

# Sri Lanka Institute of Information Technology



Lab Submission  
<Lab sheet No. 08>

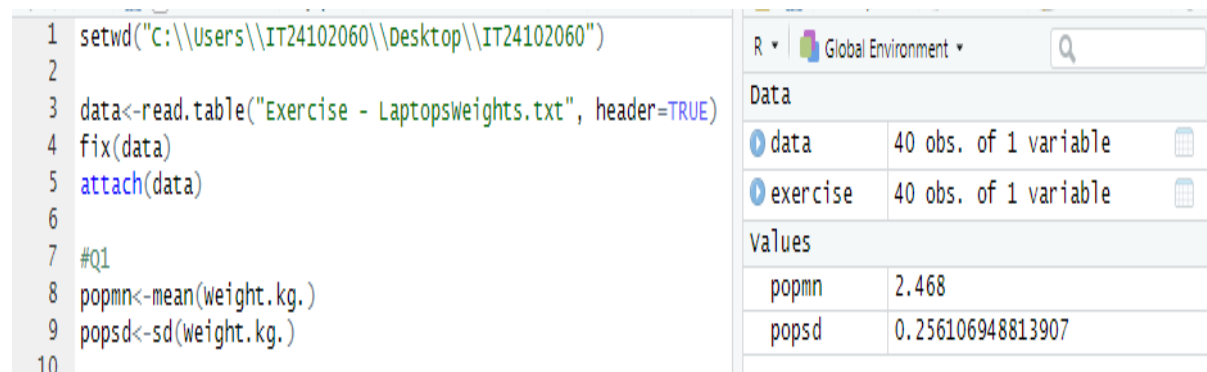
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**Probability and Statistics - IT2120**

B.Sc. (Hons) in Information Technology

Q1.

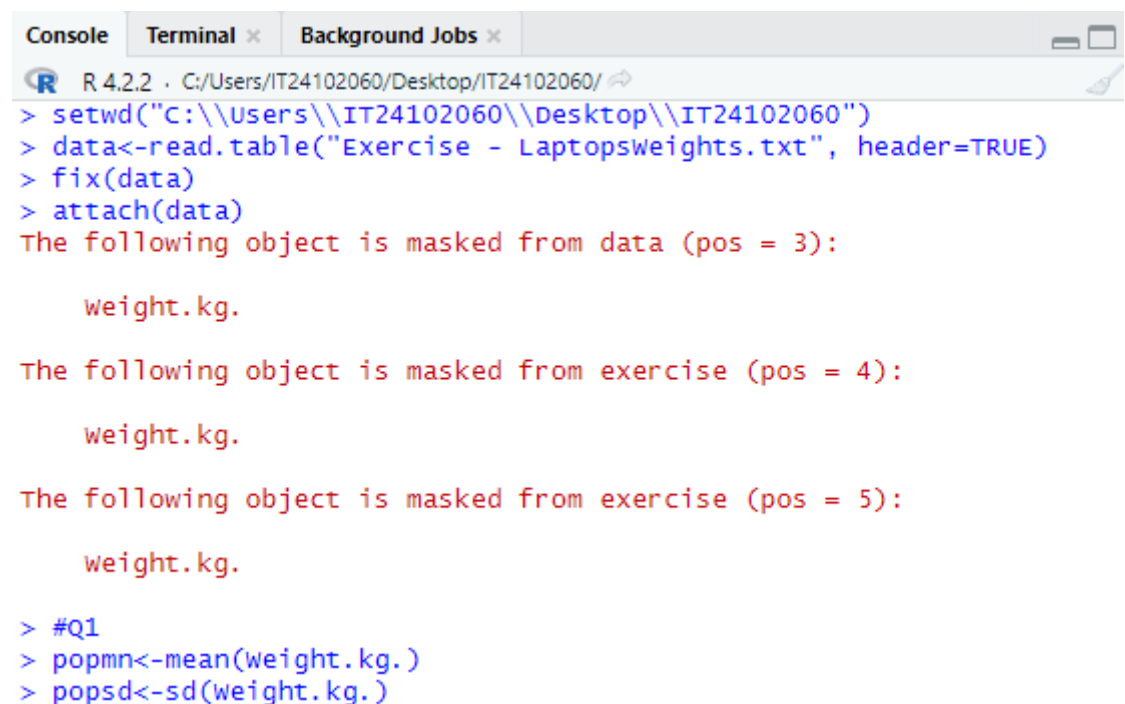


The screenshot shows the R Studio interface. The script editor on the left contains the following code:

```
1 setwd("C:\\Users\\IT24102060\\Desktop\\IT24102060")
2
3 data<-read.table("Exercise - Laptopsweights.txt", header=TRUE)
4 fix(data)
5 attach(data)
6
7 #Q1
8 popmn<-mean(weight.kg.)
9 popsd<-sd(weight.kg.)
10
```

The Environment pane on the right shows the following data:

Data	
data	40 obs. of 1 variable
exercise	40 obs. of 1 variable
Values	
popmn	2.468
popsd	0.256106948813907



The console output shows the following messages:

```
R 4.2.2 - C:/Users/IT24102060/Desktop/IT24102060/
> setwd("C:\\Users\\IT24102060\\Desktop\\IT24102060")
> data<-read.table("Exercise - Laptopsweights.txt", header=TRUE)
> fix(data)
> attach(data)
The following object is masked from data (pos = 3):

  weight.kg.

The following object is masked from exercise (pos = 4):

  weight.kg.

The following object is masked from exercise (pos = 5):

  weight.kg.

> #Q1
> popmn<-mean(weight.kg.)
> popsd<-sd(weight.kg.)
```

Q2.

```
11 #Q2
12 samples<-c()
13 n<-c()
14 for(i in 1:325){
15   s<-sample(weight.kg.,5,replace = TRUE)
16   samples<-cbind(samples, s)
17   n<-c(n,paste('s', i))
18 }
19
20 colnames(samples)=n
21
22 s.means<-apply(samples, 2 , mean)
23 s.sds<-apply(samples, 2, sd)
24
```

```
> #Q2
> samples<-c()
> n<-c()
> for(i in 1:325){
+   s<-sample(weight.kg.,5,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)
```

R Global Environment	
Data	
data	40 obs. of 1 variable
samples	num [1:5, 1:325] 2.05 2.53 2.42 2.61 2.41 2...
values	
i	325L
n	chr [1:325] "s 1" "s 2" "s 3" "s 4" "s 5" "s ...
popmn	2.468
popsd	0.256106948813907
s	num [1:5] 2.75 2.13 2.47 2.57 2.46
s.means	Named num [1:325] 2.4 2.36 2.5 2.64 2.38 ...
s.sds	Named num [1:325] 0.214 0.33 0.286 0.205 0.30...

**Q3.**

```
25 #Q3
26 samplesmean<-mean(s.means)
27 samplesd<-sd(s.means)
> #Q3
> samplesmean<-mean(s.means)
> samplesd<-sd(s.means)
```

samplesd	0.110240994748219
samplesmean	2.47021538461538

```
29 popmn
30 samplesmean
```

```
> popmn
[1] 2.468
> samplesmean
[1] 2.470215
```

**The mean of the sample mean is approximately equal to the population mean**

```
32 popsd
33 samplesd
```

```
> popsd
[1] 0.2561069
> samplesd
[1] 0.110241
```

**The SD of the sample mean is approximately equal to the population SD divided by square root of the sample size(6)**