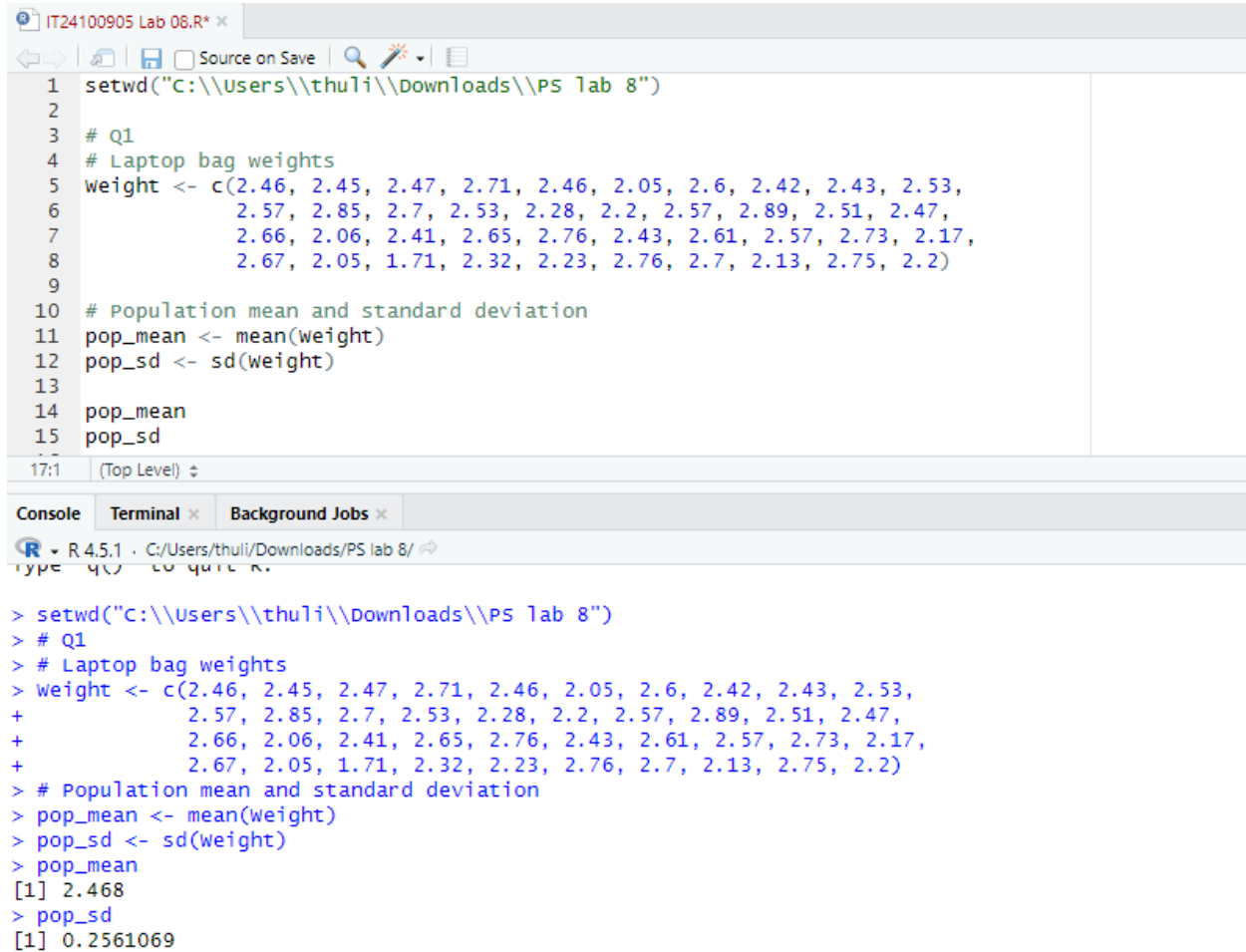


IT24100905

Rathnayake W. T. R.

