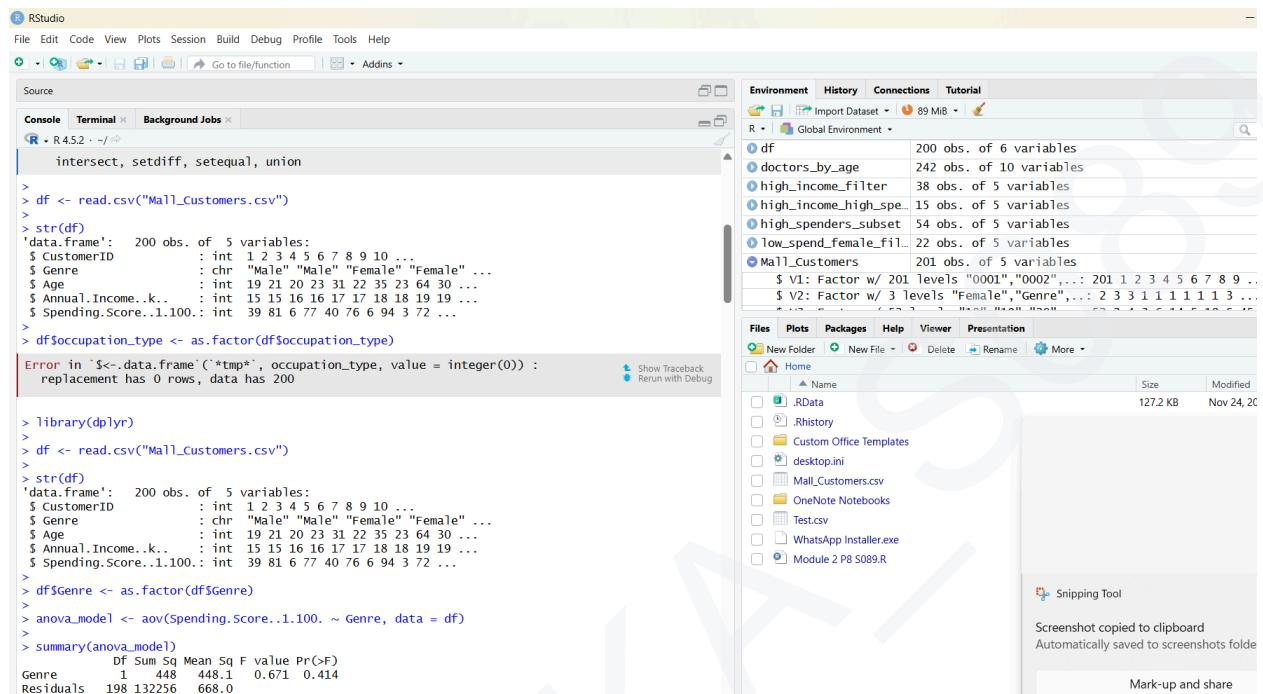


**SHETH L.U.J AND SIR M.V COLLEGE**  
**SUBJECT : Data Analysis with SAS / SPSS /R**  
**PRACTICAL NO: 7,8,9**

**OUTPUTS:**

**AIM:**

7 Performing one-way ANOVA using aov()



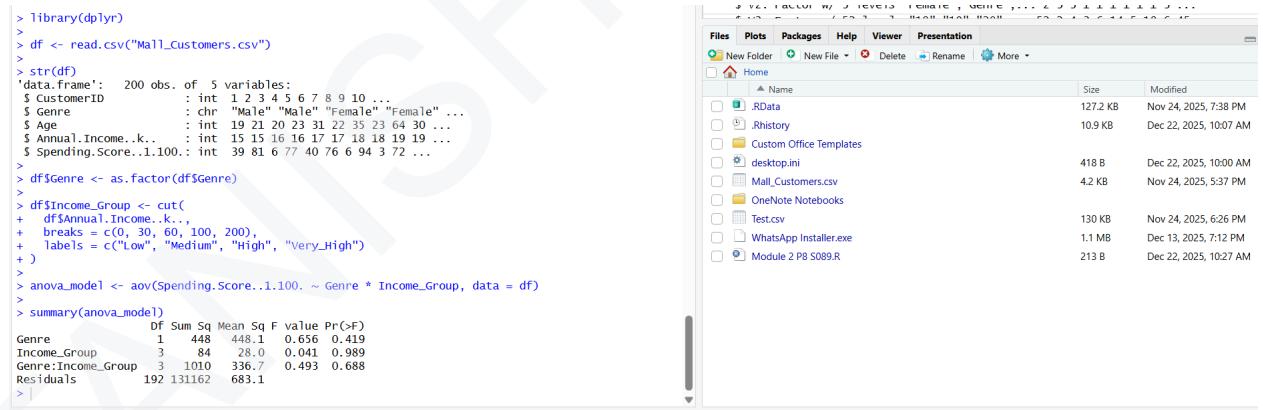
```

RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Console Terminal Background Jobs
R 4.5.2 · ~/ ...
intersect, setdiff, setequal, union
> df <- read.csv("Mall_Customers.csv")
>
> str(df)
'data.frame': 200 obs. of 5 variables:
$ CustomerID      : int 1 2 3 4 5 6 7 8 9 10 ...
$ Genre            : chr "Male" "Male" "Female" "Female" ...
$ Age              : int 19 21 20 23 31 22 35 23 64 30 ...
$ Annual.Income...k.: int 15 15 16 16 17 17 18 18 19 19 ...
$ Spending.Score..1.100.: int 39 81 6 77 40 76 6 94 3 72 ...
> df$occupation_type <- as.factor(df$occupation_type)
Error in `<-` data.frame(`*tmp*`, occupation_type, value = integer(0)) :
replacement has 0 rows, data has 200
Show Traceback
Run with Debug

> library(dplyr)
>
> df <- read.csv("Mall_Customers.csv")
>
> str(df)
'data.frame': 200 obs. of 5 variables:
$ CustomerID      : int 1 2 3 4 5 6 7 8 9 10 ...
$ Genre            : chr "Male" "Male" "Female" "Female" ...
$ Age              : int 19 21 20 23 31 22 35 23 64 30 ...
$ Annual.Income...k.: int 15 15 16 16 17 17 18 18 19 19 ...
