Sri Lanka Institute of Information Technology

Lab Submission
Lab sheet No 08

IT24102615

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Probability and Statistics | IT2120

B.Sc. (Hons) in Information Technology

Exercise

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

IT24102615.r | IT24102615.r | it24102615.r

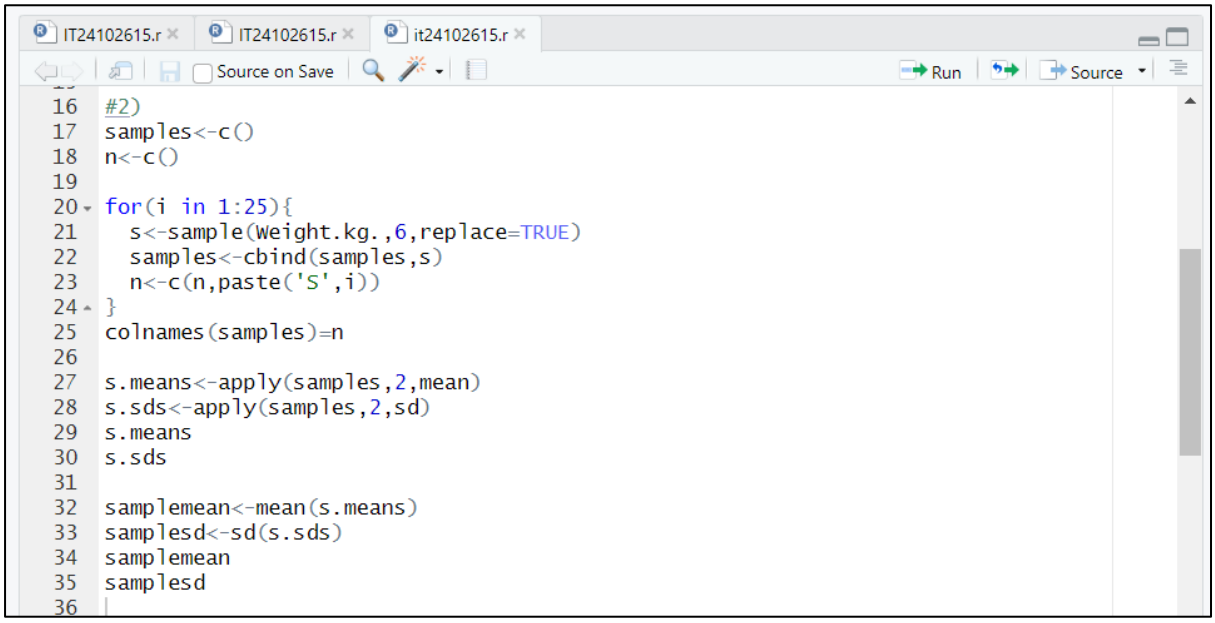
Source on Save | Run | Source

```
1  getwd()
2  setwd("C:\\Users\\ASUS\\Desktop\\PS_Lab_08\\IT24102615")
3
4  data <- read.table("Exercise - LaptopsWeights.txt", header = TRUE)
5  fix(data)
6  attach(data)
7
8  #Exercise
9  #1)
10 popmn<-mean(Weight.kg.)
11 popmn
12
13 popsd<-sd(Weight.kg.)
14 popsd
15
```

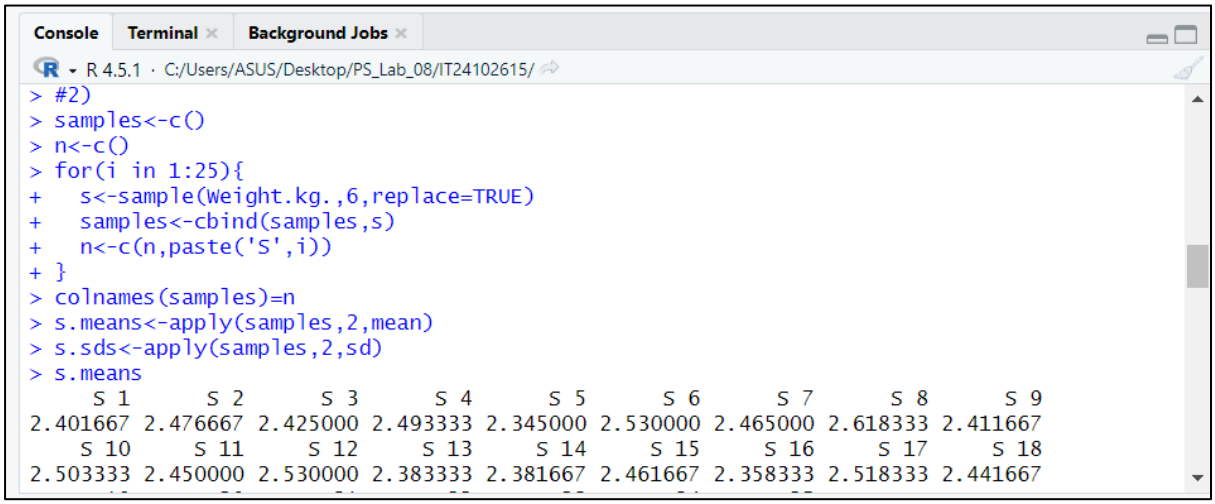
```
> getwd()
[1] "C:/Users/ASUS/Documents"
> setwd("C:\\Users\\ASUS\\Desktop\\PS_Lab_08\\IT24102615")
> data <- read.table("Exercise - LaptopsWeights", header = TRUE)
```

```
> fix(data)
> attach(data)
> #Exercise
> #1)
> popmn<-mean(Weight.kg.)
> popmn
[1] 2.468
> popsd<-sd(Weight.kg.)
> popsd
[1] 0.2561069
```

