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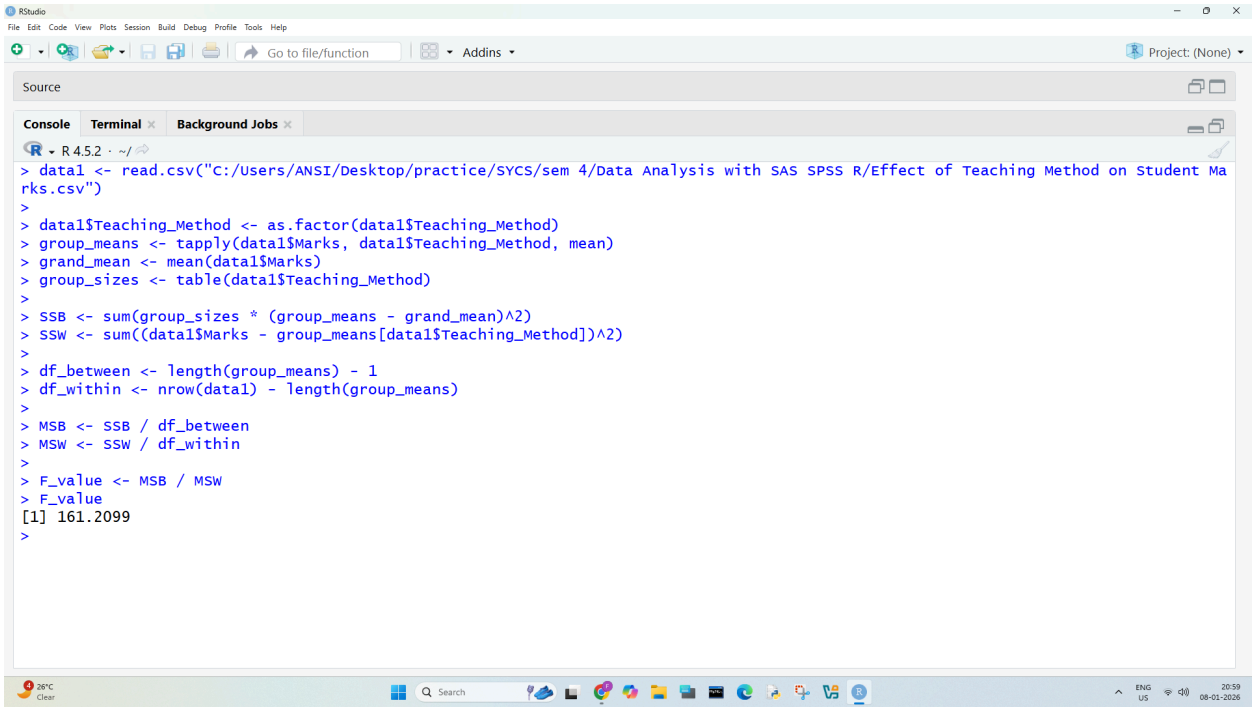
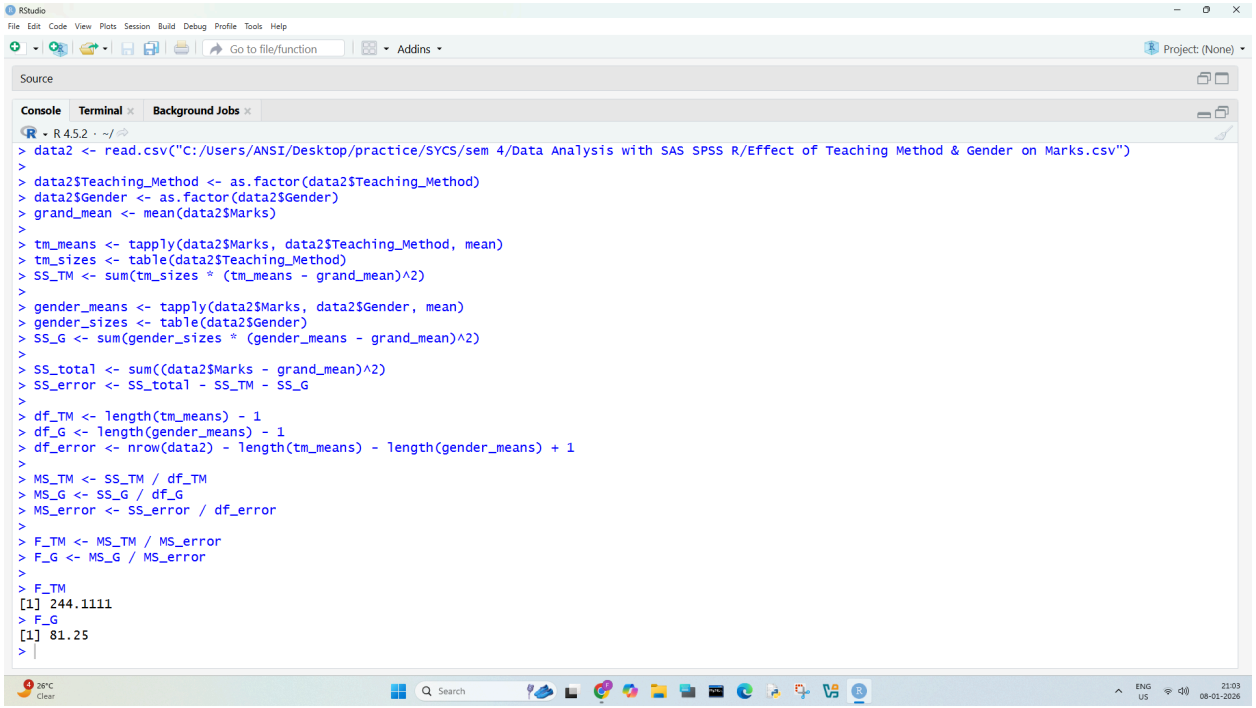
AIM:

