# IT2120 - Probability and Statistics

## Lab Sheet 08

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## Exercise:

1.

```
Console   Terminal ×   Background Jobs ×
R  R 4.2.2 · C:/Users/IT24103767/Desktop/IT24103767/
> setwd("C:\\Users\\IT24103767\\Desktop\\IT24103767")
> #Q1
> data<-read.table("Exercise - LaptopsWeights.txt",header = TRUE)
> weights<- data$Weight.kg.
> population_mean <- mean(weights)
> print(paste("Population Mean: ", population_mean))
[1] "Population Mean:  2.468"
> population_sd <- sd(weights)
> print(paste("Population Standard Deviation: ", population_sd))
[1] "Population Standard Deviation:  0.256106948813907"
>
```

2.

```
Console   Terminal ×   Background Jobs ×
R  R 4.2.2 · C:/Users/IT24103767/Desktop/IT24103767/
> #Q2
> num_samples<-25
> sample_size<-6
>
> sample_means<-numeric(num_samples)
> sample_sds<-numeric(num_samples)
> set.seed(123)
>
> for(i in 1: num_samples){
+    samp<-sample(weights,size = sample_size, replace = TRUE)
+    sample_means[i]<-mean(samp)
+    sample_sds[i]<-sd(samp)
+ }
> results<-data.frame(
+    Sample = 1: num_samples,
+    Mean = round(sample_means,3),
+    SD = round(sample_sds,3)
+ )
> print(results)
   Sample  Mean    SD
1       1 2.530 0.151
2       2 2.573 0.119
3       3 2.473 0.172
4       4 2.592 0.135
5       5 2.457 0.275
6       6 2.402 0.254
7       7 2.590 0.217
8       8 2.467 0.453
9       9 2.402 0.223
10     10 2.335 0.324
11     11 2.587 0.171
12     12 2.378 0.324
13     13 2.382 0.299
14     14 2.465 0.231
15     15 2.485 0.175
```

```
    Sample  Mean      SD
1        1  2.530  0.151
2        2  2.573  0.119
3        3  2.473  0.172
4        4  2.592  0.135
5        5  2.457  0.275
6        6  2.402  0.254
7        7  2.590  0.217
8        8  2.467  0.453
9        9  2.402  0.223
10      10  2.335  0.324
11      11  2.587  0.171
12      12  2.378  0.324
13      13  2.382  0.299
14      14  2.465  0.231
15      15  2.485  0.175
16      16  2.452  0.276
17      17  2.385  0.204
18      18  2.338  0.244
19      19  2.428  0.248
20      20  2.552  0.265
21      21  2.538  0.171
22      22  2.467  0.245
23      23  2.470  0.241
24      24  2.448  0.279
25      25  2.475  0.236
```

3.

```
Console   Terminal ×   Background Jobs ×
R  R 4.2.2 · C:/Users/IT24103767/Desktop/IT24103767/
> #Q3
> mean_of_sample_means <- mean(sample_means)
> sd_of_sample_means <- sd(sample_means)
> print(paste("Mean of Sample Means: ", mean_of_sample_means))
[1] "Mean of Sample Means:  2.4668"
> print(paste("Standard Deviation of Sample Means: ", sd_of_sample_means))
[1] "Standard Deviation of Sample Means:  0.0762487401231677"
>
> population_mean
[1] 2.468
> population_sd
[1] 0.2561069
```