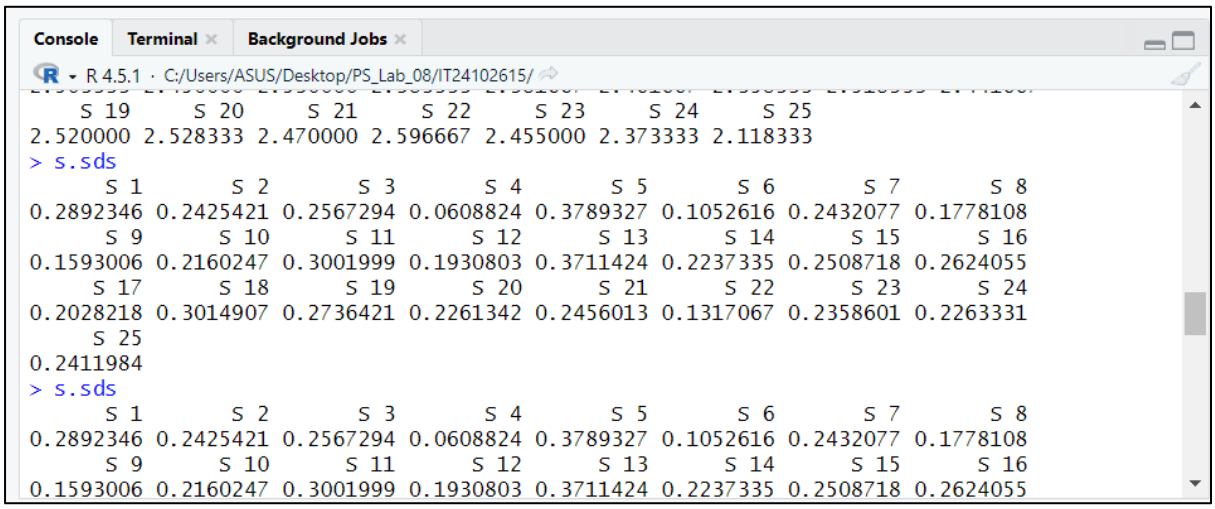
2. Draw 25 random samples of size 6 (with replacement) and calculate the sample mean and sample standard deviation for each sample.



```r
#2)
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)
s.means
s.sds

samplemean<-mean(s.means)
samplesd<-sd(s.sds)
samplemean
samplesd
```



```
> #2)
> 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)
> s.means
     S 1      S 2      S 3      S 4      S 5      S 6      S 7      S 8      S 9
2.401667 2.476667 2.425000 2.493333 2.345000 2.530000 2.465000 2.618333 2.411667
    S 10     S 11     S 12     S 13     S 14     S 15     S 16     S 17     S 18
2.503333 2.450000 2.530000 2.383333 2.381667 2.461667 2.358333 2.518333 2.441667
```



```
    S 19     S 20     S 21     S 22     S 23     S 24     S 25
2.520000 2.528333 2.470000 2.596667 2.455000 2.373333 2.118333
> s.sds
      S 1       S 2       S 3       S 4       S 5       S 6       S 7       S 8
0.2892346 0.2425421 0.2567294 0.0608824 0.3789327 0.1052616 0.2432077 0.1778108
      S 9      S 10      S 11      S 12      S 13      S 14      S 15      S 16
0.1593006 0.2160247 0.3001999 0.1930803 0.3711424 0.2237335 0.2508718 0.2624055
     S 17      S 18      S 19      S 20      S 21      S 22      S 23      S 24
0.2028218 0.3014907 0.2736421 0.2261342 0.2456013 0.1317067 0.2358601 0.2263331
     S 25
0.2411984
> s.sds
      S 1       S 2       S 3       S 4       S 5       S 6       S 7       S 8
0.2892346 0.2425421 0.2567294 0.0608824 0.3789327 0.1052616 0.2432077 0.1778108
      S 9      S 10      S 11      S 12      S 13      S 14      S 15      S 16
0.1593006 0.2160247 0.3001999 0.1930803 0.3711424 0.2237335 0.2508718 0.2624055
```

