 43.74992
>
```

ii. Test whether the average baking time is less than 46 minutes at a 5% level of significance.

```r
## ii. One-tailed t-test: H0: mean = 46, H1: mean < 46
t_test <- t.test(sample_data, mu = 46, alternative = "less")
print(t_test)
```

R 4.5.1 · C:/Users/thiya/OneDrive/Desktop/IT24101551/

```
>
> ## ii. One-tailed t-test: H0: mean = 46, H1: mean < 46
> t_test <- t.test(sample_data, mu = 46, alternative = "less")
> print(t_test)

        One Sample t-test

data:  sample_data
t = -2.8167, df = 24, p-value = 0.004776
alternative hypothesis: true mean is less than 46
95 percent confidence interval:
     -Inf 45.58124
sample estimates:
mean of x
 44.93334
```