**PDS ASSIGNMENT-1**

**1. Pie chart Visualization**

**A blue and red circle with text

Description automatically generated**

Understanding the relative proportions of male and female students in the dataset is made simpler with this pie chart visualization of the gender distribution. In particular, the pie chart makes the gender distribution easy to compare and gives a clear visual depiction of the proportions of male and female students.

This kind of analysis is very helpful when you need to quickly understand the proportions or relative distribution of several groups within a dataset. Understanding the balance or imbalance between male and female students in this instance is helpful because it may be crucial for a number of analytical tasks, including demographic analysis, focused marketing campaigns, and comprehending gender dynamics in relation to academic performance or other variables.

**2. Bar chart Visualization**

**A bar graph with different colored squares

Description automatically generated**

The distribution of race and ethnicity is shown in a bar chart, which makes it easier to analyze the demographic makeup of the dataset. It helps identify underrepresented and more prevalent groups by clearly displaying the distribution of students across different racial and ethnic groupings. Furthermore, it is simple to compare the number of students in each group, which makes it possible to comprehend the relative proportions of the various demographic categories inside the dataset. Visualizing the data also helps to spot any disparities or imbalances in representation across different racial and ethnic groups, which may reveal biases or shed light on the variety of the dataset. A deeper knowledge of demographic dynamics can be attained by examining patterns in the distribution of racial and ethnic categories across several datasets or time periods. In the end, the knowledge gathered from this visualization can help with decision-making procedures like allocating resources, creating policies, or designing focused treatments for particular populations.

**3.Box plot Visualization**

**A graph showing a graph of a course

Description automatically generated with medium confidence**

**A graph showing a green and purple box

Description automatically generated**

**A graph of a course

Description automatically generated with medium confidence**

The exam preparation course scores' box plot visualization simplifies a number of analysis. It helps to understand the effect of the test preparation course on performance across subjects by making it simple to compare math, reading, and writing scores between students who took it and those who did not. It additionally offers visual signals to help detect outliers in each course group, which may indicate remarkable performance or oddities in the data. It provides insights into the unpredictability of student performance and the impact of test preparation by presenting score ranges for each subject and course group. Additionally, a thorough examination of students' strengths and shortcomings is made possible by the distinct subplots for math, reading, and writing scores, which allow for comparison across courses within each course group. In the end, the visualization makes it possible to assess how well the test-prep course has improved performance, which helps with curriculum development and instructional interventions. The box plot visualization, when used to provide a thorough and comparative examination of student performance across disciplines with respect to their involvement in test preparation courses, improves comprehension of patterns, trends, and factors influencing academic achievement overall.

**4. Histogram Visualization**

**A graph of a number of numbers

Description automatically generated**

A variety of analysis methods are made easier by the histogram showing the distribution of math scores. It provides a graphic depiction of the math score distribution, making it simple to see how frequently or how many pupils overall receive various scores. Furthermore, it facilitates the expeditious assessment of central tendency by emphasizing the data's mean, median, and mode, so enhancing comprehension of students' mean scores on the math exam. One can detect skewness in the distribution, pointing to differences in student performance, either toward higher or lower scores. Insights into student variability in arithmetic results are also provided by the histogram, which helps to explain any regularity or unpredictable behavior in performance. It also aids in the identification of extreme numbers or outliers, which may suggest remarkable performance or anomalies in the data. One way to evaluate departures from expected patterns is to compare the actual distribution with predicted distributions, like the normal distribution. Finally, the histogram provides insights on outliers, central tendency, variability, and general trends in student performance, allowing for a thorough analysis of the distribution of arithmetic test results.

**5. Scatter Plot Visualization**

**A graph with blue dots

Description automatically generated**

A scatter plot that shows the relationship between reading and writing scores makes a number of analytical tasks easier to understand. Through the use of a pattern of dots, it makes it possible to visually analyze the relationship between these variables and determine if there is a positive, negative, or no correlation. In order to measure the direction and intensity of the link and provide insight into the degree of correlation, the correlation coefficient can also be computed. The scatter plot makes it simple to spot outliers, or data points that differ noticeably from the average pattern. These can be unusual occurrences or abnormalities in the data. In the correlation between writing and reading scores, patterns or trends can be seen, such as clusters of points showing associated performance or linear trends. Moreover, the scatter plot makes it easier to evaluate homoscedasticity, which shows if writing score variability is constant throughout reading score levels. In the end, predictions about one variable based on the other are made possible by the observed relationship between reading and writing scores, which offers insightful information for instructional interventions and student support. To sum up, the scatter plot visualization provides information on correlation, patterns, outliers, and predictive modeling, simplifying the investigation of the relationship between writing and reading scores.