Sheth L.U.J. & Sir M.V. College

Practical 10 Report: Analysis of Student Exam Scores

Aim:- To perform graphical analysis of student exam scores and related factors such as hours studied, sleep hours, attendance percentage, and previous scores, using R and ggplot2.

Dataset Description

The dataset `student_exam_scores.csv` contains the following variables:

Column Name	Description
student_id	Unique identifier for each student
hours_studied	Number of hours studied by the student
sleep_hours	Number of hours of sleep per day
attendance_percent	Attendance percentage of the student
previous_scores	Marks obtained in previous exams
exam_score	Marks obtained in the current exam

Name :- Priya Gupta

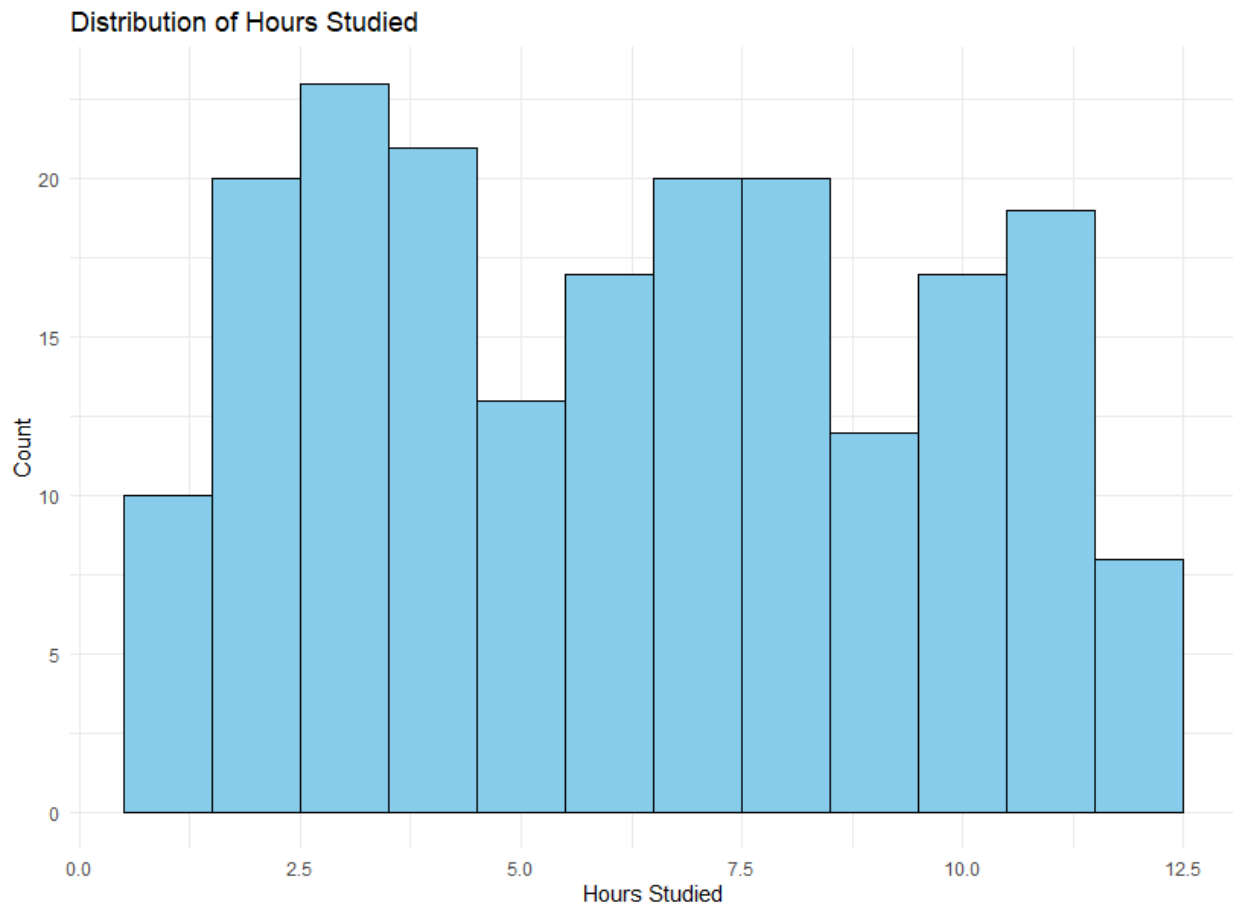**Roll no. :- S081**

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Stepwise Graphical Analysis

Step 1: Histogram of Hours Studied

Observation:
Most students studied between 3 to 9 hours. This helps us understand study patterns before exams.