$ Spending.Score..1.100.: int 39 81 6 77 40 76 6 94 3 72 ...
> df$Genre <- as.factor(df$Genre)
>
> anova_model <- aov(Spending.Score..1.100. ~ Genre, data = df)
>
> summary(anova_model)
   Df Sum Sq Mean Sq F value Pr(>F)
Genre          1    448    448.1  0.671  0.414
Residuals    198 132236   668.0

```

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



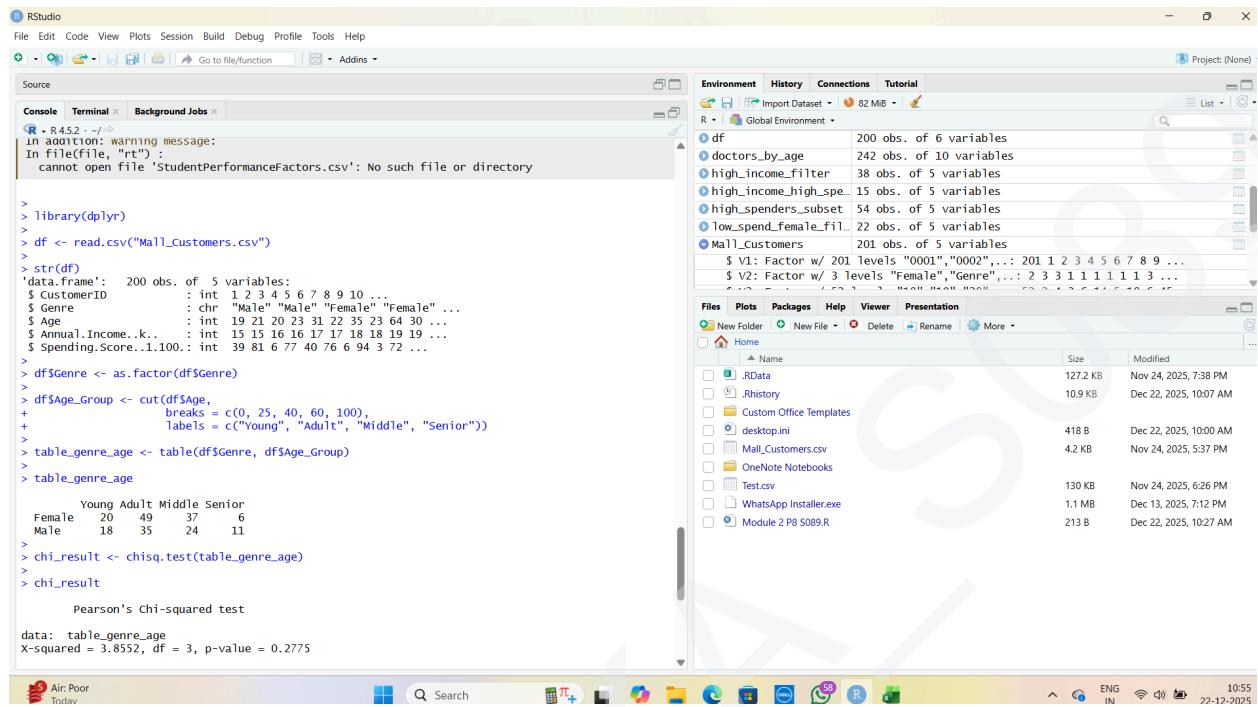
```

> library(dplyr)
>
> df <- read.csv("Mall_Customers.csv")
>
> str(df)
'data.frame': 200 obs. of 5 variables:
$ CustomerID      : int 1 2 3 4 5 6 7 8 9 10 ...
$ Genre            : chr "Male" "Male" "Female" "Female" ...
$ Age              : int 19 21 20 23 31 22 35 23 64 30 ...
$ Annual.Income...k.: int 15 15 16 16 17 17 18 18 19 19 ...
$ Spending.Score..1.100.: int 39 81 6 77 40 76 6 94 3 72 ...
> df$Genre <- as.factor(df$Genre)
>
> df$Income_Group <- cut(
+   df$Annual.Income...k.,
+   breaks = c(0, 30, 60, 100, 200),
+   labels = c("Low", "Medium", "High", "Very_High")
+ )
>
> anova_model <- aov(Spending.Score..1.100. ~ Genre * Income_Group, data = df)
>
> summary(anova_model)
   Df Sum Sq Mean Sq F value Pr(>F)
Genre          1    448    448.1  0.656  0.419
Income_Group  3     84    28.0  0.041  0.989
Genre:Income_Group  3    1010   336.7  0.493  0.688
Residuals    192 131162   683.1

