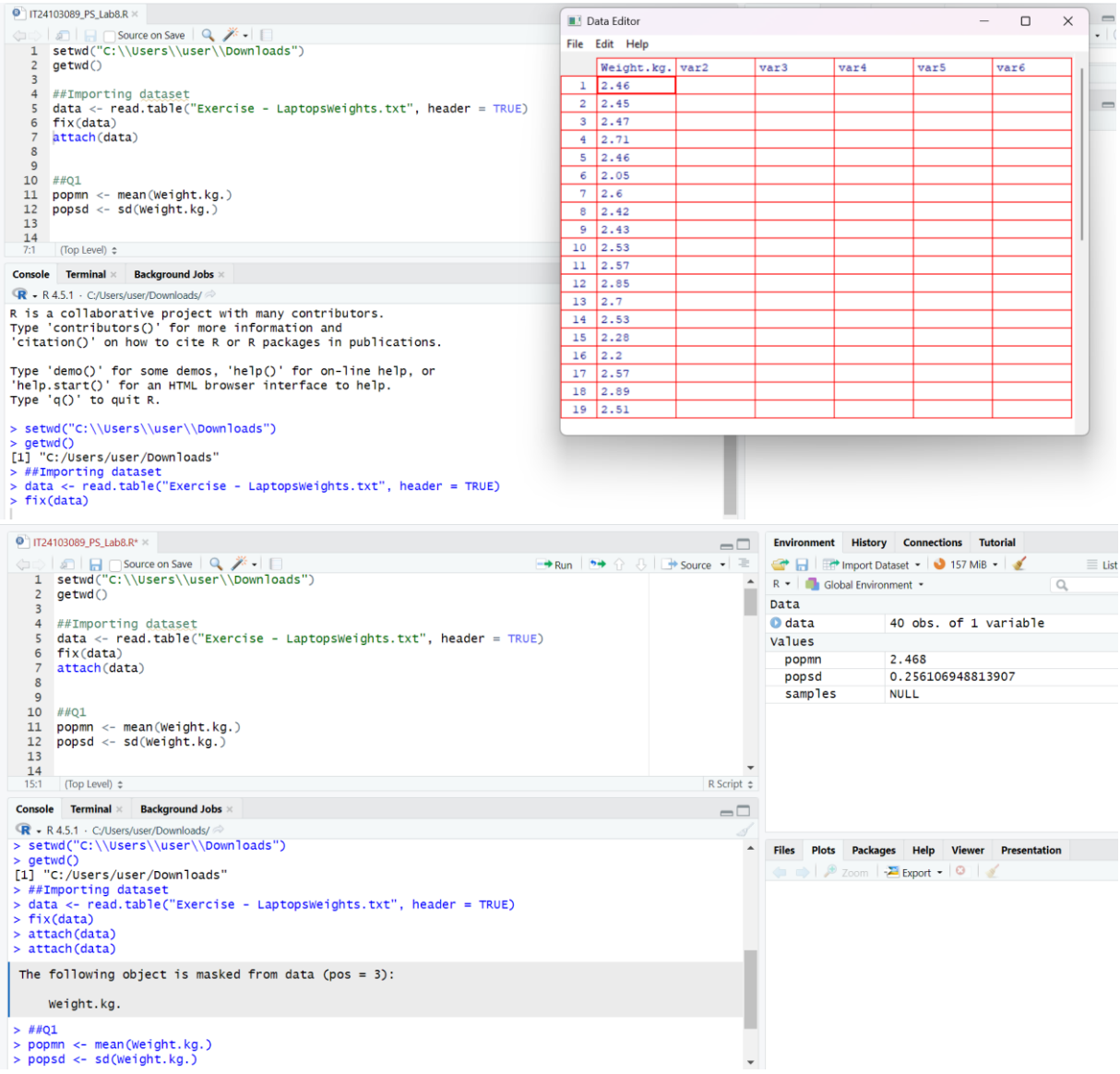
IT2120 - Probability and Statistics

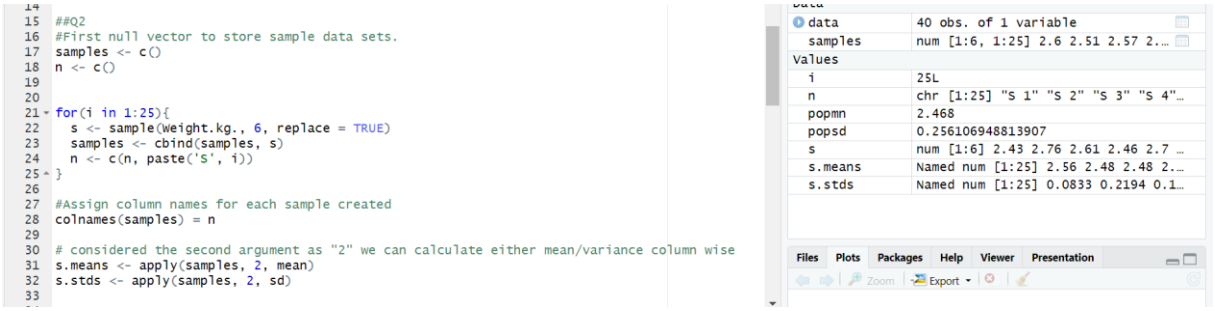
Lab Sheet 08

IT24103089 – Bandara MMSD

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



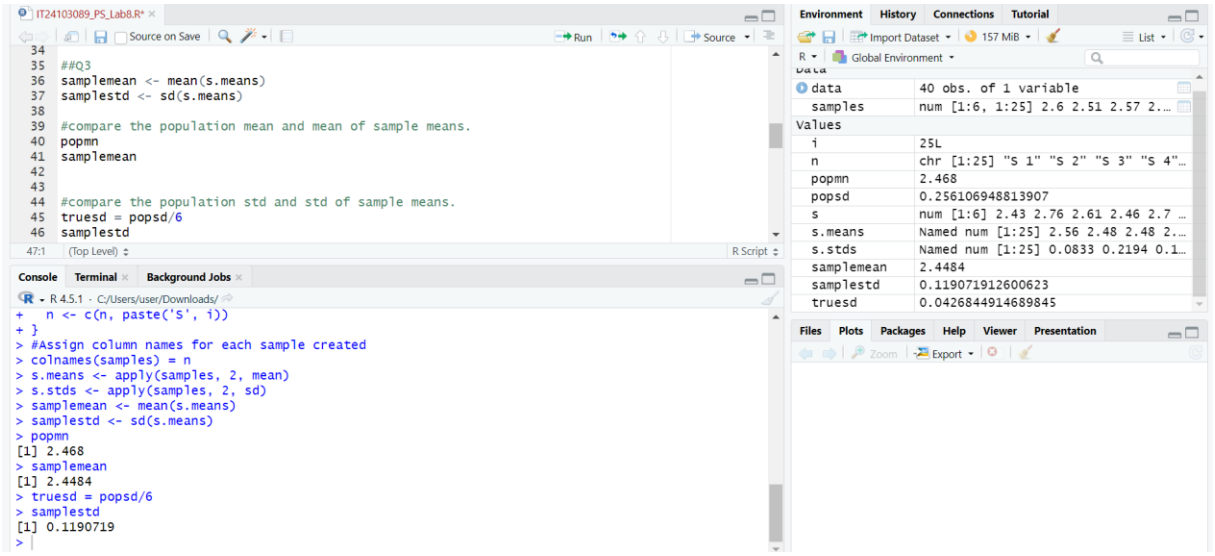
2. Draw 25 random samples of size 6 (with replacement) and calculate the sample mean and sample standard deviation for each sample.



```
##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)
```

data	40 obs. of 1 variable
samples	num [1:6, 1:25] 2.6 2.51 2.57 2.…
Values	
i	25L
n	chr [1:25] "S 1" "S 2" "S 3" "S 4"…
popmn	2.468
popsd	0.256106948813907
s	num [1:6] 2.43 2.76 2.61 2.46 2.7 …
s.means	Named num [1:25] 2.56 2.48 2.48 2.…
s.stds	Named num [1:25] 0.0833 0.2194 0.1…

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
samplemean


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

```
+   n <- c(n, paste('S', i))
+ }
> #Assign column names for each sample created
> colnames(samples) = n
> s.means <- apply(samples, 2, mean)
> s.stds <- apply(samples, 2, sd)
> samplemean <- mean(s.means)
> samplestd <- sd(s.means)
> popmn
[1] 2.468
> samplemean
[1] 2.4484
> truesd = popsd/6
> samplestd
[1] 0.1190719
>
```

data	40 obs. of 1 variable
samples	num [1:6, 1:25] 2.6 2.51 2.57 2.…
Values	
i	25L
n	chr [1:25] "S 1" "S 2" "S 3" "S 4"…
popmn	2.468
popsd	0.256106948813907
s	num [1:6] 2.43 2.76 2.61 2.46 2.7 …
s.means	Named num [1:25] 2.56 2.48 2.48 2.…
s.stds	Named num [1:25] 0.0833 0.2194 0.1…
samplemean	2.4484
samplestd	0.119071912600623
truesd	0.0426844914689845