Sri Lanka Institute of Information Technology

Lab Submission
Lab sheet No 8

IT24101551

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IT2120 - Probability and Statistics

B.Sc. (Hons) in Information Technology

Exercise

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

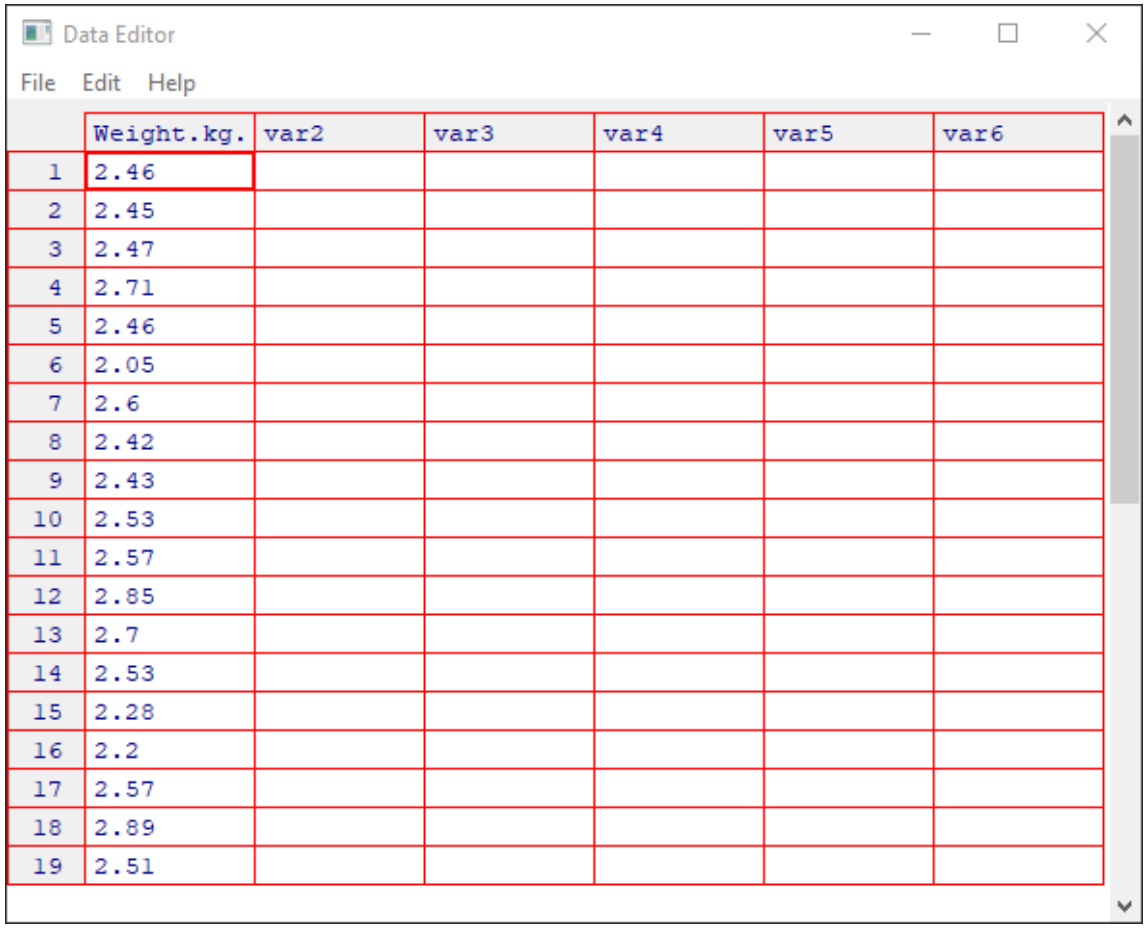
IT24101551.R*

Source on Save

```
## Setting the directory
setwd("C:\\Users\\IT24101551\\Desktop\\IT24101551")

## Importing the data set
data<-read.table("Exercise - LaptopsWeights.txt", header = TRUE)
fix(data)
attach(data)

## ------------------------------------------------------------------------

## Question 01
## Calculate the population mean and population standard deviation
popmn <- mean(weight.kg.)
popvar <- var(weight.kg.)
popSD <- sqrt(popvar)

popmn
popvar
popSD

## ------------------------------------------------------------------------
```

