

## IT2120- Probability and Statistics

### Lab Sheet 08

#### IT24103576

##### Exercise

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

```
1 setwd("C:\\Users\\USER\\OneDrive\\Desktop\\IT24103576")
2 data<-read.table("Exercise - LaptopsWeights.txt", header=TRUE)
3 fix(data)
4 attach(data)
5
6 #Q1
7 popmn<-mean(weight.kg.)
8 popmn
9
10 popvar<-var(weight.kg.)
11 popvar
12
13 pop_dev <- sd(weight.kg.)
14 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.

```
16 #Q2
17 samples<-c()
18 n<-c()
19
20 for(i in 25){
21   s<-sample(weight.kg.,6,replace=TRUE)
22   samples<-cbind(samples,s)
23   n<-c(n,paste('s',i))
24 }
25 sample
26 n
27
28 colnames(samples)=n
29
30 s.means<-apply(samples,2,mean)
31 s.means
32
33 s.vars<-apply(samples,2,var)
34 s.vars
35
36 s.dev<-apply(samples,2,sd)
37 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
```

- 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


```


Environment


History

Connections


Tutorial









Import Dataset ▾



168 MiB ▾



R ▾ |  Global Environment ▾

Data

▶ data

samples

40 obs. of 1 variable

num [1:6, 1] 2.47 2.7 2.32 2.41 2.57 2.75

Values

i

n

pop\_dev

popmn

popvar

s

s.dev

s.means

s.vars

sampledev

samplemean

25

"s 25"

0.256106948813907

2.468

0.0655907692307692

num [1:6] 2.47 2.7 2.32 2.41 2.57 2.75

Named num 0.168

Named num 2.54

Named num 0.0281

NA\_real\_

2.53666666666667