Student ID: IT24100543

Lab Sheet: 08

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.

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

Population Mean	2.468
Population Standard Deviation	0.2561069

```
> 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.

Sample	Mean	SD		Sample	Mean	SD
1	2.528333	0.18313019		14	2.596667	0.27089974
2	2.493333	0.23627667		15	2.376667	0.39550811
3	2.571667	0.25568861		16	2.520000	0.17064583
4	2.338333	0.21084750		17	2.463333	0.24451312
5	2.601667	0.16773988		18	2.388333	0.21572359
6	2.473333	0.12754084		19	2.628333	0.29403515
7	2.338333	0.15765997		20	2.603333	0.21294757
8	2.638333	0.26430412		21	2.500000	0.16260381
9	2.540000	0.31240999		22	2.445000	0.28119388
10	2.540000	0.33553937		23	2.548333	0.09887703
11	2.528333	0.21141586		24	2.598333	0.09600347
12	2.538333	0.29123301		25	2.396667	0.22259081
13	2.643333	0.16120380				

```
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
samples

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

```
> s.means
     S 1      S 2      S 3      S 4
2.528333 2.493333 2.571667 2.338333
     S 5      S 6      S 7      S 8
2.601667 2.473333 2.338333 2.638333
     S 9     S 10     S 11     S 12
2.540000 2.313333 2.528333 2.538333
    S 13     S 14     S 15     S 16
2.643333 2.596667 2.376667 2.520000
    S 17     S 18     S 19     S 20
2.463333 2.388333 2.628333 2.603333
    S 21     S 22     S 23     S 24
2.500000 2.445000 2.548333 2.598333
    S 25
2.396667
```

```
> s.sd
       S 1        S 2        S 3        S 4
0.18313019 0.23627667 0.25568861 0.21084750
       S 5        S 6        S 7        S 8
0.16773988 0.12754084 0.15765997 0.26430412
       S 9       S 10       S 11       S 12
0.31240999 0.33553937 0.21141586 0.29123301
      S 13       S 14       S 15       S 16
0.16120380 0.27089974 0.39550811 0.17064583
      S 17       S 18       S 19       S 20
0.24451312 0.21572359 0.29403515 0.21294757
      S 21       S 22       S 23       S 24
0.16260381 0.28119388 0.09887703 0.09600347
      S 25
0.22259081
```

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.

Mean	2.504467
Standard Deviation	0.09975516

```
> samplemean<-mean(s.means)
> samplesd<-sd(s.means)
> samplemean
[1] 2.504467
> samplesd
[1] 0.09975516
```

Population mean vs. sample mean

True mean vs. sample mean	**True SD vs. sample SD**

`> popmn`
`[1] 2.468`
`> samplemean`
`[1] 2.504467`
 	
The two values are approximately similar.
	`> truesd<-popsd/6`
	`> truesd`
	`[1] 0.04268449`
	`> samplesd`
	`[1] 0.09975516`
	
	Both values differ in size because the samplesd covers only a few entries while truesd covers the entire dataset.