IT24102279 – Lab 08

```
> # Set working directory
> setwd("C:\\Users\\it24102279\\Desktop\\IT24102279")
> # Read data
> data <- read.table("data.txt", header = TRUE)
> attach(data)
> # Assume the column name is 'weight'
> weights <- Weight
Error: object 'Weight' not found
> # Assume the column name is 'Weight'
> weights <- Weight.kg.
> # 1. Population mean and sd
> pop_mean <- mean(weights)
> pop_sd <- sd(weights)
> print("Population Mean")
[1] "Population Mean"
> print(pop_mean)
[1] 2.468
> print("Population Standard Deviation")
[1] "Population Standard Deviation"
> print(pop_sd)
[1] 0.2561069
> # 2. Draw 25 random samples of size 6
> n_samples <- 25
> sample_size <- 6
> sample_means <- numeric(n_samples)
> sample_sds <- numeric(n_samples)
> for (i in 1:n_samples) {
+   samp <- sample(weights, sample_size, replace = TRUE)
+   sample_means[i] <- mean(samp)
+   sample_sds[i] <- sd(samp)
+ }
> # Print sample means and sds
> print("Sample Means and Standard Deviations")
[1] "Sample Means and Standard Deviations"
> for (i in 1:n_samples) {
+   print("Sample Number")
+   print(i)
+   print("Mean")
+   print(sample_means[i])
+   print("Standard Deviation")
+   print(sample_sds[i])
+ }
```

```
[1] "Sample Number"
[1] 1
[1] "Mean"
[1] 2.431667
[1] "Standard Deviation"
[1] 0.1241639
[1] "Sample Number"
[1] 2
[1] "Mean"
[1] 2.423333
[1] "Standard Deviation"
[1] 0.2755116
[1] "Sample Number"
[1] 3
[1] "Mean"
[1] 2.45
[1] "Standard Deviation"
[1] 0.2367277
[1] "Sample Number"
[1] 4
[1] "Mean"
[1] 2.505
[1] "Standard Deviation"
[1] 0.2647074
[1] "Sample Number"
[1] 5
[1] "Mean"
[1] 2.46
[1] "Standard Deviation"
[1] 0.2309978
[1] "Sample Number"
[1] 6
[1] "Mean"
[1] 2.505
[1] "Standard Deviation"
[1] 0.2435364
[1] "Sample Number"
[1] 7
[1] "Mean"
[1] 2.458333
[1] "Standard Deviation"
[1] 0.3818595
[1] "Sample Number"
[1] 8
[1] "Mean"
[1] 2.58
[1] "Standard Deviation"
[1] 0.2346061
[1] "Sample Number"
[1] 9
[1] "Mean"
[1] 2.621667
[1] "Standard Deviation"
[1] 0.2504729
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```
[1] "Sample Number"
[1] 10
[1] "Mean"
[1] 2.453333
[1] "Standard Deviation"
[1] 0.328065
[1] "Sample Number"
[1] 11
[1] "Mean"
[1] 2.396667
[1] "Standard Deviation"
[1] 0.4386646
[1] "Sample Number"
[1] 12
[1] "Mean"
[1] 2.335
[1] "Standard Deviation"
[1] 0.2924209
[1] "Sample Number"
[1] 13
[1] "Mean"
[1] 2.323333
[1] "Standard Deviation"
[1] 0.2579664
[1] "Sample Number"
[1] 14
[1] "Mean"
[1] 2.643333
[1] "Standard Deviation"
[1] 0.1338158
[1] "Sample Number"
[1] 15
[1] "Mean"
[1] 2.51
[1] "Standard Deviation"
[1] 0.1722788
[1] "Sample Number"
[1] 16
[1] "Mean"
[1] 2.426667
[1] "Standard Deviation"
[1] 0.310784
[1] "Sample Number"
[1] 17
[1] "Mean"
[1] 2.548333
[1] "Standard Deviation"
[1] 0.3067518
[1] "Sample Number"
[1] 18
[1] "Mean"
[1] 2.501667
[1] "Standard Deviation"
[1] 0.3178941
```

```
[1] "Sample Number"
[1] 19
[1] "Mean"
[1] 2.656667
[1] "Standard Deviation"
[1] 0.1533188
[1] "Sample Number"
[1] 20
[1] "Mean"
[1] 2.536667
[1] "Standard Deviation"
[1] 0.201362
[1] "Sample Number"
[1] 21
[1] "Mean"
[1] 2.54
[1] "Standard Deviation"
[1] 0.1766352
[1] "Sample Number"
[1] 22
[1] "Mean"
[1] 2.613333
[1] "Standard Deviation"
[1] 0.2058802
[1] "Sample Number"
[1] 23
[1] "Mean"
[1] 2.455
[1] "Standard Deviation"
[1] 0.1674216
[1] "Sample Number"
[1] 24
[1] "Mean"
[1] 2.463333
[1] "Standard Deviation"
[1] 0.2244697
[1] "Sample Number"
[1] 25
[1] "Mean"
[1] 2.481667
[1] "Standard Deviation"
[1] 0.3440591
```

```
> # 3. Mean and sd of sample means
> mean_of_sample_means <- mean(sample_means)
> sd_of_sample_means <- sd(sample_means)
> print("Mean of Sample Means")
[1] "Mean of Sample Means"
> print(mean_of_sample_means)
[1] 2.4928
> print("Standard Deviation of Sample Means")
[1] "Standard Deviation of Sample Means"
> print(sd_of_sample_means)
[1] 0.08661018
> # Relationship explanation
> print("Relationship")
[1] "Relationship"
> print("The mean of the sample means is approximately equal to the population mean")
[1] "The mean of the sample means is approximately equal to the population mean"
> print(pop_mean)
[1] 2.468
> print("The standard deviation of the sample means is approximately equal to the population sd divided by sqrt(sample siz
e)")
[1] "The standard deviation of the sample means is approximately equal to the population sd divided by sqrt(sample size)"
> print(pop_sd / sqrt(sample_size))
[1] 0.1045552
>
```