

## IT2120 - Probability and Statistics – Lab Sheet 08

### Exercise

```
1 setwd("C:/Users/user/Desktop/IT24400067")
2 data <- read.table("Exercise - LaptopsWeights.txt", header = TRUE)
3 colnames(data)[1] <- "Weight.kg"
4 attach(data)
```

```
> setwd("C:/Users/user/Desktop/IT24400067")
> data <- read.table("Exercise - LaptopsWeights.txt", header = TRUE)
> colnames(data)[1] <- "Weight.kg"
> attach(data)
```

01)

```
6 #Question 1
7 pop_mean <- mean(Weight.kg)
8 pop_mean
9
10 pop_sd <- sd(Weight.kg)
11 pop_sd
12
13
```

```
> pop_mean <- mean(Weight.kg)
> pop_mean
[1] 2.468
> pop_sd <- sd(Weight.kg)
> pop_sd
[1] 0.2561069
```

02)

```
14 #Question 2
15 # First, create empty vectors .
16 sample_means <- c()
17 sample_sds <- c()
18
19 # The loop will be used to create and assign 25 samples of size 6.
20 for (i in 1:25) {
21   # Draw a random sample of size 6 with replacement from the 'weight.kg' data.
22   s <- sample(Weight.kg, 6, replace = TRUE)
23
24   # Calculate the mean and standard deviation of the current sample.
25   sample_mean_val <- mean(s)
26   sample_sd_val <- sd(s)
27
28   # Append the calculated values to our vectors.
29   sample_means <- c(sample_means, sample_mean_val)
30   sample_sds <- c(sample_sds, sample_sd_val)
31 }
32
33 sample_means
34 sample_sds
35
```

```

> # First, create empty vectors .
> sample_means <- c()
> sample_sds <- c()
>
> # The loop will be used to create and assign 25 samples of size 6.
> for (i in 1:25) {
+   # Draw a random sample of size 6 with replacement from the 'weight.kg' data.
+   s <- sample(weight.kg, 6, replace = TRUE)
+
+   # Calculate the mean and standard deviation of the current sample.
+   sample_mean_val <- mean(s)
+   sample_sd_val <- sd(s)
+
+   # Append the calculated values to our vectors.
+   sample_means <- c(sample_means, sample_mean_val)
+   sample_sds <- c(sample_sds, sample_sd_val)
+ }
>
> sample_means
[1] 2.443333 2.350000 2.413333 2.465000 2.321667 2.525000 2.326667 2.518333 2.470000 2.436667 2.475000 2.395000 2.603333 2.478333 2.628333 2.558333 2.458333 2.546667 2.418333
[20] 2.501667 2.605000 2.475000 2.270000 2.526667 2.463333
> sample_sds
[1] 0.38103368 0.40174619 0.24646839 0.22660538 0.27036395 0.28346076 0.19582305 0.19732376 0.25274493 0.26158491 0.23880955 0.18673511 0.20314199 0.30753320 0.15497312 0.24693454
[17] 0.31745341 0.26492766 0.29013215 0.21535242 0.09071935 0.35686132 0.21344789 0.23703727 0.23653048

```

03)

```

37 #Question 3
38 # Calculate the mean of the 25 sample means.
39 mean_of_sample_means <- mean(sample_means)
40
41 # Calculate the standard deviation of the 25 sample means.
42 sd_of_sample_means <- sd(sample_means)
43
44 pop_mean
45 mean_of_sample_means
46
47 pop_sd
48 sd_of_sample_means

> # Calculate the mean of the 25 sample means.
> mean_of_sample_means <- mean(sample_means)
>
> # Calculate the standard deviation of the 25 sample means.
> sd_of_sample_means <- sd(sample_means)
>
> pop_mean
[1] 2.468
> mean_of_sample_means
[1] 2.466933
>
> pop_sd
[1] 0.2561069
> sd_of_sample_means
[1] 0.09006772

```