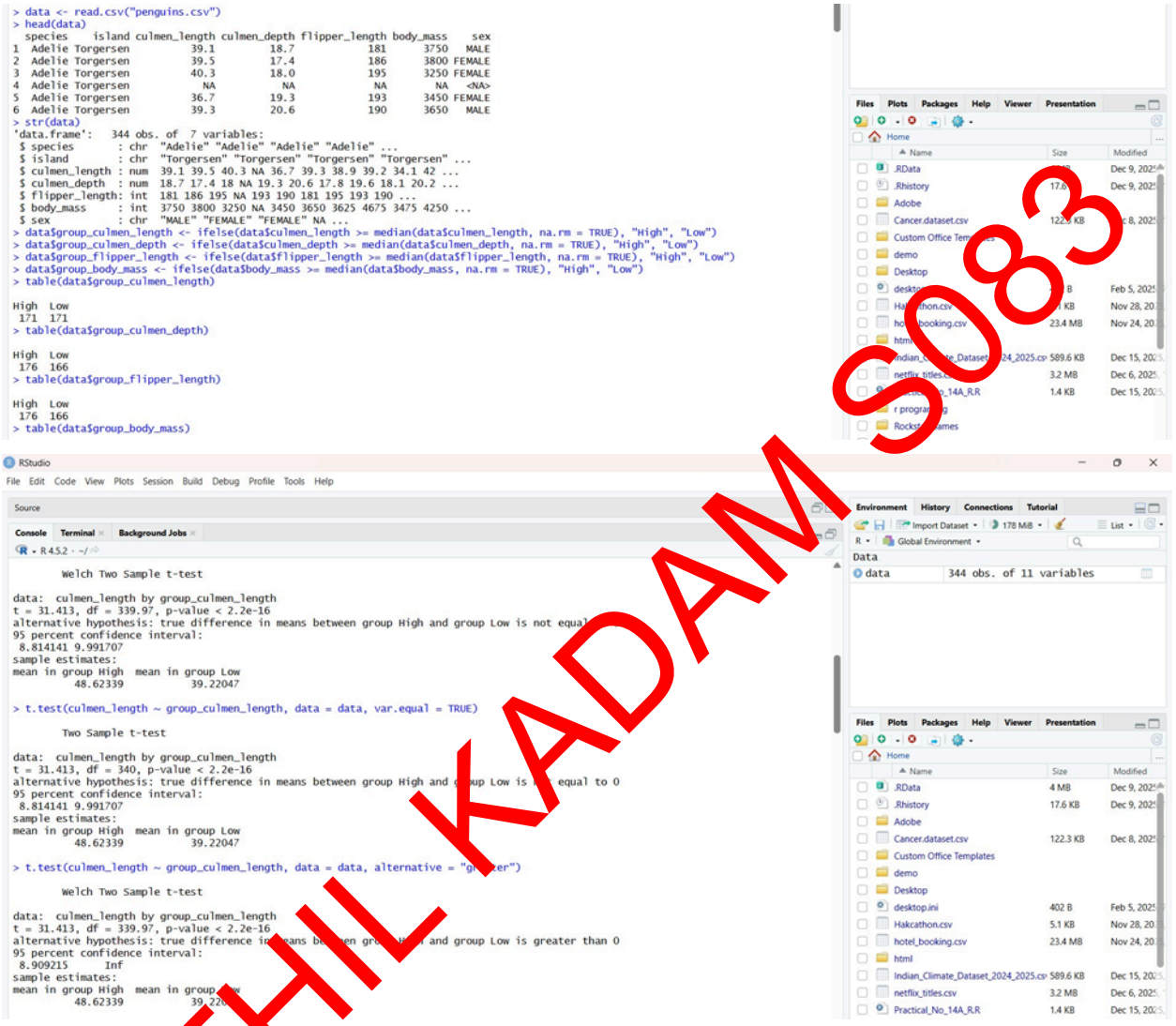
SHETH L.U.J. & SIR M.V. COLLEGE OF SCIENCE
SUBJECT - Data Analysis with R/SAS/SPSS

Aim - Performing independent two-sample t-tests using t.test() with grouping (R).