R 4.2.2 · C:/Users/IT24101551/Desktop/IT24101551/

```
> ## Setting the directory
> setwd("C:\\Users\\IT24101551\\Desktop\\IT24101551")
> ## Importing the data set
> data<-read.table("Exercise - LaptopsWeights.txt", header = TRUE)
> fix(data)
> attach(data)
> ## ------------------------------------------------------------------------
>
> ## Question 01
> ## Calculate the population mean and population standard deviation
> popmn <- mean(weight.kg.)
> popvar <- var(weight.kg.)
> popSD <- sqrt(popvar)
>
> popmn
[1] 2.468
> popvar
[1] 0.06559077
> popSD
[1] 0.2561069
>
> ## ------------------------------------------------------------------------
```



	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					

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

IT24101551.R*

Source on Save

```r
## ---------------------------------------------------------------------------

## Question 02
samples <- c()
n <- c()
## Draw 25 random samples of size 6
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

## calculate the sample mean and sample standard deviation for each sample.
s.means <- apply(samples, 2, mean)
s.var   <- apply(samples, 2, var)
s.SD    <- sqrt(s.var)

s.means
s.SD

## ---------------------------------------------------------------------------
```

R 4.2.2 · C:/Users/IT24101551/Desktop/IT24101551/

```
> 
> ## ---------------------------------------------------------------------------
> 
> ## Question 02
> samples <- c()
> n <- c()
> ## Draw 25 random samples of size 6
> 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
> 
> ## calculate the sample mean and sample standard deviation for each sample.
> s.means <- apply(samples, 2, mean)
> s.var   <- apply(samples, 2, var)
> s.SD    <- sqrt(s.var)
> 
> s.means
     S 1      S 2      S 3      S 4      S 5      S 6      S 7      S 8      S 9     S 10     S 11 
2.515000 2.543333 2.520000 2.633333 2.393333 2.603333 2.593333 2.460000 2.576667 2.436667 2.555000 
    S 12     S 13     S 14     S 15     S 16     S 17     S 18     S 19     S 20     S 21     S 22 
2.555000 2.585000 2.456667 2.471667 2.550000 2.471667 2.646667 2.441667 2.493333 2.440000 2.481667 
    S 23     S 24     S 25 
2.515000 2.600000 2.396667 
> s.SD
      S 1       S 2       S 3       S 4       S 5       S 6       S 7       S 8       S 9      S 10 
0.1947049 0.2819693 0.2002998 0.2045157 0.3892900 0.2409703 0.1061446 0.3029191 0.1344123 0.1441758 
     S 11      S 12      S 13      S 14      S 15      S 16      S 17      S 18      S 19      S 20 
0.2191575 0.2278377 0.1187855 0.2972317 0.3161276 0.2658571 0.2251592 0.1623166 0.2708813 0.2850029 
     S 21      S 22      S 23      S 24      S 25 
0.2448673 0.3306610 0.1695582 0.2683282 0.2314015 
> 
> ## ---------------------------------------------------------------------------
```

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.

```
## ------------------------------------------------------------------------

## Question 03
## Calculate the mean and standard deviation of the 25 sample means
mean_smeans <- mean(s.means)
sd_smeans   <- sd(s.means)

## state the relationship of them with true mean and true standard deviation.
mean_smeans
sd_smeans

## ------------------------------------------------------------------------
```

```
> ## ------------------------------------------------------------------------
>
> ## Question 03
> ## Calculate the mean and standard deviation of the 25 sample means
> mean_smeans <- mean(s.means)
> sd_smeans   <- sd(s.means)
>
> ## state the relationship of them with true mean and true standard deviation.
> mean_smeans
[1] 2.5174
> sd_smeans
[1] 0.0718861
>
> ## ------------------------------------------------------------------------
```