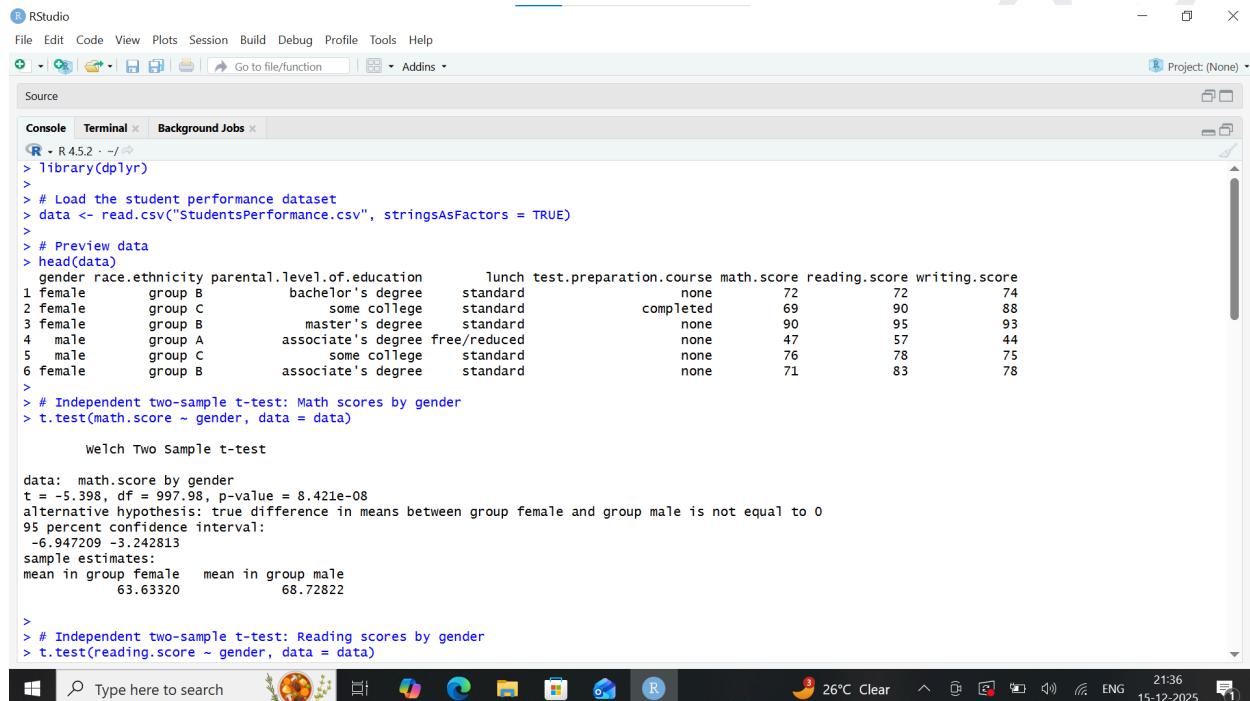


## **Practical No 5 Module II**

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

### **Output :**



The screenshot shows the RStudio interface with the following R code:

```
R - R 4.5.2 · ~/Documents
File Edit Code View Plots Session Build Debug Profile Tools Help
+ - Go to file/function | Addins |
