IT24102315 – Abeyrathna G.M.H.D.

PS

Lab – 08

```
setwd("E:\\Lab 08-20250926")
```

```
> setwd("E:\\Lab 08-20250926")
```

```
> data <- read.csv("Exercise - LaptopsWeights.txt")
```

```
fix(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					

```
attach(data)
```

```
> attach(data)
```

Q1.

```
# Question 1:

# Population mean of bag weights
pop_mean <- mean(weight.kg.)

# Population SD of bag weights
pop_sd <- sd(weight.kg.) * sqrt((length(weight.kg.) - 1) / length(weight.kg.))

pop_mean
pop_sd
```

```
> # Question 1:
>
> # Population mean of bag weights
> pop_mean <- mean(weight.kg.)
>
> # Population SD of bag weights
> pop_sd <- sd(weight.kg.) * sqrt((length(weight.kg.) - 1) / length(weight.kg.))
>
> pop_mean
[1] 2.468
> pop_sd
[1] 0.2528853
```

Q2.

```
# Question 2:

set.seed(123)   # for reproducibility
sample_means <- numeric(25)
sample_sds <- numeric(25)

for (i in 1:25) {
  sample_data <- sample(weight.kg., size = 6, replace = TRUE)
  sample_means[i] <- mean(sample_data)
  sample_sds[i] <- sd(sample_data)
}

sample_means
sample_sds
```

```
> # Question 2:
>
> set.seed(123)   # for reproducibility
> sample_means <- numeric(25)
> sample_sds <- numeric(25)
>
> for (i in 1:25) {
+   sample_data <- sample(weight.kg., size = 6, replace = TRUE)
+   sample_means[i] <- mean(sample_data)
+   sample_sds[i] <- sd(sample_data)
+ }
>
> sample_means
 [1] 2.530000 2.573333 2.473333 2.591667 2.456667 2.401667 2.590000 2.466667 2.401667
[10] 2.335000 2.586667 2.378333 2.381667 2.465000 2.485000 2.451667 2.385000 2.338333
[19] 2.428333 2.551667 2.538333 2.466667 2.470000 2.448333 2.475000
> sample_sds
 [1] 0.1513935 0.1191078 0.1718914 0.1345239 0.2749303 0.2544340 0.2167026 0.4530195
 [9] 0.2230172 0.3237746 0.1706068 0.3235686 0.2993604 0.2314951 0.1745566 0.2762909
[17] 0.2042303 0.2436733 0.2481465 0.2654367 0.1708118 0.2451666 0.2405826 0.2792430
[25] 0.2358601
```

Q3.

```
# Question 3:
# Mean & SD of the 25 sample means

mean_sample_means <- mean(sample_means)
sd_sample_means <- sd(sample_means)

mean_sample_means
sd_sample_means
```

```
> # Question 3:
> # Mean & SD of the 25 sample means
>
> mean_sample_means <- mean(sample_means)
> sd_sample_means <- sd(sample_means)
>
> mean_sample_means
[1] 2.4668
> sd_sample_means
[1] 0.07624874
```

```
# Relationship:
# - mean_sample_means ≈ pop_mean
# - sd_sample_means ≈ pop_sd / sqrt(6)
```