

# Sri Lanka Institute of Information Technology



## Lab Submission Lab Sheet 08

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**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")
51
```

```
> ##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

```

72 ##Exercise 03
73 # Calculate the mean and standard deviation of the sample means
74 mean_of_sample_means <- mean(sample_means)
75 sd_of_sample_means <- sd(sample_means)
76
77 # Display results and compare with population statistics
78 cat("Mean of Sample Means:", mean_of_sample_means, "\n")
79 cat("Standard Deviation of Sample Means:", sd_of_sample_means, "\n")
80
81 # Relationship between the sample mean and population statistics
82 cat("Population Mean:", population_mean, "\n")
83 cat("Standard Deviation of Sample Means should be close to Population SD / sqrt(sample_size):", population_sd / sqrt(sample_size), "\n")
84
85

```

```

> ##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(sample_size):", population_sd / sqrt(sample_size), "\n")
Standard Deviation of Sample Means should be close to Population SD / sqrt(sample_size): 0.1045552

```

Environment History Connections Tutorial

Import Dataset - 201 KB

R - Global Environment

Data

- data 40 obs. of 1 variable
- data1 40 obs. of 1 variable
- samples num [1:5, 1:30] 2.11 1.47 1.64 2.09 1.97 1.69 1....

values

- i 254
- mean\_of\_sample\_se 2.50706666666667
- n chr [1:30] "S1" "S2" "S3" "S4" "S5" "S6" "S7" "S8"...
- num\_samples 25
- popm 1.77425
- population\_mean 2.468
- population\_sd 0.256106948813907
- popvar 0.152455833333333
- s num [1:5] 1.69 1.97 2.11 1.64 2.17
- s\_means named num [1:30] 1.86 1.79 1.84 1.76 1.81 ...
- s\_vars named num [1:30] 0.082 0.0238 0.0109 0.2846 0.0182...
- sample num [1:6] 2.13 2.41 2.2 2.61 2.71 2.66
- sample\_means num [1:25] 2.52 2.14 2.32 2.52 2.6 ...
- sample\_sds num [1:25] 0.072 0.191 0.209 0.104 0.171 ...
- sample\_size 6
- samplemean 1.80153333333333
- samplevars 0.0102214298850573
- sd\_of\_sample\_means 0.0784710373558132
- truevar 0.0304911666666667

File Edit Bookmarks Help View Environment

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					