Sri Lanka Institute of Information Technology

Lab Submission
Lab sheet No.8

IT24100861

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Probability and Statistics| IT2120

B.Sc. (Hons) in Information Technology

Exercise

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

```
> setwd("C:\\Users\\aaa\\OneDrive\\Desktop\\IT-24100861")
> getwd()
[1] "C:/Users/aaa/OneDrive/Desktop/IT-24100861"
>
> #(01)
> data1 <- read.table("Exercise - LaptopsWeights.txt", header = TRUE)
> fix(data1)
> attach(data1)
The following object is masked from data1 (pos = 3):

    Weight.kg.

The following object is masked from data1 (pos = 4):

    Weight.kg.

The following object is masked from data1 (pos = 5):

    Weight.kg.

The following object is masked from data1 (pos = 6):

    Weight.kg.

The following object is masked from data1 (pos = 7):

    Weight.kg.

The following object is masked from data1 (pos = 8):

    Weight.kg.

The following object is masked from data1 (pos = 9):

    Weight.kg.

The following object is masked from data1 (pos = 11):
```

```
    Weight.kg.

The following object is masked from data1 (pos = 13):

    Weight.kg.

The following object is masked from data1 (pos = 15):

    Weight.kg.

The following object is masked from data1 (pos = 17):

    Weight.kg.

The following object is masked from data1 (pos = 20):

    Weight.kg.

The following object is masked from data1 (pos = 22):

    Weight.kg.
```

```
>
> popmn1 <- mean(Weight.kg.)
> popmn1
[1] 2.468
> popvar1 <- var(Weight.kg.)
> popvar1
[1] 0.06559077
```

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

```
> #(02)
> samples <- NULL
> n <- c()
>
> for(i in 1:30){
+   s <- sample(Nicotine, 5, replace = TRUE)
+   samples <- cbind(samples, s)
+   n <- c(n, paste('S', i))
+ }
>
> 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  S 13  S 14  S 15  S 16  S 17  S 18  S 19  S 20
1.820 1.706 1.760 1.492 1.670 1.440 1.758 1.928 1.390 1.596 1.934 2.068 1.848 1.798 1.758 1.756 1.758 1.896 1.534 2.190
 S 21  S 22  S 23  S 24  S 25  S 26  S 27  S 28  S 29  S 30
1.552 1.862 1.726 1.944 1.760 2.072 1.856 1.382 1.880 1.918
>
> s.var <- apply(samples, 2, var)
> s.var
    S 1     S 2     S 3     S 4     S 5     S 6     S 7     S 8     S 9    S 10    S 11    S 12    S 13    S 14    S 15
0.13790 0.11983 0.05570 0.30172 0.36915 0.14990 0.31137 0.16277 0.43280 0.25958 0.06923 0.11107 0.11327 0.01092 0.11907
   S 16    S 17    S 18    S 19    S 20    S 21    S 22    S 23    S 24    S 25    S 26    S 27    S 28    S 29    S 30
0.05718 0.41382 0.09003 0.21553 0.18060 0.02252 0.05792 0.11738 0.05703 0.14785 0.08827 0.08528 0.30497 0.02145 0.10372
>
```

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)
> samplemean1 <- mean(s.means1)
> samplemean1
[1] 2.465667
> samplevars1 <- var(s.means1)
> samplevars1
[1] 0.01726644
>
> popmn1
[1] 2.468
> samplemean1
[1] 2.465667
>
> truevar = popvar1/6
> truevar
[1] 0.01093179
> samplevars1
[1] 0.01726644
```