Sri Lanka Institute of Information Technology

Lab Submission 08

IT24100710

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Probability and Statistics | IT2120

B.Sc. (Hons) in Information Technology

Exercise

Instructions: Create a folder in your desktop with your registration number (Eg: "IT......."). You need to save the R script file and take screenshots of the command prompt with answers and save it in a word document inside the folder. Save both R script file and word document with your registration number (Eg: "IT........"). After you finish the exercise, zip the folder and upload the zip file to the submission link.

```
setwd("D:\\SLIIT\\Semester\\Y2S1\\PS\\Lab Sheet\\Lab 08\\Lab 08")

data <- read.table("Exercise - LaptopsWeights.txt",header = TRUE)

fix(data)

attach(data)

> setwd("D:\\SLIIT\\Semester\\Y2S1\\PS\\Lab Sheet\\Lab 08\\Lab 08")
> data <- read.table("Exercise - LaptopsWeights.txt",header = TRUE)
> fix(data)
> attach(data)
```

1. Calculate the population mean and population standard deviation of the laptop bag weights.

```
popmn <- mean(Weight.kg.)
popsd <- sd(Weight.kg.)

popmn
popsd

> popmn <- mean(Weight.kg.)
> popsd <- sd(Weight.kg.)
>
> popmn
[1] 2.468
> popsd
[1] 0.2561069
```

2. Draw 25 random samples of size 6 (with replacement) and calculate the sample mean and sample standard deviation for each sample.

```r
samples <- c()
n <- c()

for(i in 1: 25){
  s <- sample(weight.kg.,6,replace = TRUE)
  samples <- cbind(samples,s)
  n <-c(n,paste('S',i))
}

colnames(samples) = n

s.means <- apply(samples, 2, mean)
s.sds <- apply(samples, 2, sd)

samplemean <- mean(s.means)
samplesds <- sd(s.means)

samplemean
samplesds
> samples <- c()
> n <- c()
>
> for(i in 1: 25){
+    s <- sample(weight.kg.,6,replace = TRUE)
+    samples <- cbind(samples,s)
+    n <-c(n,paste('S',i))
+ }
>
> colnames(samples) = n
>
> s.means <- apply(samples, 2, mean)
> s.sds <- apply(samples, 2, sd)
>
> samplemean <- mean(s.means)
> samplesds <- sd(s.means)
>
> samplemean
[1] 2.460933
> samplesds
[1] 0.1036041
```

3. Calculate the mean and standard deviation of the 25 sample means and state the relationship of them with true mean and true standard deviation.

```
truesd <- popsd / 25
truesd

truemean <- popmn / 25
truemean

> truesd <- popsd / 25
> truesd
[1] 0.01024428
>
> truemean <- popmn / 25
> truemean
[1] 0.09872
```