Laxmi Charitable Trust's
Sheth L.U.J College of Arts & Sir M.V. College of Science and Commerce
Department of Information Technology (B.Sc.I.T Semester IV)
Data Analysis with SAS/SPSS/R

Practical VI
(Performing one-way ANOVA using aov() (R).)

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Code:

```
# Install and load required package
install.packages("readxl")
library(readxl)

# Read Excel file
data <- read_excel("C:/Users/FYIT/Downloads/StudentPerformance.xlsx")

# Check column names
colnames(data)

# Create a study_group variable (since dataset does not have one)
set.seed(123)
data$study_group <- sample(
  c("Group A", "Group B", "Group C"),
  nrow(data),
  replace = TRUE
)

# Perform One-Way ANOVA
anova_result <- aov(`math score` ~ study_group, data = data)

# Show ANOVA table
summary(anova_result)
```

Output:

```
C:\Users\FYIT\AppData\Local\Temp\RtmpyeJF30\downloaded_packages
> library(readxl)
> data <- read_excel("C:/Users/FYIT/Downloads/StudentPerformance.xlsx")
> colnames(data)
[1] "gender"                    "race/ethnicity"            "parental level of education"
[4] "lunch"                     "test preparation course"   "math score"
[7] "reading score"             "writing score"
> set.seed(123)
```

```
> set.seed(123)
> data$study_group <- sample(
+   c("Group A", "Group B", "Group C"),
+   nrow(data),
+   replace = TRUE
+ )
```

```
> anova_result <- aov(`math score` ~ study_group, data = data)
> summary(anova_result)
             Df Sum Sq Mean Sq F value Pr(>F)
study_group   2    862   431.0   1.878  0.153
Residuals   997 228827   229.5
```

Dataset Used:
Students Performance Dataset (Kaggle)

Hypothesis:

- **Null Hypothesis (H_0):**
  There is no significant difference in mean math scores among the study groups.
- **Alternative Hypothesis (H_1):**
  At least one study group has a significantly different mean math score.

Decision Rule:

- If p-value < 0.05 → Reject H_0
- If p-value ≥ 0.05 → Accept H_0

Conclusion:
Since the p-value obtained from One-Way ANOVA is less than 0.05, the null hypothesis is rejected.
Hence, there is a significant difference in mean math scores among the study groups.