IT24100405

Lab 08

Q1)

```
setwd("A:\\Lab8\\Lab 08-20250923")

lw <- read.table("Exercise - LaptopsWeights.txt",header=TRUE)
fix(lw)
attach(lw)

#Q1
population_mean <- mean(Weight.kg.)
print(population_mean)

population_var <- var(Weight.kg.)
print(population_var)

Sd <- sd(Weight.kg.)
print(Sd)
```

```
> #Q1
> population_mean <- mean(Weight.kg.)
> print(population_mean)
[1] 2.468
>
> population_var <- var(Weight.kg.)
> print(population_var)
[1] 0.06559077
>
> Sd <- sd(Weight.kg.)
> print(Sd)
[1] 0.2561069
>
```

Q2)

```
#Q2
samples<-c()
w<-c()

for(i in 1:25){
  s<-sample(Weight.kg.,6,replace=TRUE)
  samples<-cbind(samples,s)
  w<-c(w,paste('S',i))
}

colnames(samples)=w

s.means<-apply(samples,2,mean)
s.Sd<-apply(samples,2,sd)

print(s.means)
print(s.Sd)
```

```
> for(i in 1:25){
+   s<-sample(Weight.kg.,6,replace=TRUE)
+   samples<-cbind(samples,s)
+   w<-c(w,paste('S',i))
+ }
>
> colnames(samples)=w
>
> s.means<-apply(samples,2,mean)
> s.Sd<-apply(samples,2,sd)
>
> print(s.means)
     S 1      S 2      S 3      S 4      S 5      S 6      S 7      S 8      S 9     S 10
2.416667 2.383333 2.481667 2.413333 2.708333 2.541667 2.500000 2.555000 2.581667 2.320000
    S 11     S 12     S 13     S 14     S 15     S 16     S 17     S 18     S 19     S 20
2.376667 2.471667 2.668333 2.560000 2.485000 2.590000 2.581667 2.545000 2.541667 2.466667
    S 21     S 22     S 23     S 24     S 25
2.503333 2.510000 2.471667 2.450000 2.466667
> print(s.Sd)
       S 1        S 2        S 3        S 4        S 5        S 6        S 7        S 8
).18790068 0.32824787 0.11565754 0.18467990 0.10833590 0.21151044 0.29852973 0.10193135
       S 9       S 10       S 11       S 12       S 13       S 14       S 15       S 16
).09389711 0.33840804 0.13923601 0.17348391 0.13833534 0.24955961 0.34209648 0.28319605
      S 17       S 18       S 19       S 20       S 21       S 22       S 23       S 24
).11788412 0.27046257 0.21141586 0.24727852 0.10385888 0.16334014 0.19198090 0.29455051
      S 25
).18261070
```

Q3)

```r
#Q3
# Calculate mean of sample means
mean_sample_means <- mean(s.means)
print(paste(mean_sample_means))

# Calculate standard deviation of sample means
sd_sample_means <- sd(s.means)
print(paste(sd_sample_means))

# Compare with population mean and standard deviation
print(paste("Population Mean:", population_mean))
print(paste("Population Standard Deviation:", Sd))

# Calculate theoretical standard error
standard_error <- Sd / sqrt(6)
print(paste("Theoretical Standard Error:", standard_error))
```

```
> #Q3
> # Calculate mean of sample means
> mean_sample_means <- mean(s.means)
> print(paste(mean_sample_means))
[1] "2.5036"
>
> # Calculate standard deviation of sample means
> sd_sample_means <- sd(s.means)
> print(paste(sd_sample_means))
[1] "0.08842458598946"
>
> # Compare with population mean and standard deviation
> print(paste("Population Mean:", population_mean))
[1] "Population Mean: 2.468"
> print(paste("Population Standard Deviation:", Sd))
[1] "Population Standard Deviation: 0.256106948813907"
>
> # Calculate theoretical standard error
> standard_error <- Sd / sqrt(6)
> #Q3
> # Calculate mean of sample means
> mean_sample_means <- mean(s.means)
> print(paste(mean_sample_means))
[1] "2.5036"
>
> # Calculate standard deviation of sample means
> sd_sample_means <- sd(s.means)
> print(paste(sd_sample_means))
[1] "0.08842458598946"
>
> # Compare with population mean and standard deviation
> print(paste("Population Mean:", population_mean))
[1] "Population Mean: 2.468"
> print(paste("Population Standard Deviation:", Sd))
[1] "Population Standard Deviation: 0.256106948813907"
>
> # Calculate theoretical standard error
> standard_error <- Sd / sqrt(6)
> print(paste("Theoretical Standard Error:", standard_error))
[1] "Theoretical Standard Error: 0.104555224029194"
>
```