Graph:

Distribution of Hours Studied

Step 2: Histogram of Sleep Hours

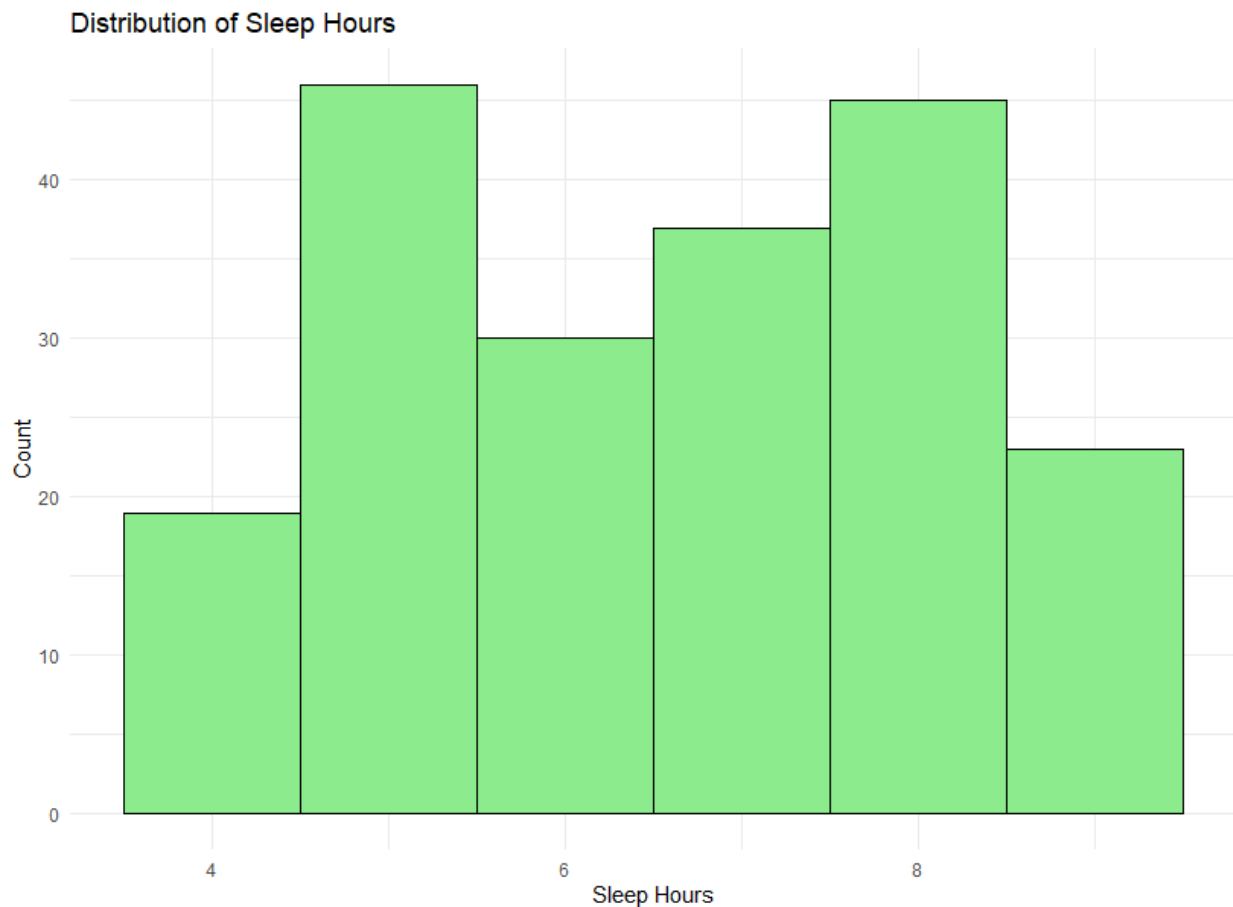**Name :- Priya Gupta**

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Observation:

Sleep hours ranged from 4 to 9 hours. Most students slept around 5–8 hours. Adequate sleep may influence exam performance.