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)

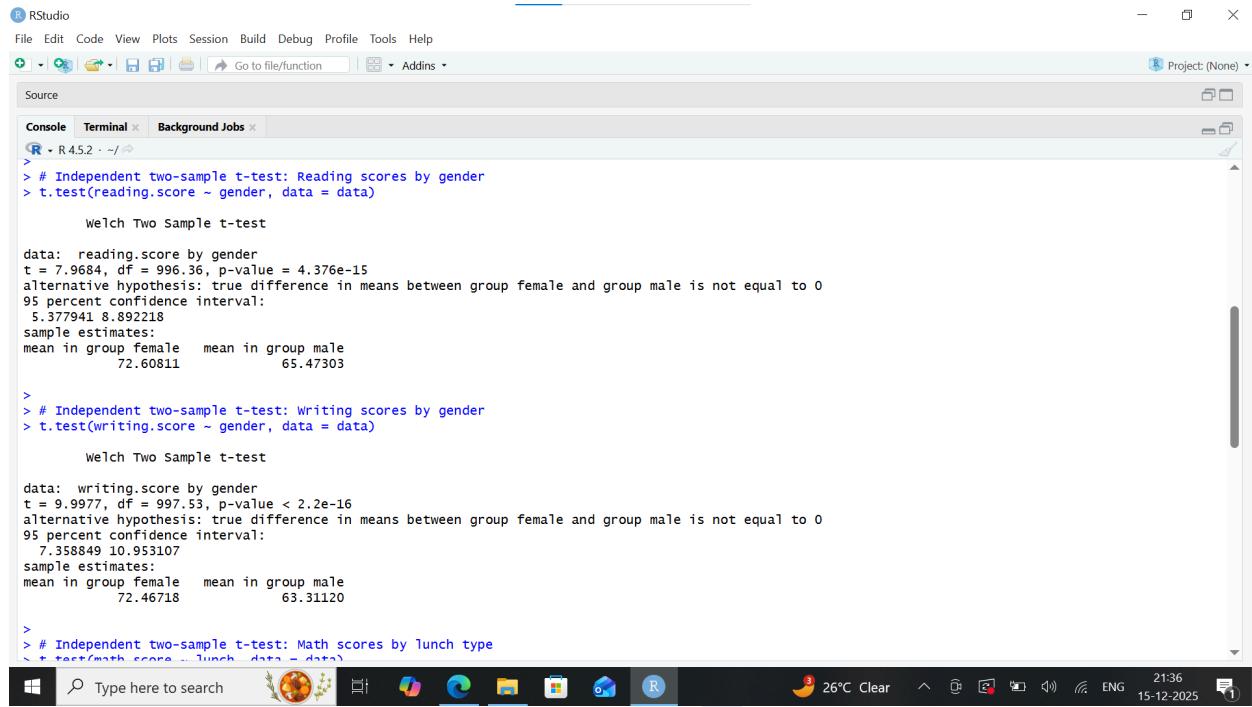
Welch Two Sample t-test

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
63.633320          68.72822

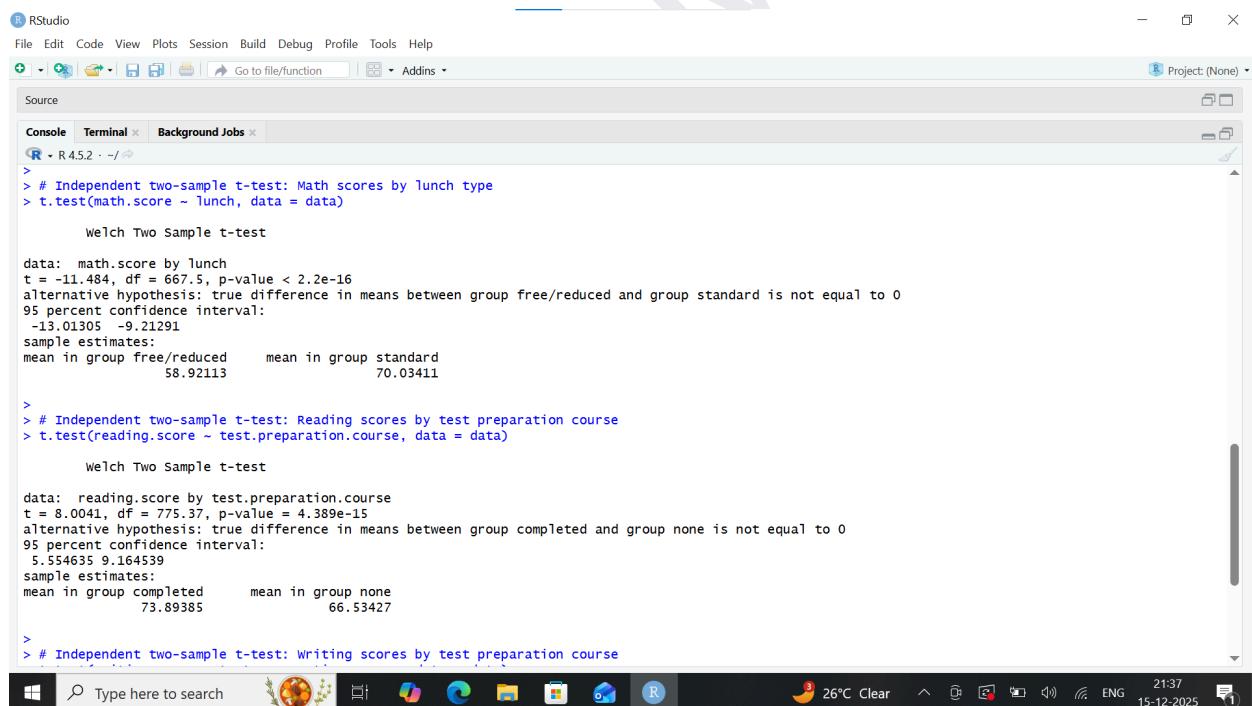
>
> # Independent two-sample t-test: Reading scores by gender
> t.test(reading.score ~ gender, data = data)
```

