Sri Lanka Institute of Information Technology

Lab Submission 08

IT24102218

Chedima Imashi K.H.

Probability and Statistics - IT2120

B.Sc. (Hons) in Information Technology

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

```
getwd()
setwd("C:\\Users\\User\\Desktop\\IT24102218")

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

```
> getwd()
[1] "C:/Users/User/Documents"
> setwd("C:\\Users\\User\\Desktop\\IT24102218")
> data <- read.table("Exercise - LaptopsWeights.txt", header = TRUE)
> fix(data)
> attach(data)
```

Data Editor

File Edit Help

	Weight.kg.	var2	var3	var4	var5	var6
1	2.46					
2	2.45					
3	2.47					
4	2.71					
5	2.46					
6	2.05					
7	2.6					
8	2.42					
9	2.43					
10	2.53					
11	2.57					
12	2.85					
13	2.7					
14	2.53					
15	2.28					
16	2.2					
17	2.57					
18	2.89					
19	2.51					

```
## (01)
popmn <- mean(Weight.kg.)
popmn

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

```
> 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.

```
## (02)
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))
}
samples

colnames(samples) = n

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

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

```
> 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))
+ }
> samples
      s    s    s    s    s    s    s    s    s    s    s    s    s    s    s    s    s    s    s    s    s    s    s    s    s
[1,] 2.65 2.89 2.76 2.17 2.57 2.66 2.73 2.51 2.13 2.05 2.66 2.65 2.53 2.76 2.57 2.89 2.51 2.05 2.46 2.05 2.51 2.66 2.70 2.42 2.76
[2,] 2.67 2.47 2.43 2.47 2.61 2.05 2.85 2.41 2.41 2.53 2.85 2.57 2.23 2.47 2.32 2.57 2.47 2.61 2.53 2.41 2.57 2.23 2.67 2.28 2.43
[3,] 2.57 2.57 2.41 2.89 2.76 2.75 2.46 2.41 2.05 2.70 2.65 2.42 2.43 2.65 2.61 2.57 2.06 1.71 2.28 2.47 2.43 2.85 2.42 2.32 2.43
[4,] 2.66 2.28 2.20 2.41 2.06 2.70 2.67 2.57 2.57 2.46 1.71 2.61 2.57 2.13 2.46 2.57 2.76 2.53 2.05 2.51 2.61 2.71 2.20 2.20 2.75
[5,] 2.89 2.60 2.05 2.66 2.43 2.53 2.85 2.43 2.57 2.32 2.61 2.60 2.89 2.85 2.76 2.67 2.60 2.51 2.05 2.51 2.06 2.45 2.23 2.76 2.71
[6,] 2.13 2.41 2.23 2.67 2.60 2.66 2.28 2.42 2.20 2.13 2.65 2.89 1.71 2.28 2.23 2.67 2.67 2.76 2.66 2.43 2.05 2.42 2.06 2.89 2.57
> 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    s 10    s 11    s 12
2.595000 2.536667 2.346667 2.545000 2.505000 2.558333 2.640000 2.458333 2.321667 2.365000 2.521667 2.623333
   s 13    s 14    s 15    s 16    s 17    s 18    s 19    s 20    s 21    s 22    s 23    s 24
2.393333 2.523333 2.491667 2.656667 2.511667 2.361667 2.338333 2.396667 2.371667 2.553333 2.380000 2.478333
   s 25
2.608333
> s.sds <- apply(samples, 2, sd)
> s.sds
      s 1       s 2       s 3       s 4       s 5       s 6       s 7       s 8       s 9      s 10
0.25169426 0.20800641 0.24695479 0.24993999 0.24205371 0.25949310 0.22768399 0.06645801 0.22648767 0.24696154
     s 11      s 12      s 13      s 14      s 15      s 16      s 17      s 18      s 19      s 20
0.40656693 0.15279616 0.39787770 0.28125907 0.19549084 0.12436505 0.24506462 0.39811640 0.25482674 0.17466158
     s 21      s 22      s 23      s 24      s 25
0.25269877 0.22668627 0.26283074 0.28074306 0.15393722
```

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.

```
## (03)
samplemean <- mean(s.means)
samplemean

popmn
samplemean

samplesd <- sd(s.means)
samplesd

popsd
samplesd
```

```
> samplemean <- mean(s.means)
> samplemean
[1] 2.483267
> popmn
[1] 2.468
> samplemean
[1] 2.483267
> samplesd <- sd(s.means)
> samplesd
[1] 0.103666
> popsd
[1] 0.2561069
> samplesd
[1] 0.103666
```