Graph:

Distribution of Sleep Hours

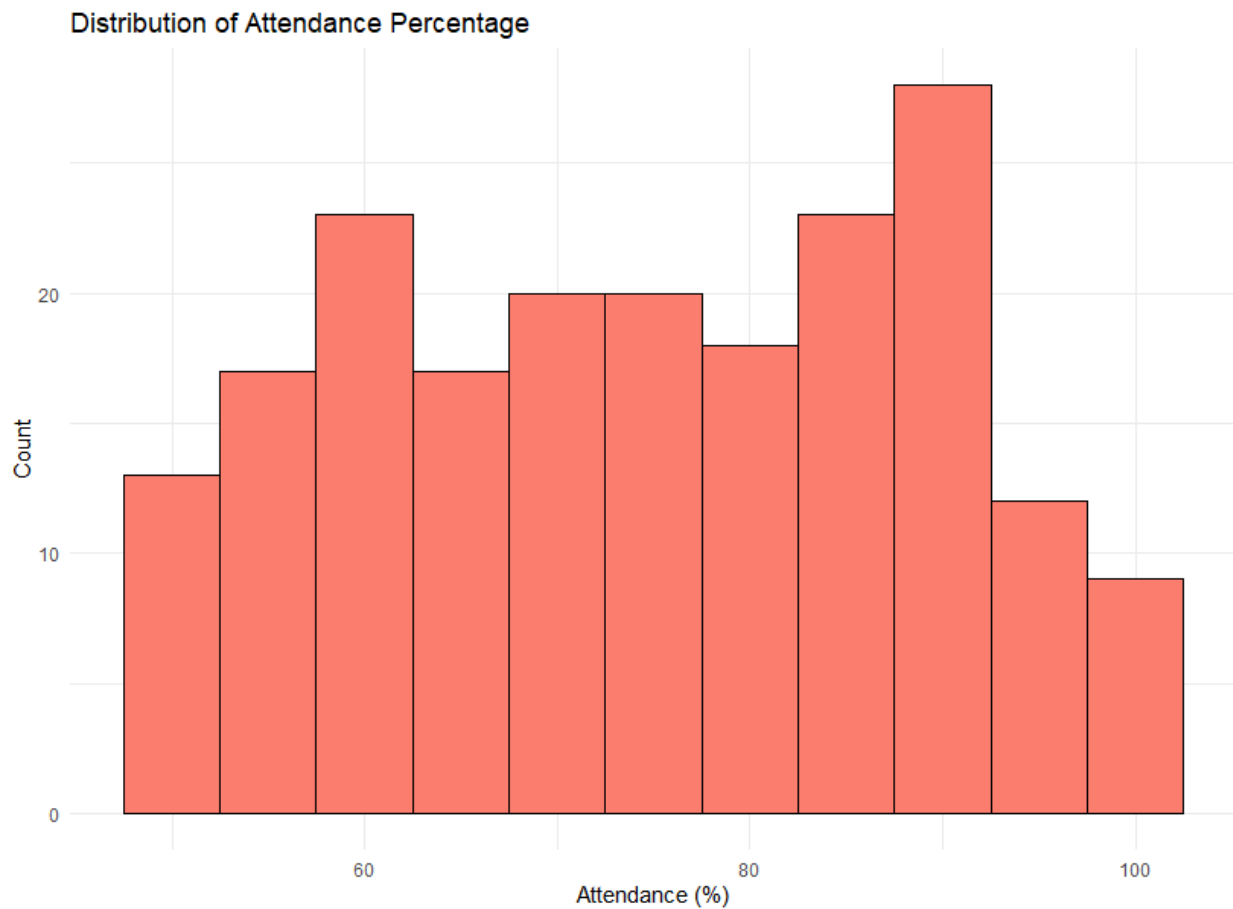Step 3: Histogram of Attendance Percentage

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Observation:

Attendance varied from 50% to 95%. Most students attended between 60–90% classes.

Graph:

