PS Lab 08

IT24510004

```
setwd("C:\\Users\\ASUS\\Desktop\\PS_Lab08")
getwd()
#Importing the dataset
data <-read.table("Data - Lab 8.txt",header = TRUE)
fix(data)
attach(data)
```

```
> setwd("C:\\Users\\ASUS\\Desktop\\PS_Lab08")
> getwd()
[1] "C:/Users/ASUS/Desktop/PS_Lab08"
> data <-read.table("Data - Lab 8.txt",header = TRUE)
> fix(data)
> attach(data)
The following object is masked from data (pos = 3):

    Nicotine

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

    Nicotine
```

```
#Question 1
popmean <- mean (Nicotine)
popvar<-var(Nicotine)
```

```
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> popmean <- mean (Nicotine)
> popvar<-var(Nicotine)
```

```
#Question 2
#Fiest create null vectors to store sample data sets.
samples<-c()
n<-c()
# The "for" loop will be used to create and assign samples of size 5 for "samp
#Using "sample" command we can draw a random sample either with replacement or
for(i in 1:30){
  s<-sample(Nicotine,5,replace=TRUE)
  samples<-cbind(samples,s)
  n<-c(n,paste('s',i))
}
```

```
> #Question 2
> #Fiest create null vectors to store sample data sets.
> samples<-c()
> n<-c()
> # The "for" loop will be used to create and assign samples of size 5 for "samples"
variable created above.
> #Using "sample" command we can draw a random sample either with replacement or wit
hout replacement.
> for(i in 1:30){
+   s<-sample(Nicotine,5,replace=TRUE)
+   samples<-cbind(samples,s)
+   n<-c(n,paste('s',i))
+ }
```

```
#Asssign column names for each sample created.Names have stored earlier under
colnames(samples)=n
s.means<-apply(samples,2,mean)
s.vars<-apply(samples,2,var)
#Question 3
#Following commands will calculate mean and variance of sample means stored in
samplemean <-mean(s.means)
samplevars<-var(s.means)
```

```
> #Asssign column names for each sample created.Names have stored earlier under "n"
ariable
> colnames(samples)=n
> s.means<-apply(samples,2,mean)
> s.means<-apply(samples,2,mean)
> s.vars<-apply(samples,2,var)
```

```
#Question 3
#Following commands will calculate mean and variance of sample means stored i
samplemean <-mean(s.means)
samplevars<-var(s.means)


#Question 4
#Compare the population mean and mean of sample means.
popmn
samplemean

#Question 5
#Compare the population variance and variance of sample mean
truevar = popvar/5
samplevars
```

```
> #Question 3
> #Following commands will calculate mean and variance of sample means stored in "s
means"variable.
> samplemean <-mean(s.means)
> samplevars<-var(s.means)
> #Question 4
> #Compare the population mean and mean of sample means.
> popmn
[1] 2.468
> samplemean
[1] 1.814533
```

```
> #Question 5
> #Compare the population variance and variance of sample mean
> truevar = popvar/5
> samplevars
[1] 0.02954343
```

Exercise

```
#Exercise
setwd("C:\\Users\\ASUS\\Desktop\\PS_Lab08")
getwd()
# Read the data file

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

```
> #Exercise
> setwd("C:\\Users\\ASUS\\Desktop\\PS_Lab08")
> getwd()
[1] "C:/Users/ASUS/Desktop/PS_Lab08"
> weights <- 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.

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

```
> #Q1
> 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.

```
# Q2
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.means
s.sd<-apply(samples,2,sd)
s.sd
```

```
> # Q2
> 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)
```

```
> colnames(samples)=n
> s.means<-apply(samples,2,mean)
> s.means
     S 1      S 2      S 3      S 4      S 5      S 6      S 7      S 8      S 9
2.370000 2.441667 2.518333 2.691667 2.548333 2.480000 2.335000 2.475000 2.441667
    S 10     S 11     S 12     S 13     S 14     S 15     S 16     S 17     S 18
2.470000 2.511667 2.368333 2.350000 2.553333 2.530000 2.396667 2.616667 2.488333
    S 19     S 20     S 21     S 22     S 23     S 24     S 25
2.428333 2.275000 2.351667 2.415000 2.536667 2.436667 2.363333
> s.sd<-apply(samples,2,sd)
> s.sd
```

```
> s.sd<-apply(samples,2,sd)
> s.sd
       S 1        S 2        S 3        S 4        S 5        S 6        S 7
0.20697826 0.20875025 0.25451261 0.06853223 0.19712094 0.20803846 0.22941229
       S 8        S 9       S 10       S 11       S 12       S 13       S 14
0.27420795 0.20903748 0.25760435 0.14274686 0.32375402 0.14463748 0.22826885
      S 15       S 16       S 17       S 18       S 19       S 20       S 21
0.27217641 0.37908662 0.26620794 0.26041633 0.27744669 0.20983327 0.27257415
      S 22       S 23       S 24       S 25
0.13765900 0.24426761 0.12060956 0.24377585
```

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.

```
#Q3
#calculate the mean and standard deviation of the 25 sample means
samplemean<-mean(s.means)
samplemean
samplesd<-sd(s.sd)
samplesd

#state therelationship of them with true mean and true standard deviation
popmn
samplemean

truesd=popsd/5
samplesd
```

```
> #Q3
> #calculate the mean and standard deviation of the 25 sample means
> samplemean<-mean(s.means)
> samplemean
[1] 2.455733
> samplesd<-sd(s.sd)
> samplesd
[1] 0.06682075
> #state therelationship of them with true mean and true standard deviation
> popmn
[1] 2.468
```

```
> samplemean
[1] 2.455733
> truesd=popsd/5
> samplesd
[1] 0.06682075
```