To enhance restaurants' understanding of tipping behavior, helping tailor services and optimize operations develop a predictive model to estimate **tip amounts** in restaurants based on customer billing and demographic details (Tip dataset attached)

1. Use **regression techniques**—including linear regression, ridge and lasso regularization, decision tree regression, ensemble methods (e.g., random forest), Support Vector Regression (SVR) and KNN. Estimate:

1. Identify which factors significantly impact tip amounts.
2. Prediction Accuracy: Build and evaluate models to forecast tips effectively.
3. Insights for Management: Provide actionable insights to improve customer service strategies and revenue management.

2. Check if the data follows a linear trend using following methods to analyze the relationship between the target variable and predictors.

Scatter Plot

Pair Plot for Multiple Features

Correlation Matrix (Heatmap)

Statistical Tests for Linearity (Rainbow Test)

Residuals Plot

Line Plot (for time-series data)

Based on the trend in data apply suitable regression method and check model prediction accuracy.