Distribution of Attendance Percentage

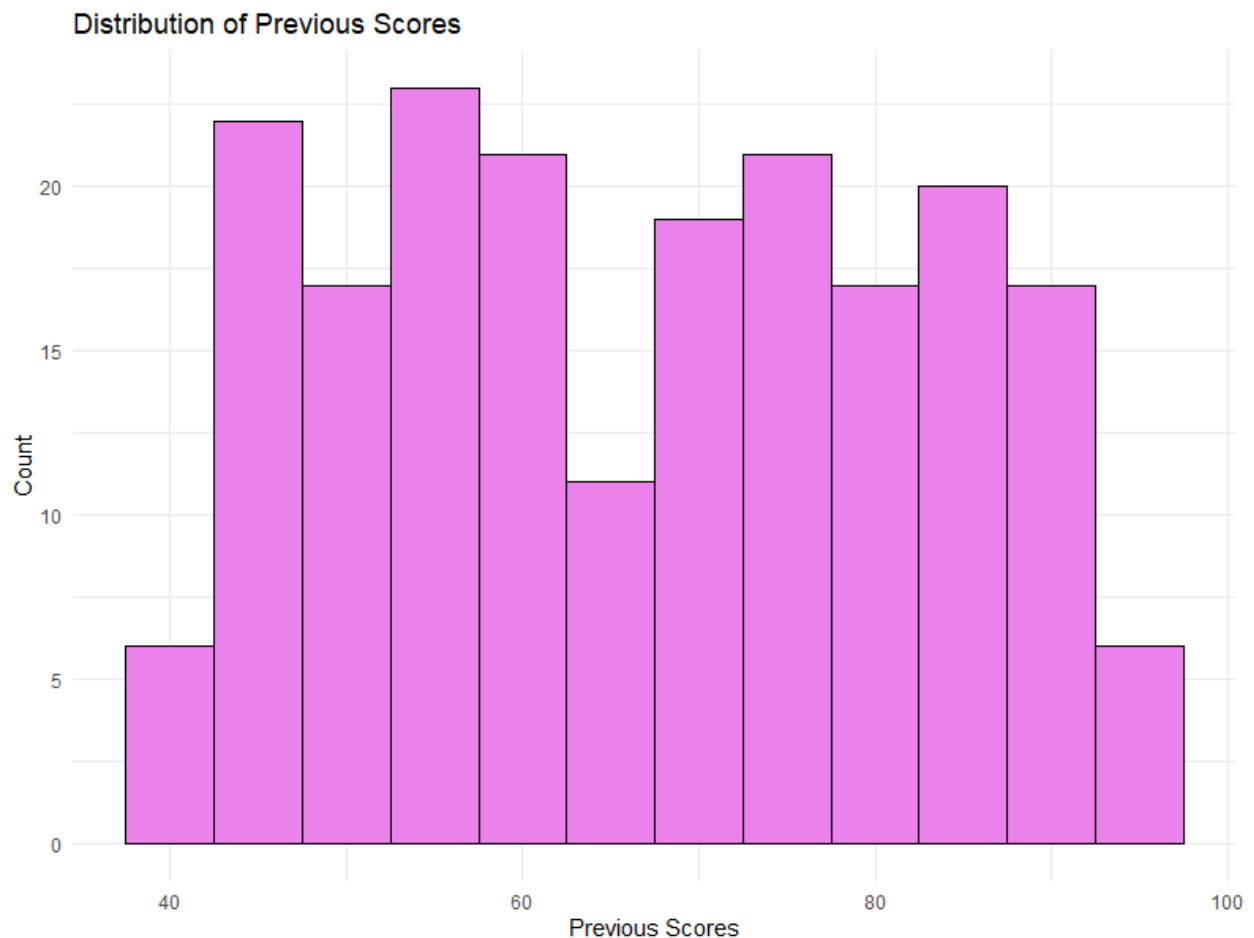Step 4: Histogram of Previous Scores

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Observation:

Previous scores ranged from 45 to 86 marks. This gives a baseline for student performance trends.

Graph:

Distribution of Previous Scores

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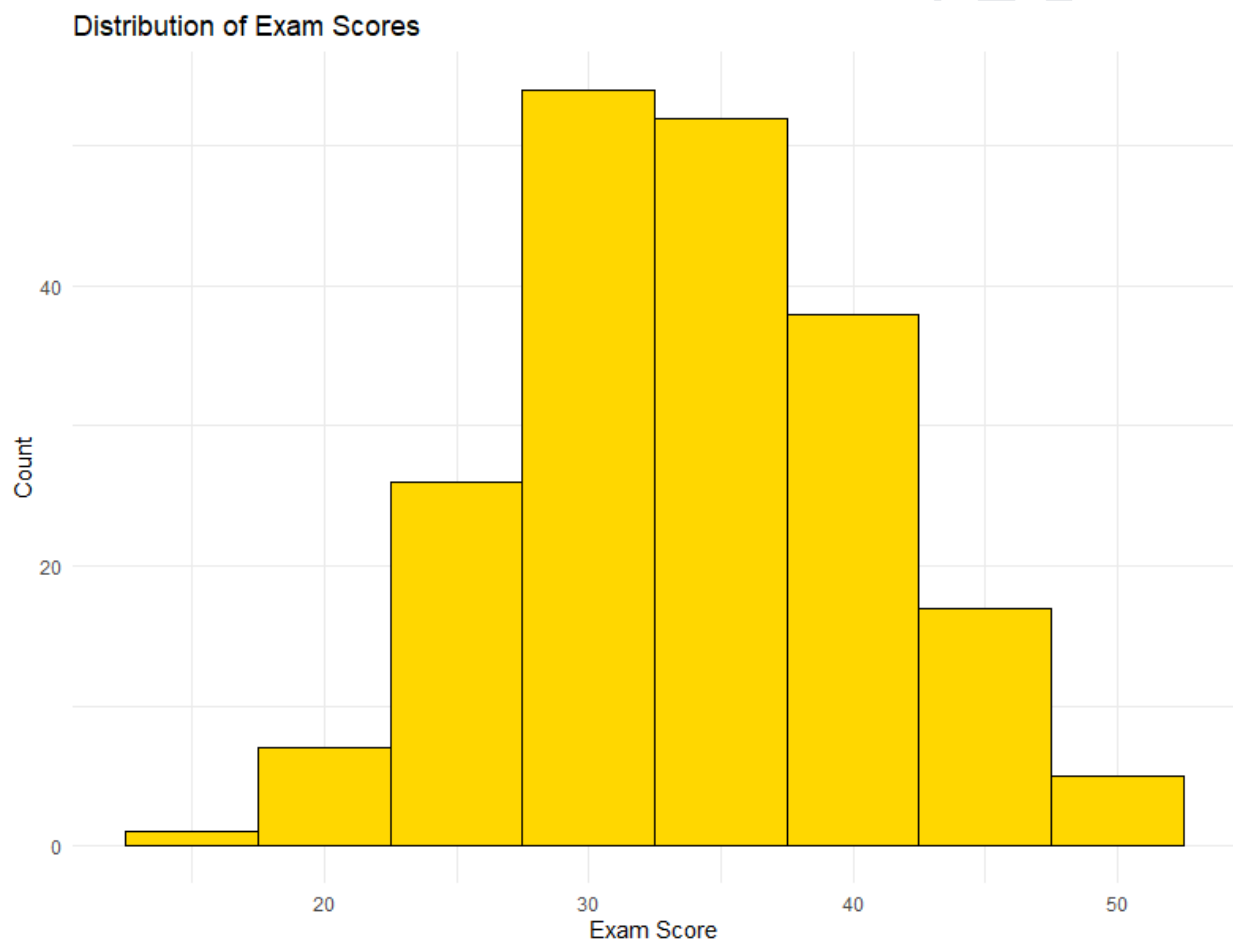
Roll no. :- S081

