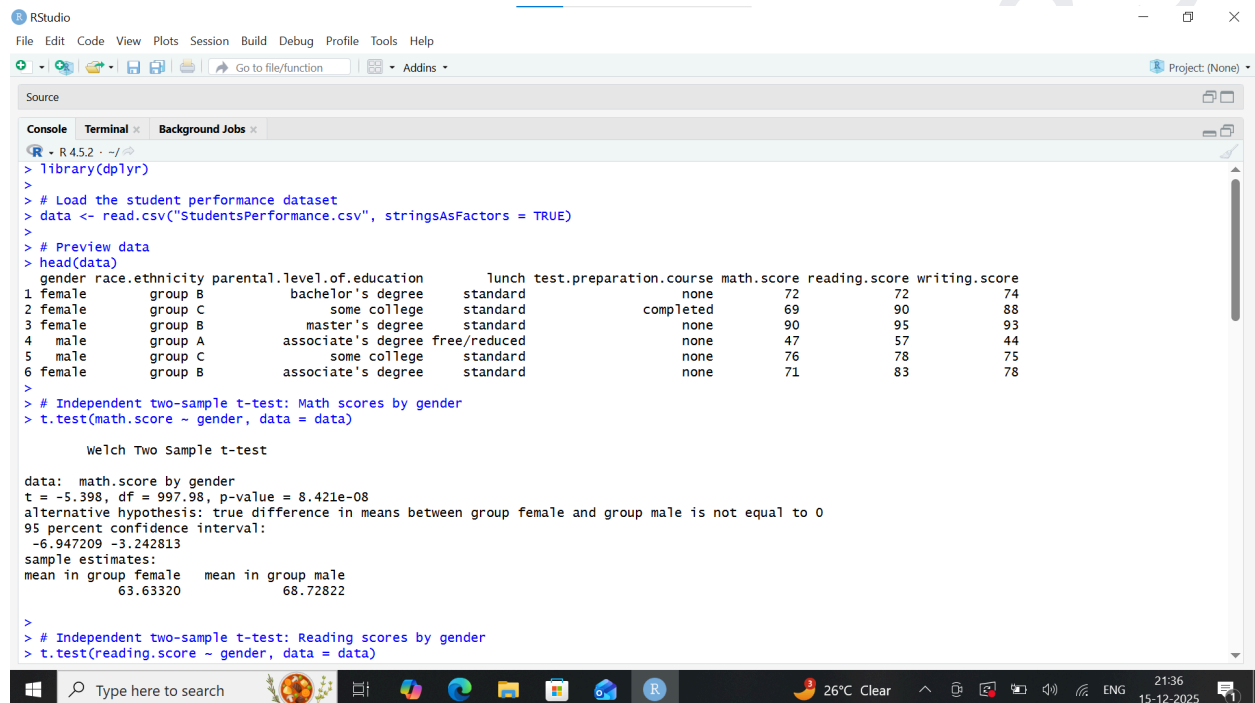


## Practical No 5 Module II

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

**Output :**



```
R - R 4.5.2 - ~/R
File Edit Code View Plots Session Build Debug Profile Tools Help
Go to file/function Addins Project: (None)
Source
Console Terminal Background Jobs
> library(dplyr)
> 
> # Load the student performance dataset
> data <- read.csv("StudentsPerformance.csv", stringsAsFactors = TRUE)
> 
> # Preview data
> head(data)
  gender race.ethnicity parental.level.of.education lunch test.preparation.course math.score reading.score writing.score
1 female      group B      bachelor's degree      standard                none             72             72             74
2 female      group C            some college      standard                completed          69             90             88
3 female      group B      master's degree      standard                none             90             95             93
4 male        group A      associate's degree free/reduced                none             47             57             44
5 male        group C            some college      standard                none             76             78             75
6 female      group B      associate's degree      standard                none             71             83             78
> 
> # Independent two-sample t-test: Math scores by gender
> t.test(math.score ~ gender, data = data)

Welch Two Sample t-test

data:  math.score by gender
t = -5.398, df = 997.98, p-value = 8.421e-08
alternative hypothesis: true difference in means between group female and group male is not equal to 0
95 percent confidence interval:
 -6.947209 -3.242813
sample estimates:
mean in group female  mean in group male
        63.63320         68.72822
> 
> # Independent two-sample t-test: Reading scores by gender
> t.test(reading.score ~ gender, data = data)
```

