Sri Lanka Institute of Information Technology

Lab Submission
Lab Sheet 08

IT24101387

Deshani B.A.M

Probability and Statistics | IT2120

B.Sc. (Hons) in Information Technology

Exercise – 01

```
39  data1 <- read.table("Exercise - LaptopsWeights.txt", header = TRUE)
40  fix(data1)
41  attach(data1)
42
43  ##Exercise 01
44  # Calculate the population mean and population standard deviation
45  population_mean <- mean(weight.kg.)
46  population_sd <- sd(weight.kg.)
47
48  # Display results
49  cat("Population Mean:", population_mean, "\n")
50  cat("Population Standard Deviation:", population_sd, "\n")
```

```
> ##Exercise 01
> # Calculate the population mean and population standard deviation
> population_mean <- mean(weight.kg.)
> population_sd <- sd(weight.kg.)
> # Display results
> cat("Population Mean:", population_mean, "\n")
Population Mean: 2.468
> cat("Population Standard Deviation:", population_sd, "\n")
Population Standard Deviation: 0.2561069
```

Exercise – 02

```
52  ##Exercise 02
53  # Set the sample size and number of samples
54  sample_size <- 6
55  num_samples <- 25
56
57  # List to store sample means and sample standard deviations
58  sample_means <- numeric(num_samples)
59  sample_sds <- numeric(num_samples)
60
61  # Loop to generate samples and calculate sample mean and standard deviation
62  for (i in 1:num_samples) {
63    sample <- sample(weight.kg., sample_size, replace = TRUE)
64    sample_means[i] <- mean(sample)
65    sample_sds[i] <- sd(sample)
66  }
67
68  # Display results
69  cat("Sample Means:", sample_means, "\n")
70  cat("Sample Standard Deviations:", sample_sds, "\n")
71
```

```
> ##Exercise 02
> # Set the sample size and number of samples
> sample_size <- 6
> num_samples <- 25
> # List to store sample means and sample standard deviations
> sample_means <- numeric(num_samples)
> sample_sds <- numeric(num_samples)
> # Loop to generate samples and calculate sample mean and standard deviation
> for (i in 1:num_samples) {
+   sample <- sample(weight.kg., sample_size, replace = TRUE)
+   sample_means[i] <- mean(sample)
+   sample_sds[i] <- sd(sample)
+ }
> # Display results
> cat("Sample Means:", sample_means, "\n")
Sample Means: 2.525 2.541667 2.316667 2.516667 2.603333 2.611667 2.438333 2.54 2.595 2.
548333 2.341667 2.561667 2.538333 2.566667 2.408333 2.45 2.516667 2.598333 2.393333 2.4
73333 2.528333 2.49 2.49 2.56 2.523333
> cat("Sample Standard Deviations:", sample_sds, "\n")
Sample Standard Deviations: 0.07204165 0.191041 0.2991766 0.194285 0.1706068 0.1955931
0.1849775 0.2073644 0.1678988 0.1410555 0.2066317 0.2408665 0.2407004 0.3132198 0.25325
22 0.1882551 0.4152429 0.1739444 0.3216002 0.173628 0.2551405 0.2231591 0.1628496 0.211
9434 0.1930458
>
```

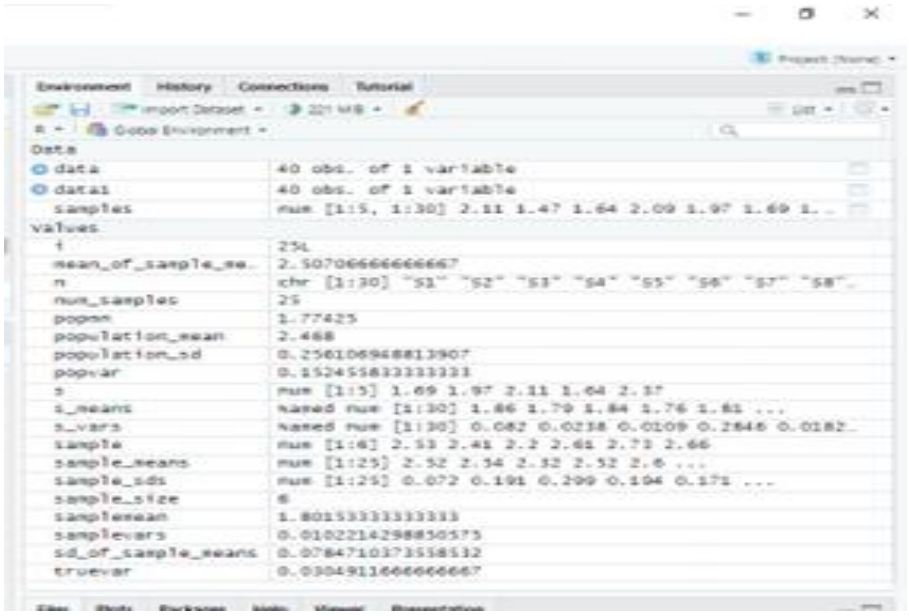
Exercise – 03

```
##Exercise 03
# Calculate the mean and standard deviation of the sample means
mean_of_sample_means <- mean(sample_means)
sd_of_sample_means <- sd(sample_means)

# Display results and compare with population statistics
cat("Mean of Sample Means:", mean_of_sample_means, "\n")
cat("Standard Deviation of Sample Means:", sd_of_sample_means, "\n")

# Relationship between the sample mean and population statistics
cat("Population Mean:", population_mean, "\n")
cat("Standard Deviation of Sample Means should be close to Population SD / sqrt(sample_size):", population_sd / sqrt(sample_size), "\n")
```

```
> ##Exercise 03
> # Calculate the mean and standard deviation of the sample means
> mean_of_sample_means <- mean(sample_means)
> sd_of_sample_means <- sd(sample_means)
> # Display results and compare with population statistics
> cat("Mean of Sample Means:", mean_of_sample_means, "\n")
Mean of Sample Means: 2.507067
> cat("Standard Deviation of Sample Means:", sd_of_sample_means, "\n")
Standard Deviation of Sample Means: 0.07847104
> # Relationship between the sample mean and population statistics
> cat("Population Mean:", population_mean, "\n")
Population Mean: 2.468
> cat("Standard Deviation of Sample Means should be close to Population SD / sqrt(sampl
e_size):", population_sd / sqrt(sample_size), "\n")
Standard Deviation of Sample Means should be close to Population SD / sqrt(sample_siz
e): 0.1045552
```



Data Editor

File Edit Help

	Weight.kg.	var2	var3	var4	var5	var6
1	2.46					
2	2.45					
3	2.47					
4	2.71					
5	2.46					
6	2.05					
7	2.6					
8	2.42					
9	2.43					
10	2.53					
11	2.57					
12	2.85					
13	2.7					
14	2.53					
15	2.28					
16	2.2					
17	2.57					
18	2.89					
19	2.51					