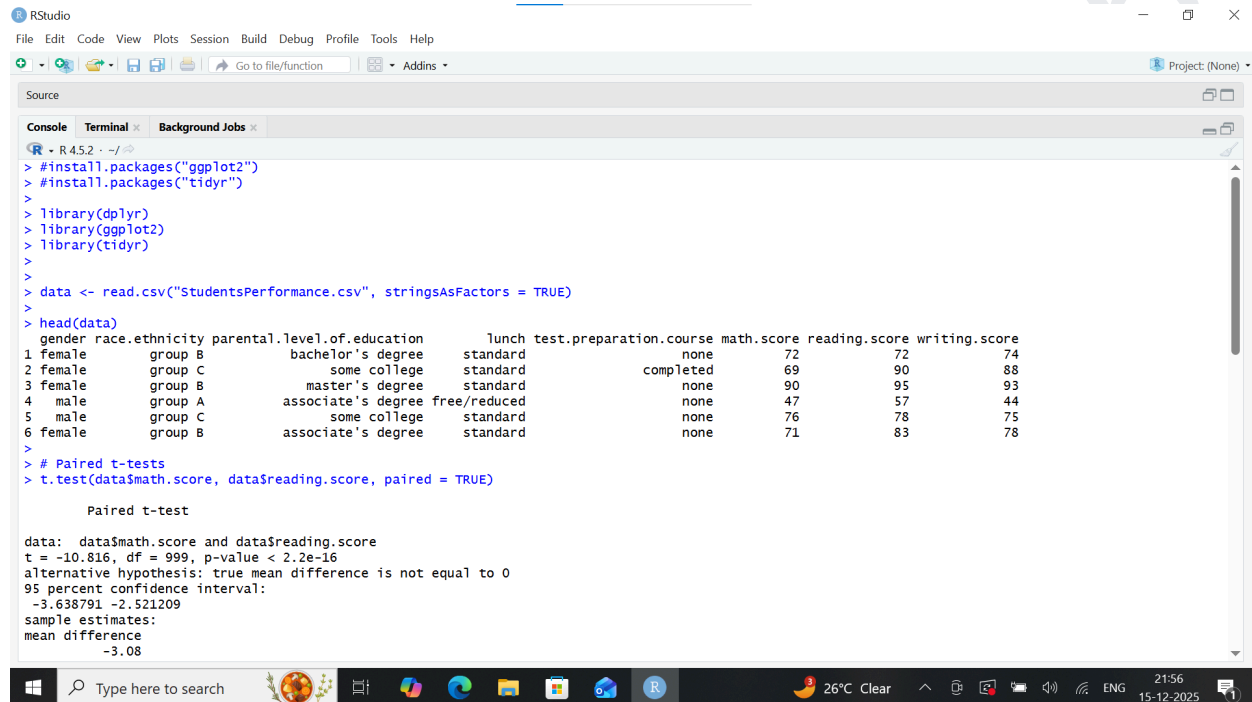


Practical No 6 Module II

Aim : Performing paired t-tests using `t.test(paired=TRUE)` (R).

Output :



```
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 4.5.2 - ~/
> #install.packages("ggplot2")
> #install.packages("tidyr")
>
> library(dplyr)
> library(ggplot2)
> library(tidyr)
>
> data <- read.csv("StudentsPerformance.csv", stringsAsFactors = TRUE)
> 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
>
> # Paired t-tests
> t.test(data$math.score, data$reading.score, paired = TRUE)

Paired t-test

data: data$math.score and data$reading.score
t = -10.816, df = 999, p-value < 2.2e-16
alternative hypothesis: true mean difference is not equal to 0
95 percent confidence interval:
 -3.638791 -2.521209
sample estimates:
mean difference
 -3.08
```

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SUBJECT : R Programming

```
RStudio
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Source
Console Terminal Background Jobs

R - R4.5.2 - ~/...
-3.638791 -2.521209
sample estimates:
mean difference
-3.08

> t.test(data$math.score, data$writing.score, paired = TRUE)

Paired t-test

data: data$math.score and data$writing.score
t = -6.5157, df = 999, p-value = 1.145e-10
alternative hypothesis: true mean difference is not equal to 0
95 percent confidence interval:
-2.556797 -1.373203
sample estimates:
mean difference
-1.965

> t.test(data$reading.score, data$writing.score, paired = TRUE)

Paired t-test

data: data$reading.score and data$writing.score
t = 7.7874, df = 999, p-value = 1.705e-14
alternative hypothesis: true mean difference is not equal to 0
95 percent confidence interval:
0.8340336 1.3959664
sample estimates:
mean difference
1.115

>
```