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## SUBJECT : R Programming

```
RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Go to file/function Addins Project: (None)

Source
Console Terminal Background Jobs
R - R 4.5.2 - ~/
>
> # Independent two-sample t-test: Reading scores by gender
> t.test(reading.score ~ gender, data = data)

Welch Two Sample t-test

data: reading.score by gender
t = 7.9684, df = 996.36, p-value = 4.376e-15
alternative hypothesis: true difference in means between group female and group male is not equal to 0
95 percent confidence interval:
 5.377941 8.892218
sample estimates:
mean in group female mean in group male
      72.60811      65.47303

>
> # Independent two-sample t-test: Writing scores by gender
> t.test(writing.score ~ gender, data = data)

Welch Two Sample t-test

data: writing.score by gender
t = 9.9977, df = 997.53, p-value < 2.2e-16
alternative hypothesis: true difference in means between group female and group male is not equal to 0
95 percent confidence interval:
 7.358849 10.953107
sample estimates:
mean in group female mean in group male
      72.46718      63.31120

>
> # Independent two-sample t-test: Math scores by lunch type
> t.test(math.score ~ lunch, data = data)
```

```
RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Go to file/function Addins Project: (None)

Source
Console Terminal Background Jobs
R - R 4.5.2 - ~/
>
> # Independent two-sample t-test: Math scores by lunch type
> t.test(math.score ~ lunch, data = data)

Welch Two Sample t-test

data: math.score by lunch
t = -11.484, df = 667.5, p-value < 2.2e-16
alternative hypothesis: true difference in means between group free/reduced and group standard is not equal to 0
95 percent confidence interval:
-13.01305 -9.21291
sample estimates:
mean in group free/reduced mean in group standard
      58.92113      70.03411

>
> # Independent two-sample t-test: Reading scores by test preparation course
> t.test(reading.score ~ test.preparation.course, data = data)

Welch Two Sample t-test

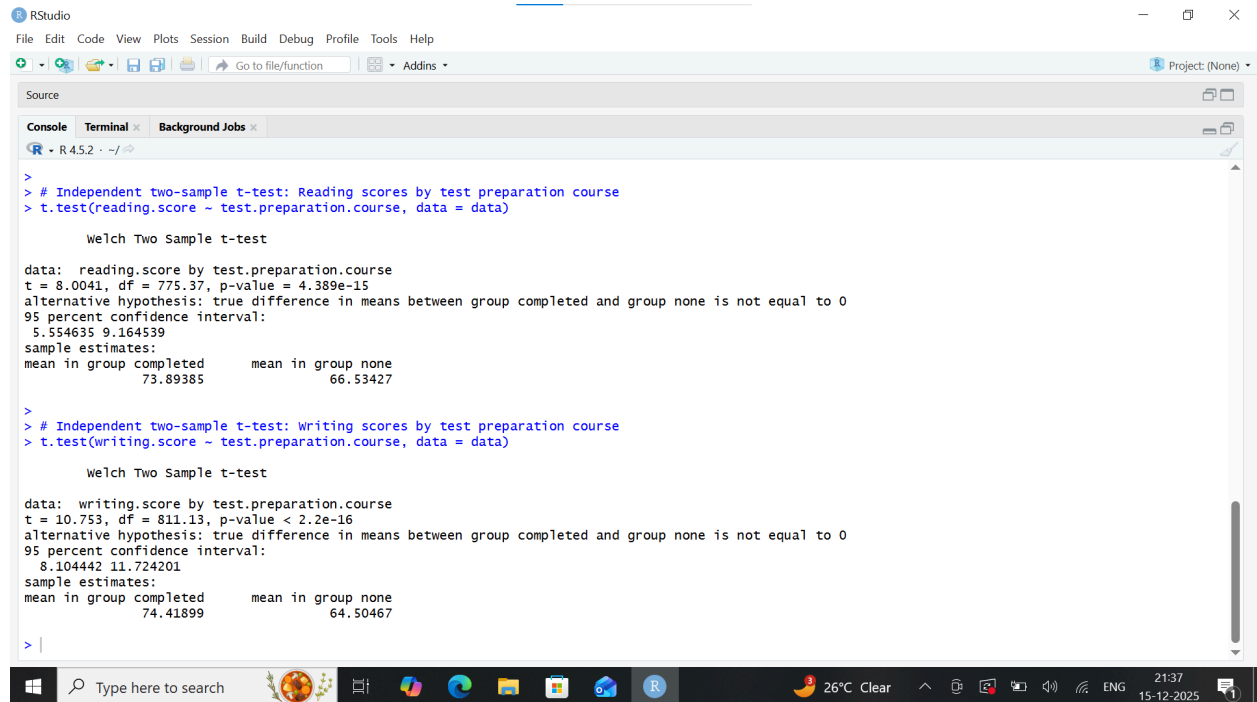
data: reading.score by test.preparation.course
t = 8.0041, df = 775.37, p-value = 4.389e-15
alternative hypothesis: true difference in means between group completed and group none is not equal to 0
95 percent confidence interval:
 5.554635 9.164539
sample estimates:
mean in group completed mean in group none
      73.89385      66.53427

>
> # Independent two-sample t-test: Writing scores by test preparation course
```