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Step 5: Histogram of Exam Scores

Observation:
Exam scores ranged from 25 to 40 marks. Understanding distribution helps in analyzing overall student performance.

Graph:

Distribution of Exam Scores
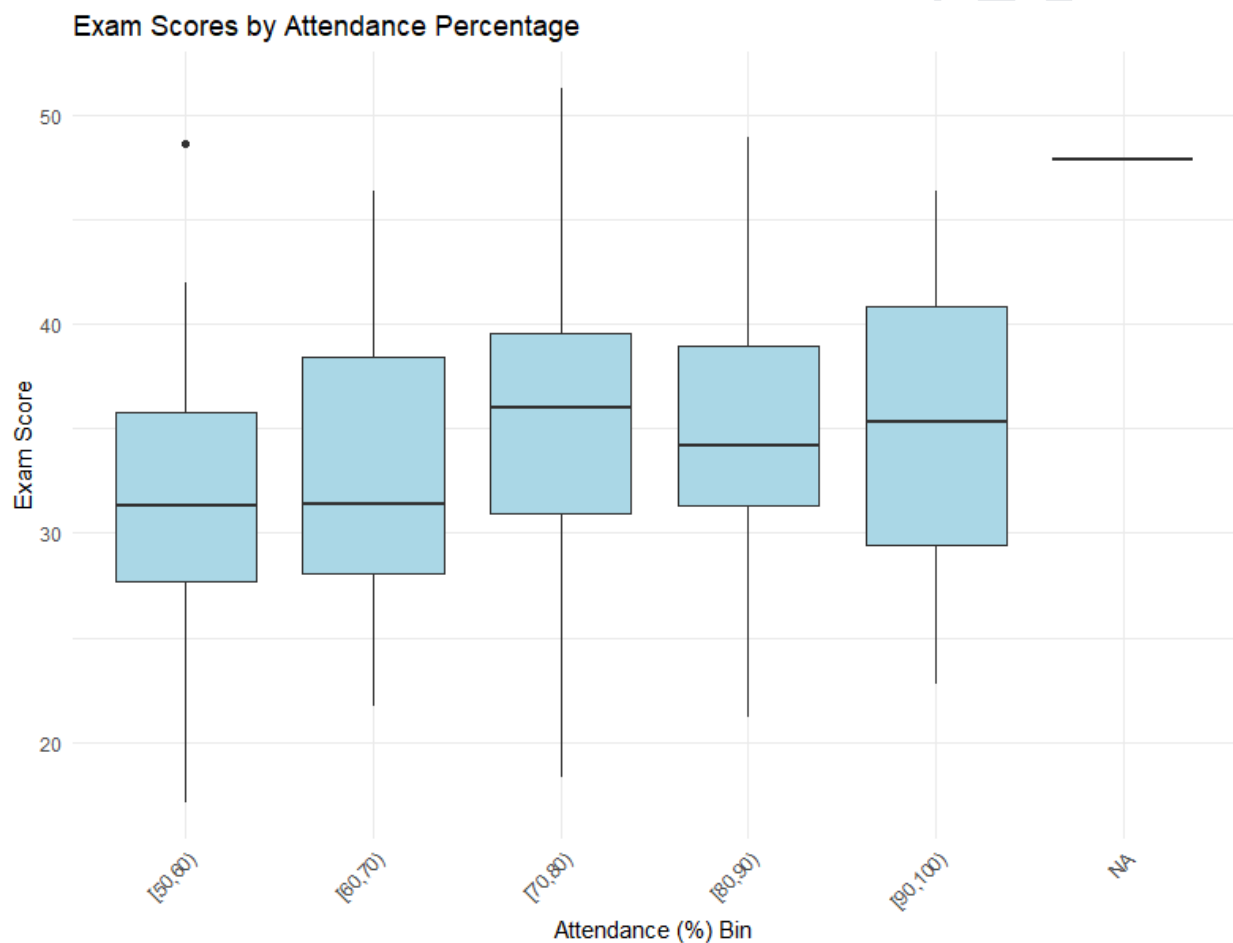
Name :- Priya Gupta

