IT2120- Probability and Statistics

Lab Sheet 08

IT24103576

Exercise

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

```
setwd("C:\\Users\\USER\\OneDrive\\Desktop\\IT24103576")
data<-read.table("Exercise - LaptopsWeights.txt", header=TRUE)
fix(data)
attach(data)

#Q1
popmn<-mean(Weight.kg.)
popmn

popvar<-var(Weight.kg.)
popvar

pop_dev <- sd(Weight.kg.)
pop_dev
```

```
R 4.5.1 · C:/Users/USER/OneDrive/Desktop/IT24103576/
> setwd("C:\\Users\\USER\\OneDrive\\Desktop\\IT24103576")
> 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 data (pos = 4):

    Weight.kg.

> popmn<-mean(Weight.kg.)
> popmn<-mean(Weight.kg.)
> popmn
[1] 2.468
> popvar<-var(Weight.kg.)
> popvar
[1] 0.06559077
> pop_dev <- sd(Weight.kg.)
> pop_dev
[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 25){
  s<-sample(Weight.kg.,6,replace=TRUE)
  samples<-cbind(samples,s)
  n<-c(n,paste('s',i))
}
sample
n

colnames(samples)=n

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

s.vars<-apply(samples,2,var)
s.vars

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

```
> samples<-c()
> n<-c()
> for(i in 25){
+   s<-sample(Weight.kg.,6,replace=TRUE)
+   samples<-cbind(samples,s)
+   n<-c(n,paste('s',i))
+ }
> sample
function (x, size, replace = FALSE, prob = NULL)
{
    if (length(x) == 1L && is.numeric(x) && is.finite(x) && x >=
        1) {
        if (missing(size))
            size <- x
        sample.int(x, size, replace, prob)
    }
    else {
        if (missing(size))
            size <- length(x)
        x[sample.int(length(x), size, replace, prob)]
    }
}
<bytecode: 0x0000023829ff2ef0>
<environment: namespace:base>
> n
[1] "s 25"
> colnames(samples)=n
> s.means<-apply(samples,2,mean)
> s.means
    s 25
2.536667
> s.vars<-apply(samples,2,var)
> s.vars
      s 25
0.02814667
> s.dev<-apply(samples,2,sd)
> s.dev
     s 25
0.1677697
```

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.

```
39  #Q3
40  samplemean<-mean(s.means)
41  samplemean
42
43  sampledev<-sd(s.means)
44  sampledev
45
46  popmn
47  samplemean
48
49  pop_dev
50  sampledev
```

```
> samplemean<-mean(s.means)
> samplemean<-mean(s.means)
> samplemean
[1] 2.536667
> sampledev<-sd(s.means)
> sampledev
[1] NA
> popmn
[1] 2.468
> samplemean
[1] 2.536667
> pop_dev
[1] 0.2561069
> sampledev
[1] NA
```