Ps lab 08

IT24103512

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1. Calculate the population mean and population standard deviation of the laptop bag weights.

```
setwd("C:\\Users\\Chamath\\OneDrive\\Desktop\\IT24103512\\Lab 08")
# Import the dataset
weights <- read.table("Exercise - LaptopsWeights.txt", header=TRUE)
attach(weights)
#Q1
#  Population mean & standard deviation
weights <- c(2.3, 2.7, 3.1, 2.9, 3.4, 2.5, 3.0, 2.8, 3.2, 2.6)
pop_mean <- mean(weights)
pop_sd   <- sd(weights)

cat("Population Mean =", pop_mean, "\n")
cat("Population SD   =", pop_sd, "\n")
```

```
> #Q1
> #  Population mean & standard deviation
> weights <- c(2.3, 2.7, 3.1, 2.9, 3.4, 2.5, 3.0, 2.8, 3.2, 2.6)
> pop_mean <- mean(weights)
> pop_sd   <- sd(weights)
>
> cat("Population Mean =", pop_mean, "\n")
Population Mean = 2.85
> cat("Population SD   =", pop_sd, "\n")
Population SD   = 0.3374743
```

2. Draw 25 random samples of size 6 (with replacement) and calculate the sample mean and sample standard deviation for each sample

```r
#Q2
#Take 25 samples of size 6 (with replacement)
set.seed(123)
sample_means <- c()
sample_sds   <- c()

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

print(data.frame(Sample=1:25, SampleMean=sample_means, SampleSD=sampl
```

sd(x, na.rm = FALSE)

```
> #Take 25 samples of size 6 (with replacement)
> set.seed(123)
> sample_means <- c()
> sample_sds   <- c()
>
> for(i in 1:25){
+   sample_data <- sample(weights, size = 6, replace = TRUE)
+   sample_means[i] <- mean(sample_data)
+   sample_sds[i]   <- sd(sample_data)
+ }
>
> print(data.frame(Sample=1:25, SampleMean=sample_means, SampleSD=sample_s
ds))
   Sample SampleMean  SampleSD
1       1   2.900000 0.3521363
2       2   2.950000 0.3507136
2       2   2.950000 0.3507136
3       3   3.016667 0.2562551
4       4   2.850000 0.3391165
5       5   3.066667 0.2732520
6       6   2.983333 0.3816630
7       7   2.850000 0.3937004
8       8   3.016667 0.3710346
9       9   2.700000 0.2280351
10     10   2.566667 0.2422120
11     11   2.933333 0.3723797
12     12   3.083333 0.1602082
13     13   2.883333 0.2639444
14     14   3.000000 0.3521363
15     15   2.600000 0.2000000
16     16   2.766667 0.3204164
17     17   2.850000 0.2345208
```

```
18      18   2.950000 0.3885872
19      19   2.883333 0.2786874
20      20   2.950000 0.1870829
21      21   2.850000 0.3016621
22      22   2.833333 0.1966384
23      23   2.733333 0.3265986
24      24   2.933333 0.3326660
25      25   2.833333 0.3723797
```

3. Calculate the mean and standard deviation of the 25 sample means and state the relationship of them with true mean and true standard deviation

```r
#Q3
#Mean & SD of sample means
mean_of_sample_means <- mean(sample_means)
sd_of_sample_means   <- sd(sample_means)

cat("Mean of Sample Means =", mean_of_sample_means, "\n")
cat("SD of Sample Means   =", sd_of_sample_means, "\n")
```

```r
> #Mean & SD of sample means
> mean_of_sample_means <- mean(sample_means)
> sd_of_sample_means   <- sd(sample_means)
>
> cat("Mean of Sample Means =", mean_of_sample_means, "\n")
Mean of Sample Means = 2.879333
> cat("SD of Sample Means   =", sd_of_sample_means, "\n")
SD of Sample Means   = 0.1308165
```