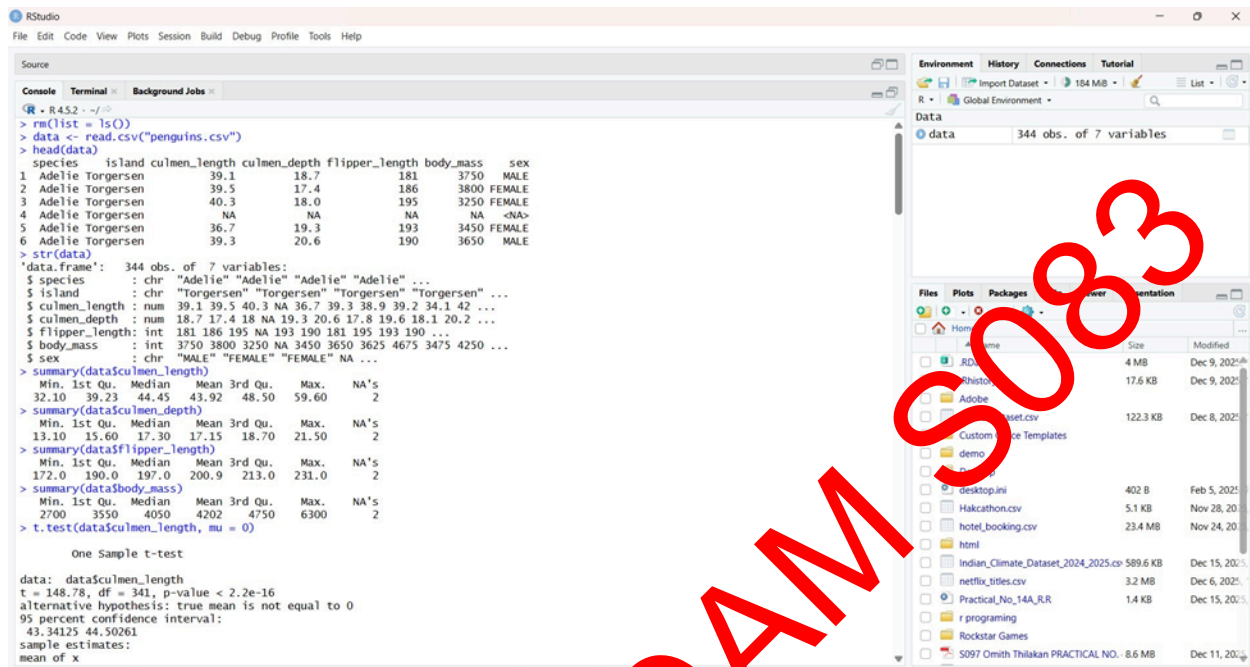


**SHETH L.U.J. & SIR M.V. COLLEGE OF SCIENCE**  
**SUBJECT - Data Analysis with R/SAS/SPSS**

Aim - Performing one-sample t-tests using t.test() (R).

Output :



The screenshot displays the RStudio interface. The console window shows the following R code and its output:

```
> rm(list = ls())
> 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 ...
> summary(data$culmen_length)
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.   NA's
  32.10  39.23   44.45   43.92  48.50   59.60     2
> summary(data$culmen_depth)
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.   NA's
  13.10  15.60  17.30  17.15  18.70   21.50     2
> summary(data$flipper_length)
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.   NA's
  172.0  190.0  197.0  200.9  213.0   231.0     2
> summary(data$body_mass)
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.   NA's
   2700   3550   4050   4202   4750   6300     2
> t.test(data$culmen_length, mu = 0)

One Sample t-test

data: data$culmen_length
t = 148.78, df = 341, p-value < 2.2e-16
alternative hypothesis: true mean is not equal to 0
95 percent confidence interval:
 43.34125 44.50261
sample estimates:
mean of x
```

The Environment pane on the right shows the 'data' object with 344 observations and 7 variables.

Name - Mithil Kadam  
Roll No - S083

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The image displays two screenshots of the RStudio interface, showing the results of t-tests performed on data from a file named 'data'.

**Top Screenshot:** The console shows the results of a t-test for 'data\$culmen\_length' with a null hypothesis of  $\mu = 50$ . The test is a one-sample t-test. The results are as follows:

- One Sample t-test
- data: data\$culmen\_length
- t = -20.588, df = 341, p-value < 2.2e-16
- alternative hypothesis: true mean is not equal to 50
- 95 percent confidence interval: 43.34125 44.50261
- sample estimates: mean of x 43.92193

The test is repeated for 'greater' and 'less' alternatives, both yielding the same p-value and confidence interval.

**Bottom Screenshot:** The console shows the results of a t-test for 'data\$culmen\_depth' with a null hypothesis of  $\mu = 15$ . The test is a one-sample t-test. The results are as follows:

- One Sample t-test
- data: data\$culmen\_depth
- t = 20.145, df = 341, p-value < 2.2e-16
- alternative hypothesis: true mean is not equal to 15
- 95 percent confidence interval: 16.94113 17.36121
- sample estimates: mean of x 17.15117

The test is repeated for 'greater' and 'less' alternatives, both yielding the same p-value and confidence interval.

Both screenshots show the 'Environment' pane on the right, indicating that the 'data' object has 344 observations and 7 variables.

Name - Mithil Kadam  
Roll No - S083