7 Performing one-way ANOVA using aov() (R).



```
> data1 <- read.csv("C:/Users/ANSI/Desktop/practice/SYCS/sem 4/Data Analysis with SAS SPSS R/Effect of Teaching Method on Student Marks.csv")
>
> data1$Teaching_Method <- as.factor(data1$Teaching_Method)
> group_means <- tapply(data1$Marks, data1$Teaching_Method, mean)
> grand_mean <- mean(data1$Marks)
> group_sizes <- table(data1$Teaching_Method)
>
> SSB <- sum(group_sizes * (group_means - grand_mean)^2)
> SSW <- sum((data1$Marks - group_means[data1$Teaching_Method])^2)
>
> df_between <- length(group_means) - 1
> df_within <- nrow(data1) - length(group_means)
>
> MSB <- SSB / df_between
> MSW <- SSW / df_within
>
> F_value <- MSB / MSW
> F_value
[1] 161.2099
>
```

8 Performing two-way ANOVA using aov() (R).



```
> data2 <- read.csv("C:/Users/ANSI/Desktop/practice/SYCS/sem 4/Data Analysis with SAS SPSS R/Effect of Teaching Method & Gender on Marks.csv")
>
> data2$Teaching_Method <- as.factor(data2$Teaching_Method)
> data2$Gender <- as.factor(data2$Gender)
> grand_mean <- mean(data2$Marks)
>
> tm_means <- tapply(data2$Marks, data2$Teaching_Method, mean)
> tm_sizes <- table(data2$Teaching_Method)
> SS_TM <- sum(tm_sizes * (tm_means - grand_mean)^2)
>
> gender_means <- tapply(data2$Marks, data2$Gender, mean)
> gender_sizes <- table(data2$Gender)
> SS_G <- sum(gender_sizes * (gender_means - grand_mean)^2)
>
> SS_total <- sum((data2$Marks - grand_mean)^2)
> SS_error <- SS_total - SS_TM - SS_G
>
> df_TM <- length(tm_means) - 1
> df_G <- length(gender_means) - 1
> df_error <- nrow(data2) - length(tm_means) - length(gender_means) + 1
>
> MS_TM <- SS_TM / df_TM
> MS_G <- SS_G / df_G
> MS_error <- SS_error / df_error
>
> F_TM <- MS_TM / MS_error
> F_G <- MS_G / MS_error
>
> F_TM
[1] 244.1111
> F_G
[1] 81.25
>
```

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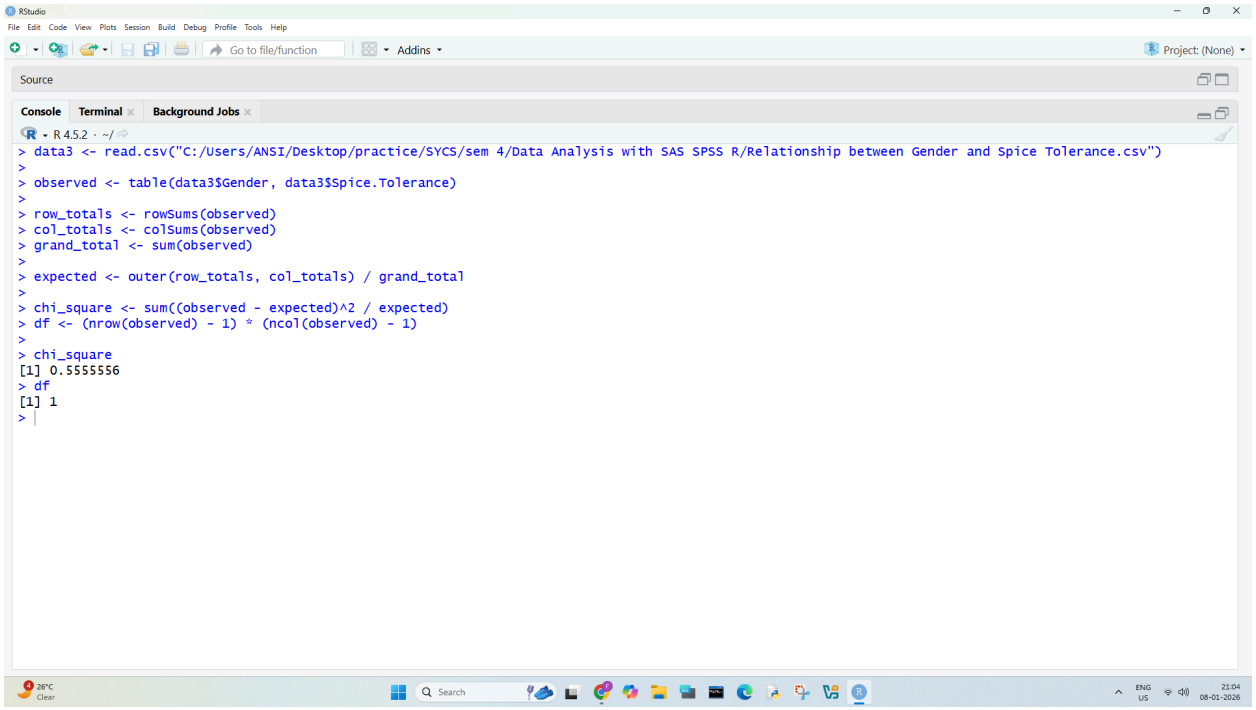
9 Conducting Chi-square tests using chisq.test() (R)



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