IT24100905

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Lab 08

IT24100905 Lab 08.R*

Source on Save

```r
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
pop_sd
```

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Console Terminal Background Jobs

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```
> 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
```

```r
#Q2
set.seed(123)  # For reproducibility

# Create a matrix with 6 rows (sample size), 25 columns (samples)
samples <- matrix(nrow = 6, ncol = 25)

# Fill matrix with random samples
for (i in 1:25) {
  samples[, i] <- sample(weight, 6, replace = TRUE)
}

# Sample means and standard deviations
sample_means <- apply(samples, 2, mean)
sample_sds <- apply(samples, 2, sd)

# Create a table of results
sample_stats <- data.frame(
  Sample = 1:25,
  Mean = round(sample_means, 4),
  SD = round(sample_sds, 4)
)

print(sample_stats)
```

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Console Terminal Background Jobs

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```
+ )
> 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
```

Source on Save Run

```r
#Q3

# From previous steps
sample_mean_of_means <- mean(sample_means)
sample_sd_of_means <- sd(sample_means)

# Population SD from Q1 was:
# pop_sd = 0.2169 (already calculated)

# Sample size
n <- 6

# Theoretical SD of sample means
theoretical_sd_of_means <- pop_sd / sqrt(n)

# Print all
sample_mean_of_means
sample_sd_of_means
theoretical_sd_of_means
```

60:1 (Top Level)

Console Terminal Background Jobs

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```
> # 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
```