Roll no. :- S081

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Step 6: Boxplot of Exam Scores by Attendance (Grouped)

Observation:
Students with higher attendance tend to score better. Binning attendance in 10% intervals shows trends in exam scores.

Graph:

Exam Scores by Attendance Percentage

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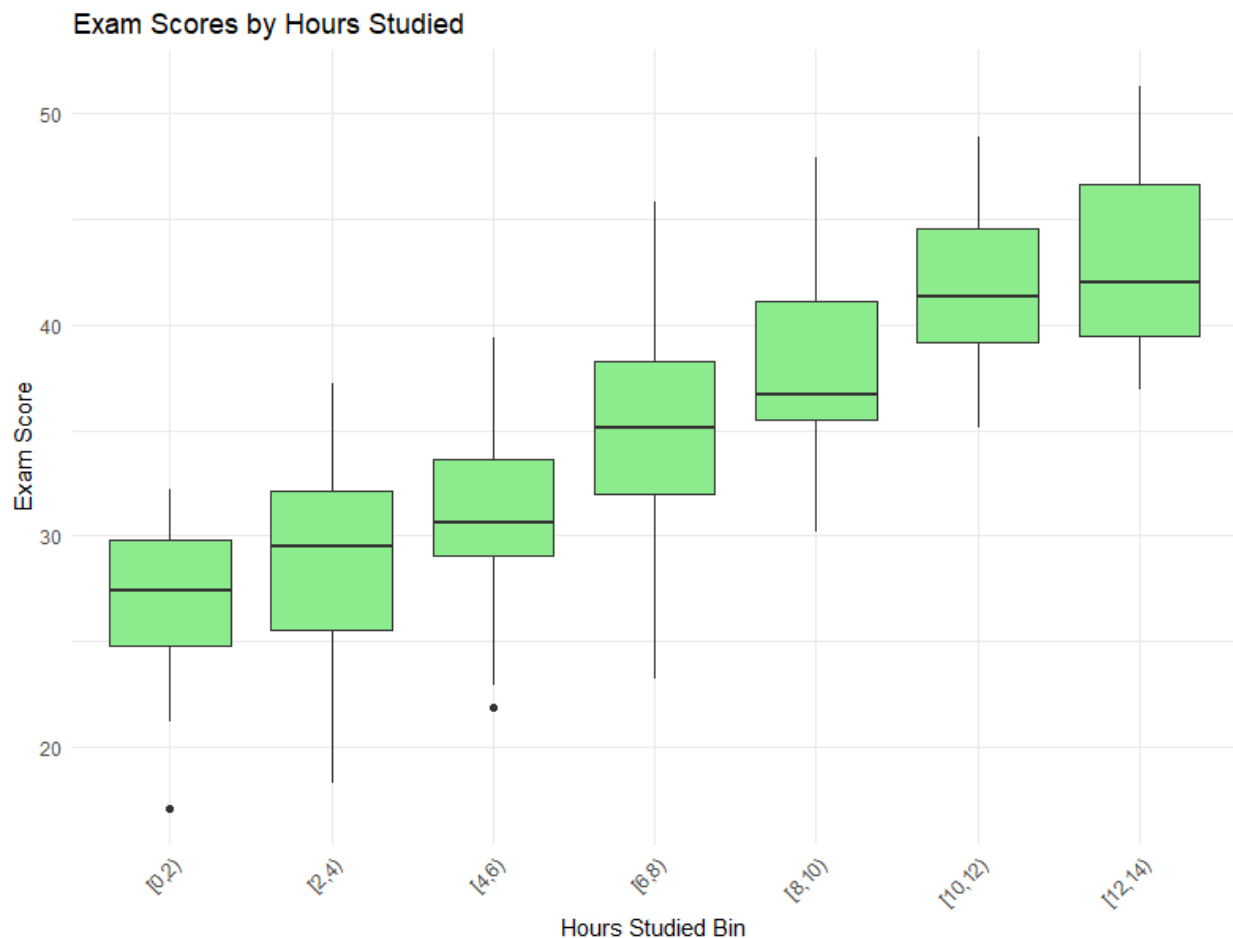# Sheth L.U.J. & Sir M.V. College