Output :



```
> data <- read.csv("penguins.csv")
> head(data)
  species    island culmen_length culmen_depth flipper_length body_mass    sex
1  Adelie Torgersen          39.1          18.7             181      3750   MALE
2  Adelie Torgersen          39.5          17.4             186      3800 FEMALE
3  Adelie Torgersen          40.3          18.0             195      3250 FEMALE
4  Adelie Torgersen            NA            NA              NA        NA   <NA>
5  Adelie Torgersen          36.7          19.3             193      3450 FEMALE
6  Adelie Torgersen          39.3          20.6             190      3650   MALE
> str(data)
'data.frame':   344 obs. of  7 variables:
 $ species       : chr  "Adelie" "Adelie" "Adelie" "Adelie" ...
 $ island        : chr  "Torgersen" "Torgersen" "Torgersen" "Torgersen" ...
 $ culmen_length : num  39.1 39.5 40.3 NA 36.7 39.3 38.9 39.2 34.1 42 ...
 $ culmen_depth  : num  18.7 17.4 18 NA 19.3 20.6 17.8 19.6 18.1 20.2 ...
 $ flipper_length: int  181 186 195 NA 193 190 181 195 193 190 ...
 $ body_mass     : int  3750 3800 3250 NA 3450 3650 3625 4675 3475 4250 ...
 $ sex           : chr  "MALE" "FEMALE" "FEMALE" NA ...
> data$group_culmen_length <- ifelse(data$culmen_length >= median(data$culmen_length, na.rm = TRUE), "High", "Low")
> data$group_culmen_depth <- ifelse(data$culmen_depth >= median(data$culmen_depth, na.rm = TRUE), "High", "Low")
> data$group_flipper_length <- ifelse(data$flipper_length >= median(data$flipper_length, na.rm = TRUE), "High", "Low")
> data$group_body_mass <- ifelse(data$body_mass >= median(data$body_mass, na.rm = TRUE), "High", "Low")
