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| **Data Set:**  mtcars |
| **Question / Problem:**  Using R and the mtcars dataset(built in)  Perform a correlation and explain the relationship between MPG and HP – you should plot a basic scatter |
| **Variables:**  **MPG: Numerical,Dependent**  **HP:Numerical,Independent** |
| **Techniques used:**  **Correlation Analysis**   * Used the cor() function in R to compute the Pearson correlation coefficient between the two variables. * The result (r = -0.7761684) indicates a strong negative correlation. This means as horsepower increases, fuel efficiency (MPG) decreases.   **Scatter Plot with Regression Line**   * Created using the plot() function with MPG on the y-axis and HP on the x-axis. * Added a regression line using the lm() function combined with abline() to illustrate the negative linear trend. * Customized the plot with appropriate labels (main, xlab, ylab), colors (col), and point styles (pch). |
| **Analysis and Visualisation:**      **Correlation = -0.7761684**          **1. Scatter Plot Description**   * **Description**:   + The scatter plot depicts individual car data points, plotting HP (x-axis) against MPG (y-axis).   + A red regression line is added to illustrate the negative relationship. * **Interpretation**:   + Most data points align closely to the regression line, confirming a strong linear relationship.   + As HP increases, MPG decreases.   **2. Correlation Coefficient Analysis**   * **Result**: r = -0.7761684 * **Interpretation**:   + The strong negative correlation confirms that cars with higher horsepower tend to have lower fuel efficiency.   + This aligns with expectations, as more powerful engines typically consume more fuel. |
| **Considerations:**  **The analysis is limited to linear relationships.** |