The RStudio interface includes a menu bar, a toolbar with icons for file operations, and a status bar at the bottom showing system information like temperature, battery level, and date.

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**SUBJECT : R Programming**



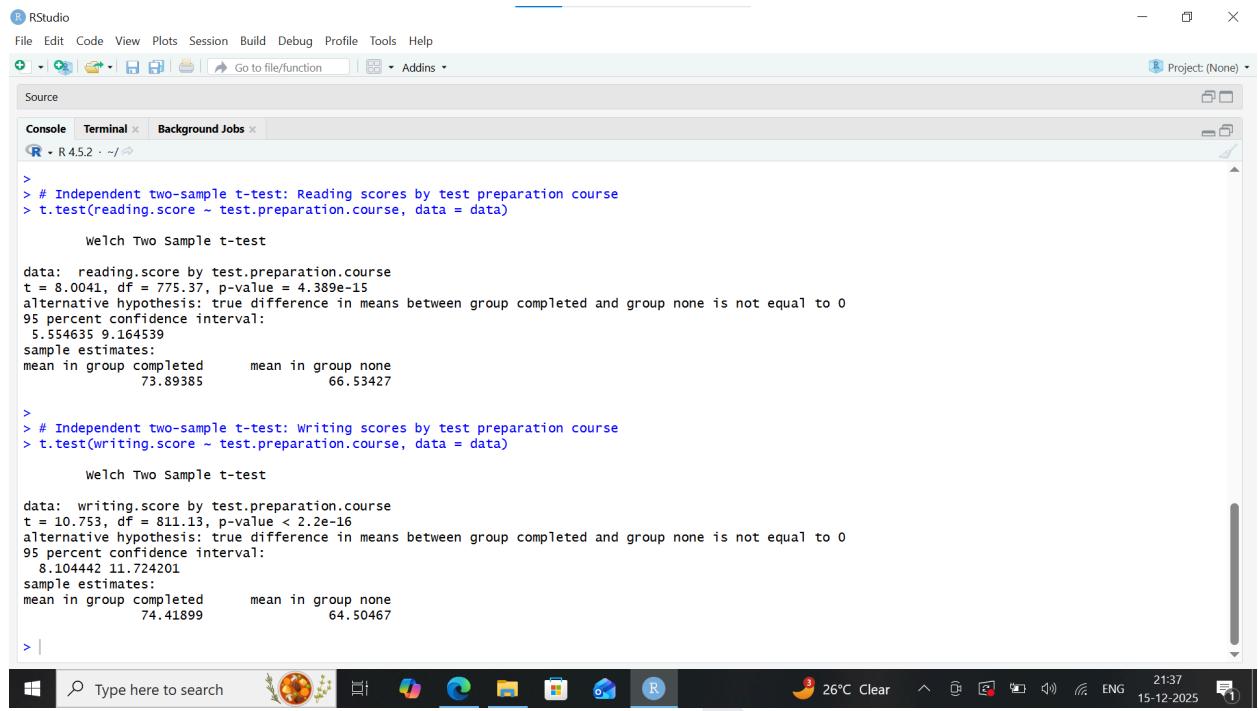
RStudio  
File Edit Code View Plots Session Build Debug Profile Tools Help  
Go to file/function | Addins | Project: (None)  
Source  
Console Terminal Background Jobs  
R - R 4.5.2 - ~/  
> # Independent two-sample t-test: Reading scores by gender  
> t.test(reading.score ~ gender, data = data)  
Welch 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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**SUBJECT : R Programming**



The screenshot shows the RStudio interface with the following R code running in the console:

```
> # 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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