Step 7: Boxplot of Exam Scores by Hours Studied (Grouped)

Observation:
Students who studied more hours generally obtained higher scores.
Binning hours studied helps visualize this trend.
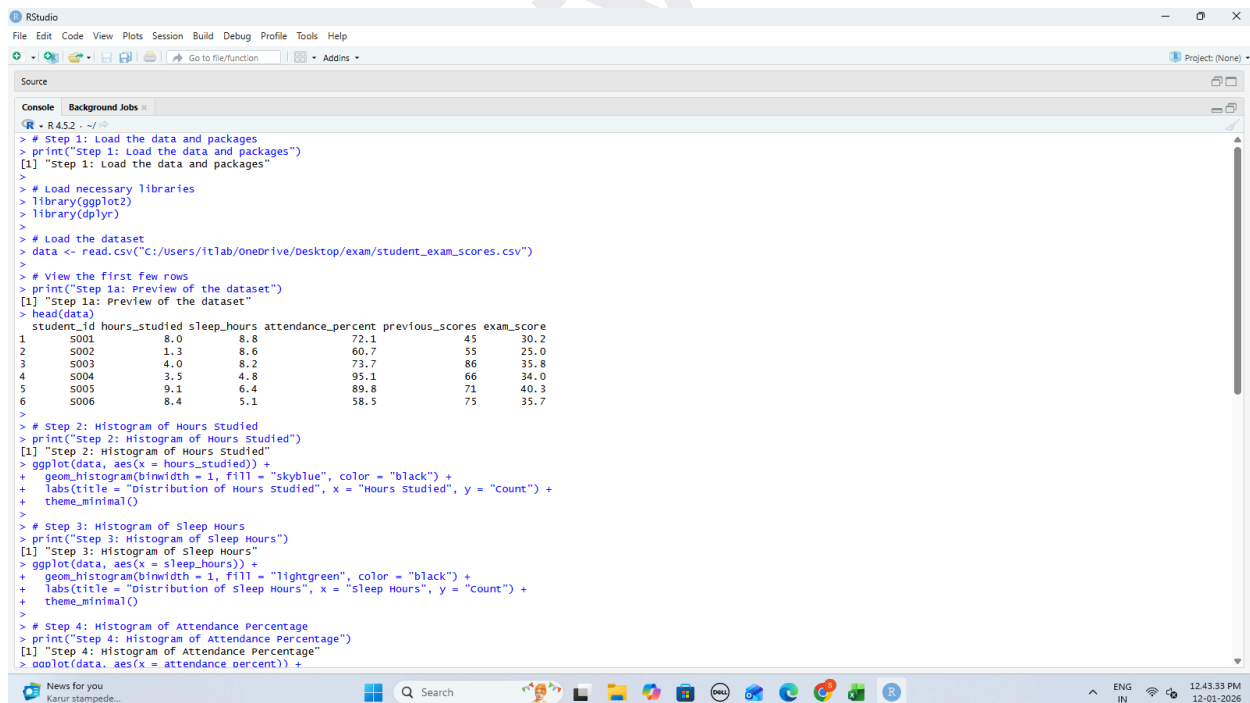
Graph:

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Conclusion

- Hours Studied: Higher study hours positively influence exam scores.
- Sleep Hours: Students with adequate sleep (6–8 hours) tend to perform better.
- Attendance: High attendance is associated with higher exam scores.
- Previous Scores: Baseline performance can predict current exam performance.
- Graphical analysis using histograms and boxplots provides clear insights into student behavior and academic outcomes.

