Sri Lanka Institute of Information Technology

Lab Submission
Lab Sheet 08

IT24104309

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Probability and Statistics | IT2120

B.Sc. (Hons) in Information Technology

Question 01: Calculate the population mean and population standard deviation of the laptop bag weights.

```
 1  setwd("C:\\Users\\IT24104309\\Desktop\\IT24104309")
 2  data <- read.table("Exercise - LaptopsWeights.txt", header=TRUE)
 3  fix(data)
 4  attach(data)
 5
 6  # question 01
 7  popmn <- mean(Weight.kg.)
 8  popsd <- sd(Weight.kg.)
 9
10  print(popmn)
11  print(popsd)
12
```

```
> setwd("C:\\Users\\IT24104309\\Desktop\\IT24104309")
> data <- read.table("Exercise - LaptopsWeights.txt", header=TRUE)
> fix(data)
> attach(data)
> popmn <- mean(Weight.kg.)
> popsd <- sd(Weight.kg.)
> print(popmn)
[1] 2.468
> print(popsd)
[1] 0.2561069
```

Question 02: Draw 25 random samples of size 6 (with replacement) and calculate the sample mean and sample standard deviation for each sample.

```
13  # question 02
14  samples <- c()
15  n <- c()
16
17 ▾ for(i in 1:25){
18     s<- sample(Weight.kg., 6, replace=TRUE)
19     samples<- cbind(samples, s)
20     n <- c(n, paste('S', i))
21 ▴ }
22
23  colnames(samples)=n
24
25  s.means <- apply(samples, 2, mean)
26  s.sds <- apply(samples, 2, sd)
27
```

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

Question 03: Calculate the mean and standard deviation of the 25 sample means and state the relationship of them with true mean and true standard deviation.

```
28  # question 03
29  samplemean <- mean(s.means)
30  samplesd <- sd(s.means)
31
32  popmn
33  samplemean
34
35  # popmn = 2.468 and samplemean = 2.462867
36  # the population mean is approximately equal to sample mean
37
38  truesd = popsd/6
39  truesd
40  samplesd
41
42  # truesd = 0.04268449 and samplesd = 0.1035051
43  # the true standard deviation is different from sample standard deviation
44  # because the sample size is too small
```

```
> samplemean <- mean(s.means)
> samplesd <- sd(s.means)
> popmn
[1] 2.468
> samplemean
[1] 2.462867
> truesd = popsd/6
> truesd
[1] 0.04268449
> samplesd
[1] 0.1035051
```