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

Source
Console Terminal Background Jobs

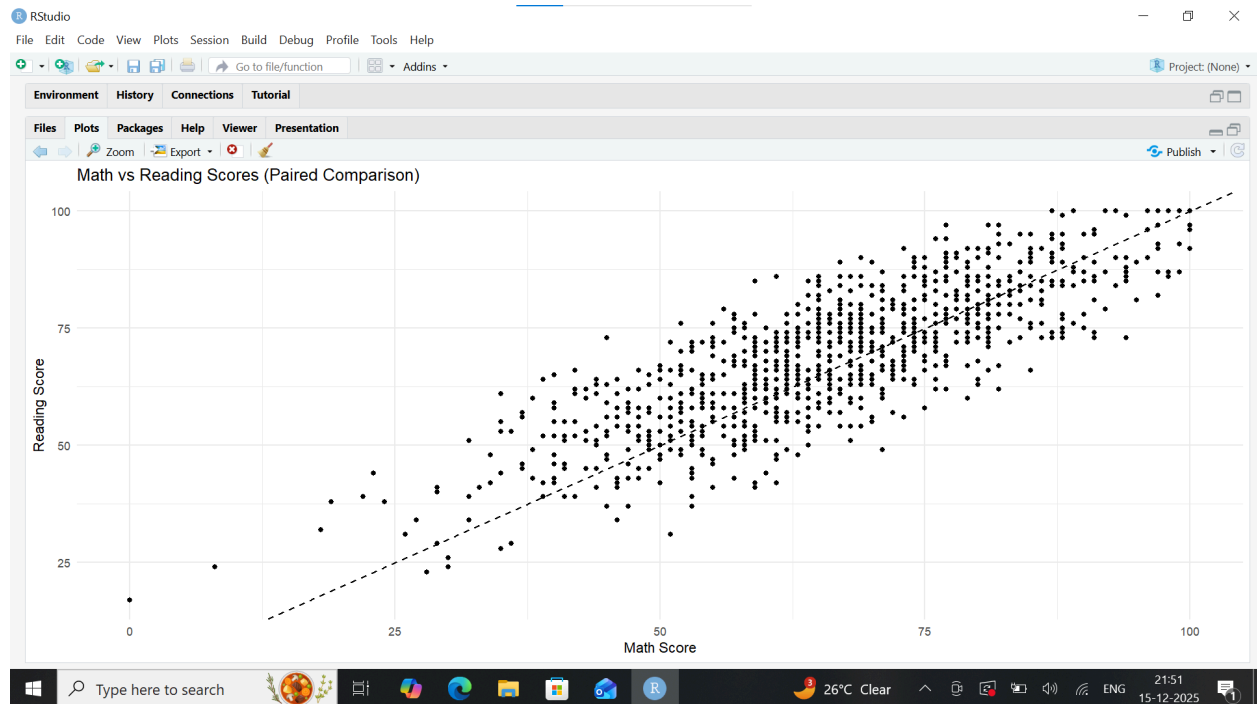
R - R4.5.2 - ~/...
alternative hypothesis: true mean difference is not equal to 0
95 percent confidence interval:
0.8340336 1.3959664
sample estimates:
mean difference
1.115

>
> # Convert data to long format for visualization
> score_data <- data %>%
+   select(math.score, reading.score, writing.score) %>%
+   pivot_longer(cols = everything(),
+               names_to = "Subject",
+               values_to = "Score")
>
> # Boxplot to compare score distributions
> ggplot(score_data, aes(x = Subject, y = Score)) +
+   geom_boxplot() +
+   labs(title = "Comparison of Student Scores Across Subjects",
+        x = "Subject",
+        y = "Score") +
+   theme_minimal()
>
> # Line plot showing paired nature of scores
> ggplot(data, aes(x = math.score, y = reading.score)) +
+   geom_point() +
+   geom_abline(slope = 1, intercept = 0, linetype = "dashed") +
+   labs(title = "Math vs Reading Scores (Paired Comparison)",
+        x = "Math Score",
+        y = "Reading Score") +
+   theme_minimal()
>
```

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