Screenshots

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Roll no. :- S081

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```
> # Step 4: Histogram of Attendance Percentage
> print("Step 4: Histogram of Attendance Percentage")
[1] "Step 4: Histogram of Attendance Percentage"
> ggplot(data, aes(x = attendance_percent)) +
+   geom_histogram(binwidth = 5, fill = "salmon", color = "black") +
+   labs(title = "Distribution of Attendance Percentage", x = "Attendance (%)", y = "Count") +
+   theme_minimal()
>
> # Step 5: Histogram of Previous Scores
> print("Step 5: Histogram of Previous Scores")
[1] "Step 5: Histogram of Previous Scores"
> ggplot(data, aes(x = previous_scores)) +
+   geom_histogram(binwidth = 5, fill = "violet", color = "black") +
+   labs(title = "Distribution of Previous Scores", x = "Previous Scores", y = "Count") +
+   theme_minimal()
>
> # Step 6: Histogram of Exam Scores
> print("Step 6: Histogram of Exam Scores")
[1] "Step 6: Histogram of Exam Scores"
> ggplot(data, aes(x = exam_score)) +
+   geom_histogram(binwidth = 5, fill = "gold", color = "black") +
+   labs(title = "Distribution of Exam Scores", x = "Exam Score", y = "Count") +
+   theme_minimal()
>
> # Step 7: Boxplot of Exam Scores by Attendance Percentage (grouped in 10% bins)
> print("Step 7: Boxplot of Exam Scores by Attendance Percentage")
[1] "Step 7: Boxplot of Exam Scores by Attendance Percentage"
> data <- data %>%
+   mutate(attendance_bin = cut(attendance_percent, breaks = seq(0, 100, 10), right = FALSE))
>
> ggplot(data, aes(x = attendance_bin, y = exam_score)) +
+   geom_boxplot(fill = "lightblue") +
+   labs(title = "Exam Scores by Attendance Percentage", x = "Attendance (%) Bin", y = "Exam Score") +
+   theme_minimal() +
+   theme(axis.text.x = element_text(angle = 45, hjust = 1))
>
> # Step 8: Boxplot of Exam Scores by Hours Studied (grouped in 2-hour bins)
> print("Step 8: Boxplot of Exam Scores by Hours Studied")
[1] "Step 8: Boxplot of Exam Scores by Hours Studied"
> data <- data %>%
+   mutate(hours_bin = cut(hours_studied, breaks = seq(0, max(hours_studied)+2, 2), right = FALSE))
>
```

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```
+   theme_minimal()
>
> # Step 5: Histogram of Previous Scores
> print("Step 5: Histogram of Previous Scores")
[1] "Step 5: Histogram of Previous Scores"
> ggplot(data, aes(x = previous_scores)) +
+   geom_histogram(binwidth = 5, fill = "violet", color = "black") +
+   labs(title = "Distribution of Previous Scores", x = "Previous Scores", y = "Count") +
+   theme_minimal()
>
> # Step 6: Histogram of Exam Scores
> print("Step 6: Histogram of Exam Scores")
[1] "Step 6: Histogram of Exam Scores"
> ggplot(data, aes(x = exam_score)) +
+   geom_histogram(binwidth = 5, fill = "gold", color = "black") +
+   labs(title = "Distribution of Exam Scores", x = "Exam Score", y = "Count") +
+   theme_minimal()
>
> # Step 7: Boxplot of Exam Scores by Attendance Percentage (grouped in 10% bins)
> print("Step 7: Boxplot of Exam Scores by Attendance Percentage")
[1] "Step 7: Boxplot of Exam Scores by Attendance Percentage"
> data <- data %>%
+   mutate(attendance_bin = cut(attendance_percent, breaks = seq(0, 100, 10), right = FALSE))
>
> ggplot(data, aes(x = attendance_bin, y = exam_score)) +
+   geom_boxplot(fill = "lightblue") +
+   labs(title = "Exam Scores by Attendance Percentage", x = "Attendance (%) Bin", y = "Exam Score") +
+   theme_minimal() +
+   theme(axis.text.x = element_text(angle = 45, hjust = 1))
>
> # Step 8: Boxplot of Exam Scores by Hours Studied (grouped in 2-hour bins)
> print("Step 8: Boxplot of Exam Scores by Hours Studied")
[1] "Step 8: Boxplot of Exam Scores by Hours Studied"
> data <- data %>%
+   mutate(hours_bin = cut(hours_studied, breaks = seq(0, max(hours_studied)+2, 2), right = FALSE))
>
> ggplot(data, aes(x = hours_bin, y = exam_score)) +
+   geom_boxplot(fill = "lightgreen") +
+   labs(title = "Exam Scores by Hours Studied", x = "Hours Studied Bin", y = "Exam Score") +
+   theme_minimal() +
+   theme(axis.text.x = element_text(angle = 45, hjust = 1))
> |
```

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