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# SHETH L.U.J. AND SIR M.V. COLLEGE OF ARTS SCIENCE AND COMMERCE

## SUBJECT : R Programming



The screenshot shows the RStudio interface with the console window active. The console displays the output of two t-test commands. The first command is `t.test(reading.score ~ test.preparation.course, data = data)`, which results in a Welch Two Sample t-test. The data is 'reading.score by test.preparation.course', with  $t = 8.0041$ ,  $df = 775.37$ , and  $p\text{-value} = 4.389e-15$ . The alternative hypothesis is 'true difference in means between group completed and group none is not equal to 0'. The 95 percent confidence interval is  $5.554635$  to  $9.164539$ . The sample estimates are mean in group completed  $73.89385$  and mean in group none  $66.53427$ . The second command is `t.test(writing.score ~ test.preparation.course, data = data)`, which also results in a Welch Two Sample t-test. The data is 'writing.score by test.preparation.course', with  $t = 10.753$ ,  $df = 811.13$ , and  $p\text{-value} < 2.2e-16$ . The alternative hypothesis is 'true difference in means between group completed and group none is not equal to 0'. The 95 percent confidence interval is  $8.104442$  to  $11.724201$ . The sample estimates are mean in group completed  $74.41899$  and mean in group none  $64.50467$ .

```
>
> # Independent two-sample t-test: Reading scores by test preparation course
> t.test(reading.score ~ test.preparation.course, data = data)

Welch Two Sample t-test

data:  reading.score by test.preparation.course
t = 8.0041, df = 775.37, p-value = 4.389e-15
alternative hypothesis: true difference in means between group completed and group none is not equal to 0
95 percent confidence interval:
 5.554635 9.164539
sample estimates:
mean in group completed      mean in group none
      73.89385              66.53427

>
> # Independent two-sample t-test: Writing scores by test preparation course
> t.test(writing.score ~ test.preparation.course, data = data)

Welch Two Sample t-test

data:  writing.score by test.preparation.course
t = 10.753, df = 811.13, p-value < 2.2e-16
alternative hypothesis: true difference in means between group completed and group none is not equal to 0
95 percent confidence interval:
 8.104442 11.724201
sample estimates:
mean in group completed      mean in group none
      74.41899              64.50467

> |
```

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