

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

## SUBJECT : R Programming

## **Practical No 7 Module II**

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

## Output :

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Source

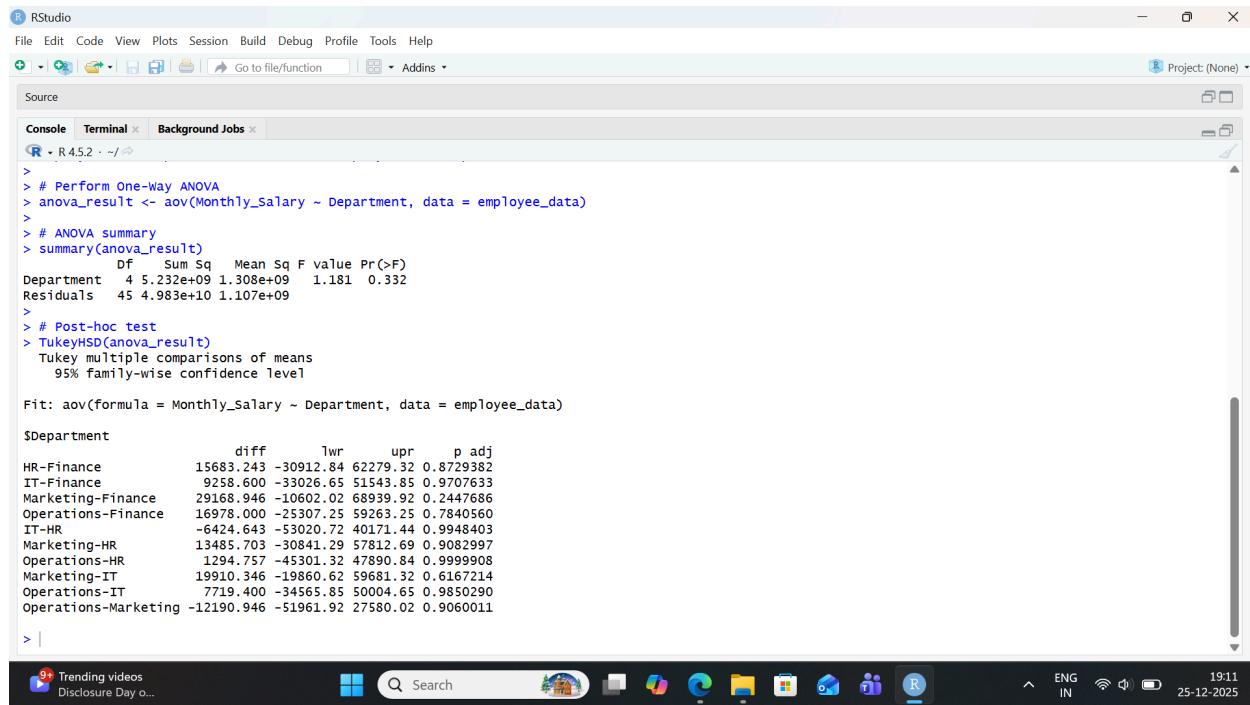
Console Terminal Background Jobs

R - R 4.5.2 - / ~

```
> # Load library
> library(dplyr)
>
> # Import dataset
> employee_data <- read.csv("employee_salary_dataset.csv")
>
> # View data
> head(employee_data)
#> #> #> #> #> #>
#> EmployeeID      Name Department Experience_Years Education_Level Age Gender      City Monthly_Salary
#> 1          1 Employee_1   Marketing           15            Master  53 Female    Delhi     111416
#> 2          2 Employee_2 Operations            7            Bachelor 25 Female Bangalore  95271
#> 3          3 Employee_3        IT           12            High School 51 Female Hyderabad 69064
#> 4          4 Employee_4 Operations            8                  PhD 44 Male    Delhi     95091
#> 5          5 Employee_5 Operations           15            Master  36 Female    Delhi     132450
#> 6          6 Employee_6   Finance            3            High School 50 Male    Mumbai    65818
> str(employee_data)
'data.frame': 50 obs. of 9 variables:
$ EmployeeID : int 1 2 3 4 5 6 7 8 9 10 ...
$ Name        : chr "Employee_1" "Employee_2" "Employee_3" "Employee_4" ...
$ Department  : chr "Marketing" "Operations" "IT" "Operations" ...
$ Experience_Years: int 15 7 12 8 15 3 14 17 4 18 ...
$ Education_Level: chr "Master" "Bachelor" "High School" "PhD" ...
$ Age         : int 53 25 51 44 36 50 57 34 53 28 ...
$ Gender      : chr "Female" "Female" "Female" "Male" ...
$ City        : chr "Delhi" "Bangalore" "Hyderabad" "Delhi" ...
$ Monthly_Salary: int 111416 95271 69064 95091 132450 65818 70255 44830 42429 31893 ...
>
> # Convert Department to factor
> employee_data$Department <- as.factor(employee_data$Department)
>
> # Perform One-Way ANOVA
> anova_result <- aov(Monthly_Salary ~ Department, data = employee_data)
```

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

```
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 - /~>
> # Perform One-way ANOVA
> anova_result <- aov(Monthly_Salary ~ Department, data = employee_data)
> # ANOVA summary
> summary(anova_result)
   Df Sum Sq Mean Sq F value Pr(>F)
Department  4 5.232e+09 1.308e+09  1.181  0.332
Residuals  45 4.983e+10 1.107e+09
> # Post-hoc test
> TukeyHSD(anova_result)
Tukey multiple comparisons of means
 95% family-wise confidence level

Fit: aov(formula = Monthly_Salary ~ Department, data = employee_data)

$Department
      diff    lwr     upr   p adj
HR-Finance 15683.243 -30912.84 62279.32 0.8729382
IT-Finance  9258.600 -33026.65 51543.85 0.9707633
Marketing-Finance 29168.946 -10602.02 68939.92 0.2447686
Operations-Finance 16978.000 -25307.25 59263.25 0.7840560
IT-HR       -6424.643 -53020.72 40171.44 0.9948403
Marketing-HR 13485.703 -30841.29 57812.69 0.9082997
Operations-HR 1294.757 -45301.32 47890.84 0.9999908
Marketing-IT 19910.346 -19860.62 59681.32 0.6167214
Operations-IT 7719.400 -34565.85 50004.65 0.9850290
Operations-Marketing -12190.946 -51961.92 27580.02 0.9060011
> |
```

The code performs a one-way ANOVA on 'Monthly\_Salary' by 'Department'. It then uses Tukey's HSD test for post-hoc comparisons. The results show significant differences between departments like HR vs Finance and Marketing vs Finance.

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