Lab 08



The screenshot shows an RStudio interface with a script editor and a console. The script editor contains R code for setting the working directory, creating a vector of laptop bag weights, and calculating the population mean and standard deviation. The console shows the execution of these commands, resulting in the mean weight of 2.468 and a standard deviation of 0.2561069.

```
IT24100905 Lab 08.R* x
1 setwd("C:\\Users\\thuli\\Downloads\\PS lab 8")
2
3 # Q1
4 # Laptop bag weights
5 weight <- c(2.46, 2.45, 2.47, 2.71, 2.46, 2.05, 2.6, 2.42, 2.43, 2.53,
6             2.57, 2.85, 2.7, 2.53, 2.28, 2.2, 2.57, 2.89, 2.51, 2.47,
7             2.66, 2.06, 2.41, 2.65, 2.76, 2.43, 2.61, 2.57, 2.73, 2.17,
8             2.67, 2.05, 1.71, 2.32, 2.23, 2.76, 2.7, 2.13, 2.75, 2.2)
9
10 # Population mean and standard deviation
11 pop_mean <- mean(weight)
12 pop_sd <- sd(weight)
13
14 pop_mean
15 pop_sd
17:1 (Top Level) ↕

Console Terminal x Background Jobs x
R 4.5.1 · C:/Users/thuli/Downloads/PS lab 8/ ↗
> setwd("C:\\Users\\thuli\\Downloads\\PS lab 8")
> # Q1
> # Laptop bag weights
> weight <- c(2.46, 2.45, 2.47, 2.71, 2.46, 2.05, 2.6, 2.42, 2.43, 2.53,
+             2.57, 2.85, 2.7, 2.53, 2.28, 2.2, 2.57, 2.89, 2.51, 2.47,
+             2.66, 2.06, 2.41, 2.65, 2.76, 2.43, 2.61, 2.57, 2.73, 2.17,
+             2.67, 2.05, 1.71, 2.32, 2.23, 2.76, 2.7, 2.13, 2.75, 2.2)
> # Population mean and standard deviation
> pop_mean <- mean(weight)
> pop_sd <- sd(weight)
> pop_mean
[1] 2.468
> pop_sd
[1] 0.2561069
```

```
17 #Q2
18 set.seed(123) # For reproducibility
19
20 # Create a matrix with 6 rows (sample size), 25 columns (samples)
21 samples <- matrix(nrow = 6, ncol = 25)
22
23 # Fill matrix with random samples
24 for (i in 1:25) {
25   samples[, i] <- sample(weight, 6, replace = TRUE)
26 }
27
28 # Sample means and standard deviations
29 sample_means <- apply(samples, 2, mean)
30 sample_sds <- apply(samples, 2, sd)
31
32 # Create a table of results
33 sample_stats <- data.frame(
34   Sample = 1:25,
35   Mean = round(sample_means, 4),
36   SD = round(sample_sds, 4)
37 )
38
39 print(sample_stats)
40
```

31:1 (Top Level) R Script

Console Terminal Background Jobs

R 4.5.1 · C:/Users/thuli/Downloads/PS lab 8/

```
+ )
> print(sample_stats)
  Sample Mean SD
1      1 2.5300 0.1514
2      2 2.5733 0.1191
3      3 2.4733 0.1719
4      4 2.5917 0.1345
5      5 2.4567 0.2749
```

```
41 #Q3
42
43 # From previous steps
44 sample_mean_of_means <- mean(sample_means)
45 sample_sd_of_means <- sd(sample_means)
46
47 # Population SD from Q1 was:
48 # pop_sd = 0.2169 (already calculated)
49
50 # sample size
51 n <- 6
52
53 # Theoretical SD of sample means
54 theoretical_sd_of_means <- pop_sd / sqrt(n)
55
56 # Print all
57 sample_mean_of_means
58 sample_sd_of_means
59 theoretical_sd_of_means
60 |
```

60:1 (Top Level)

Console Terminal Background Jobs

R 4.5.1 · C:/Users/thuli/Downloads/PS lab 8/

```
> # Theoretical SD of sample means
> theoretical_sd_of_means <- pop_sd / sqrt(n)
> # Print all
> sample_mean_of_means
[1] 2.4668
> sample_sd_of_means
[1] 0.07624874
> theoretical_sd_of_means
[1] 0.1045552
```