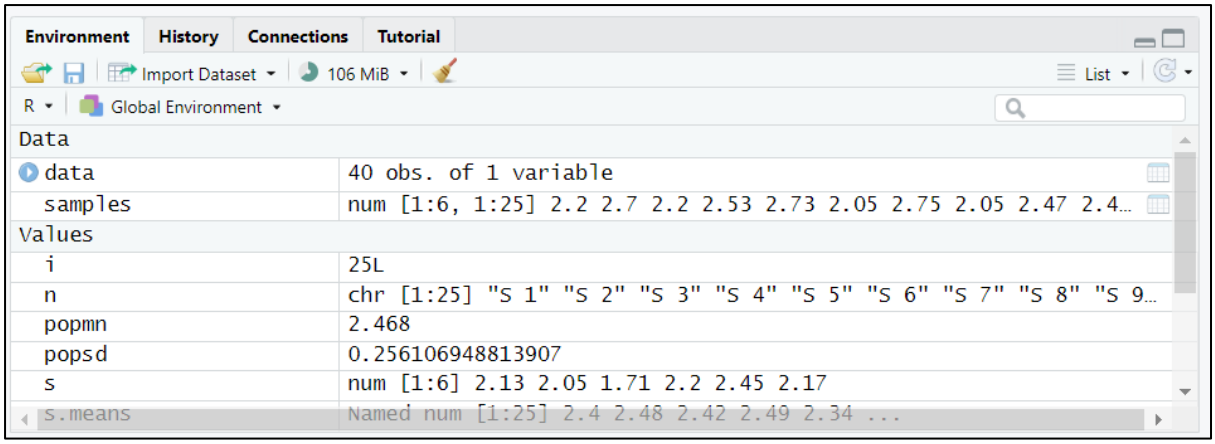
```
     S 17      S 18      S 19      S 20      S 21      S 22      S 23      S 24
0.2028218 0.3014907 0.2736421 0.2261342 0.2456013 0.1317067 0.2358601 0.2263331
     S 25
0.2411984
> samplemean<-mean(s.means)
> samplesd<-sd(s.sds)
> samplemean
[1] 2.450267
> samplesd
[1] 0.07194424
```

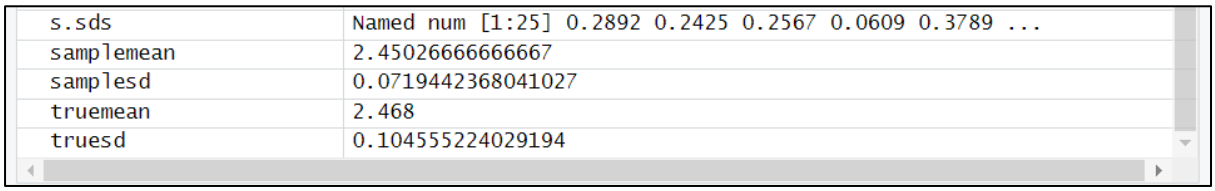
3. Calculate the mean and standard deviation of the 25 sample means and state the relationship of them with true mean and true standard deviation.

```
37  #3)
38  popmn
39  samplemean
40
41  truemean = popmn
42  truemean
43
44  samplemean
45
46  popsd
47  samplesd
48
49  truesd = popsd / sqrt(6)
50  truesd
51
52  samplesd
53
54
36:1  (Top Level)                                    R Script
```

```
> #3)
> popmn
[1] 2.468
> samplemean
[1] 2.450267
> truemean = popmn
> truemean
[1] 2.468
> samplemean
[1] 2.450267
> popsd
[1] 0.2561069
> samplesd
[1] 0.07194424
> truesd = popsd / sqrt(6)
```

```
> truesd
[1] 0.1045552
> samplesd
[1] 0.07194424
>
```


Environment
History
Connections
Tutorial
Import Dataset
106 MiB
List
R
Global Environment
Data
data
40 obs. of 1 variable
samples
num [1:6, 1:25] 2.2 2.7 2.2 2.53 2.73 2.05 2.75 2.05 2.47 2.4...
Values
i
25L
n
chr [1:25] "S 1" "S 2" "S 3" "S 4" "S 5" "S 6" "S 7" "S 8" "S 9...
popmn
2.468
popsd
0.256106948813907
s
num [1:6] 2.13 2.05 1.71 2.2 2.45 2.17
s.means
Named num [1:25] 2.4 2.48 2.42 2.49 2.34 ...


s.sds
Named num [1:25] 0.2892 0.2425 0.2567 0.0609 0.3789 ...
samplemean
2.45026666666667
samplesd
0.0719442368041027
truemean
2.468
truesd
0.104555224029194