> table(data$group_culmen_length)

High  Low
 171  171
> table(data$group_culmen_depth)

High  Low
 176  166
> table(data$group_flipper_length)

High  Low
 176  166
> table(data$group_body_mass)
```

```
        Welch Two Sample t-test

data:  culmen_length by group_culmen_length
t = 31.413, df = 339.97, p-value < 2.2e-16
alternative hypothesis: true difference in means between group High and group Low is not equal
95 percent confidence interval:
 8.814141 9.991707
sample estimates:
mean in group High  mean in group Low
          48.62339           39.22047

> t.test(culmen_length ~ group_culmen_length, data = data, var.equal = TRUE)

        Two Sample t-test

data:  culmen_length by group_culmen_length
t = 31.413, df = 340, p-value < 2.2e-16
alternative hypothesis: true difference in means between group High and group Low is not equal to 0
95 percent confidence interval:
 8.814141 9.991707
sample estimates:
mean in group High  mean in group Low
          48.62339           39.22047

> t.test(culmen_length ~ group_culmen_length, data = data, alternative = "greater")

        Welch Two Sample t-test

data:  culmen_length by group_culmen_length
t = 31.413, df = 339.97, p-value < 2.2e-16
alternative hypothesis: true difference in means between group High and group Low is greater than 0
95 percent confidence interval:
 8.909215      Inf
sample estimates:
mean in group High  mean in group Low
          48.62339           39.22
```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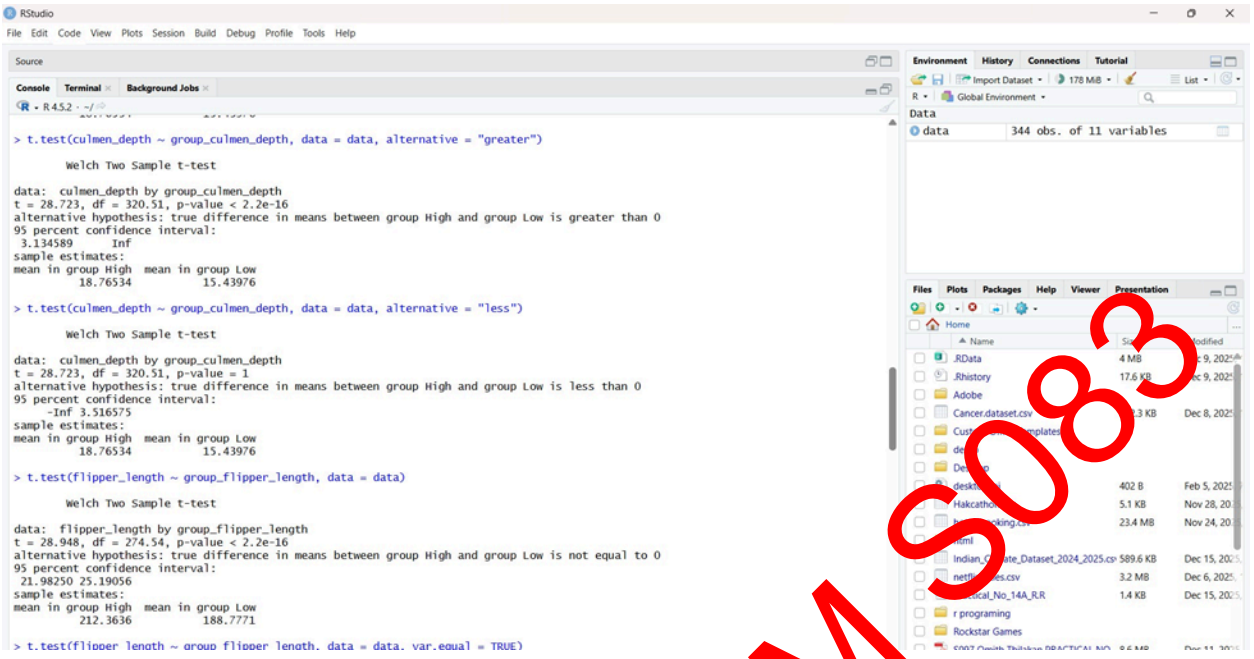

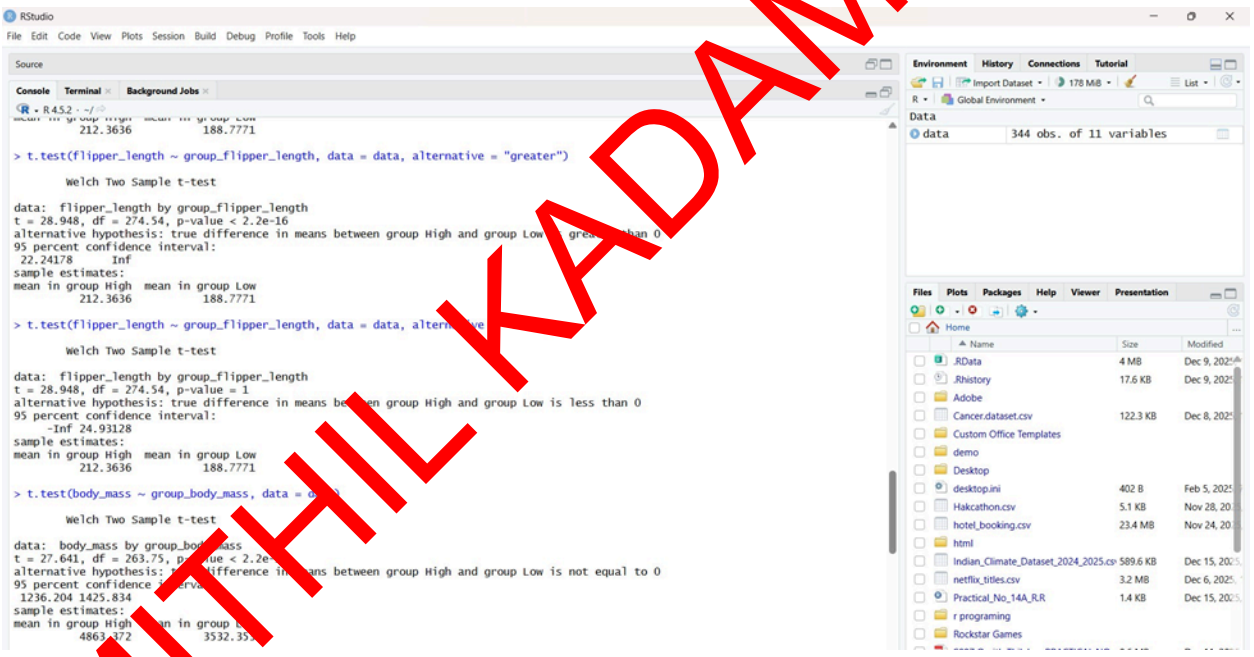

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