


### Exercise

**Instructions:** Create a folder in your desktop with your registration number (Eg: "IT....."). You need to save the R script file and take screenshots of the command prompt with answers and save it in a word document inside the folder. Save both R script file and word document with your registration number (Eg: "IT....."). After you finish the exercise, zip the folder and upload the zip file to the submission link.

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



The screenshot shows the R Studio interface. The left pane displays the R script with the following code:

```
setwd("C:\\Users\\vishwa nethsara\\Desktop\\IT24103517")  
  
##Importing dataset  
data <- read.table("Exercise - Laptopsweights.txt", header = TRUE)  
fix(data)  
attach(data)  
  
##Q1  
popem <- mean(weight.kg.)  
popstd <- sd(weight.kg.)
```

The right pane shows the Global Environment with the following variables:

Variable	Value
data	40 obs. of 1 variable
samples	num [1:6, 1:25] 2.61 2.7 1.71 2.76 2.75 2.43 2.7 2.1...
values	
n	25L
chr [1:25]	"S 1" "S 2" "S 3" "S 4" "S 5" "S 6" "S 7" "
popem	2.468
popstd	0.256106948813907

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

```
##Q2
#First null vector to store sample data sets.
samples <- c()
n <- c()

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

#Assign column names for each sample created
colnames(samples) = n

# considered the second argument as "2" we can calculate either mean/variance column wise
s.means <- apply(samples, 2, mean)
s.stds <- apply(samples, 2, sd)
```

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.

```
##Q3
samplemean <- mean(s.means)
samplestd <- sd(s.means)

#compare the population mean and mean of sample means.
popmn
[1] 2.468
samplemean
[1] 2.4952

#compare the population std and std of sample means.
truesd = popsd/6
samplestd
[1] 0.075554
```

**Environment**

Object	Class	Value
poppsd	num	0.256106948813907
s	num [1:6]	2.57 2.53 2.43 2.73 2.47 2.05
s.mean	Named num [1:25]	2.38 2.41 2.64 2.45 2.42 ...
s.means	Named num [1:25]	2.49 2.47 2.54 2.64 2.41 ...
s.std	Named num [1:25]	0.35 0.239 0.192 0.235 0.228 ...
s.stds	Named num [1:25]	0.4027 0.2296 0.0788 0.1807 0.1816 ...
s.vars	Named num [1:25]	0.0689 0.0318 0.0938 0.039 0.1446 ...
samplemean	num	2.4952
samplestd	num	0.075540032520277
truesd	num	0.042684493680045