```

**SHETH L.U.J AND SIR M.V COLLEGE**  
**SUBJECT : Data Analysis with SAS / SPSS /R**  
**PRACTICAL NO: 7,8,9**

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



The screenshot shows the RStudio interface with the following details:

- File Menu:** File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, Help.
- Terminal Tab:** Shows R version 4.5.2 and a warning message: "In file(file, "rt") : cannot open file 'StudentPerformanceFactors.csv': No such file or directory".
- Code Editor (Source):**

```
> library(dplyr)
>
> df <- read.csv("Mall_Customers.csv")
>
> str(df)
'data.frame': 200 obs. of 6 variables:
$ CustomerID : int 1 2 3 4 5 6 7 8 9 10 ...
$ Genre        : chr "Male" "Male" "Female" "Female" ...
$ Age          : int 19 21 20 23 31 22 35 23 64 30 ...
$ Annual.Income.k.: int 15 15 16 16 17 17 18 18 19 19 ...
$ Spending.Score..1.100.: int 39 81 6 77 40 76 6 94 3 72 ...
>
> df$Genre <- as.factor(df$Genre)
>
> df$Age_Group <- cut(df$Age,
+                         breaks = c(0, 25, 40, 60, 100),
+                         labels = c("Young", "Adult", "Middle", "Senior"))
>
> table_genre_age <- table(df$Genre, df$Age_Group)
>
> table_genre_age
   Young Adult Middle Senior
Female    20    49    37     6
Male      18    35    24    11
>
> chi_result <- chisq.test(table_genre_age)
>
> chi_result
Pearson's Chi-squared test
data: table_genre_age
X-squared = 3.8552, df = 3, p-value = 0.2775
```
- Environment Tab:** Shows objects in the Global Environment: df, doctors\_by\_age, high\_income\_filter, high\_income\_high\_spender\_subset, low\_spend\_female\_file, Mall\_Customers.
- Plots Tab:** Not visible in the screenshot.
- Packages Tab:** Not visible in the screenshot.
- Help Tab:** Not visible in the screenshot.
- Viewer Tab:** Not visible in the screenshot.
- Presentation Tab:** Not visible in the screenshot.
- File Explorer:** Shows files in the current directory: RData (127.2 KB, Nov 24, 2025, 7:38 PM), .Rhistory (10.9 KB, Dec 22, 2025, 10:07 AM), Custom Office Templates, desktop.ini (418 B, Dec 22, 2025, 10:00 AM), Mall\_Customers.csv (4.2 KB, Nov 24, 2025, 5:37 PM), OneNote Notebooks, Text.csv (130 KB, Nov 24, 2025, 6:26 PM), WhatsApp Installer.exe (1.1 MB, Dec 13, 2025, 7:12 PM), Module 2 P8 S089.R (213 B, Dec 22, 2025, 10:27 AM).
- Taskbar:** Shows system icons, search bar, and system status (Air: Poor, Date: 22-12-2025, Time: 10:55 AM).