**Column Interpretation**

Here’s an interpretation of the column names in heart dataset:

1. **age**: age of the individual patient
2. **sex**: Gender Type

* Describe the type of gender of the patient. Categorized as:
* 0: Female
* 1: Male

1. **cp**: Chest Pain Type
   * Describes the type of chest pain the patient experienced. Categorized as:
     + **0**: Typical angina
     + **1**: Atypical angina
     + **2**: Non-anginal pain
     + **3**: Asymptomatic
2. **trestbps**: Resting Blood Pressure
   * Resting blood pressure (in mm Hg) taken during a patient's physical exam.
3. **chol**: Serum Cholesterol
   * The patient’s cholesterol level in mg/dL.
4. **fbs**: Fasting Blood Sugar
   * Indicates if the patient’s fasting blood sugar level is greater than 120 mg/dL.
     + **1**: True (fasting blood sugar > 120 mg/dL)
     + **0**: False (fasting blood sugar ≤ 120 mg/dL)
5. **restecg**: Resting Electrocardiographic Results
   * Describes the results of the patient's resting electrocardiogram.
     + **0**: Normal
     + **1**: ST-T wave abnormality (indicates potential heart issues)
     + **2**: Left ventricular hypertrophy (possible heart disease)
6. **thalach**: Maximum Heart Rate Achieved
   * Maximum heart rate achieved during a stress test.
7. **exang**: Exercise-Induced Angina
   * Indicates if the patient experienced angina (chest pain) during exercise.
     + **1**: Yes (experienced angina)
     + **0**: No (did not experience angina)
8. **oldpeak**: ST Depression Induced by Exercise
   * Measures the difference between rest and exercise, indicating possible heart disease if ST depression is present (higher values suggest more severe ischemia).
9. **slope**: Slope of the Peak Exercise ST Segment
   * Describes the slope of the ST segment during peak exercise.
     + **0**: Upsloping
     + **1**: Flat
     + **2**: Downsloping
10. **ca**: Number of Major Vessels Colored by Fluoroscopy
    * The number of major vessels (0-3) that have been colored by the fluoroscopy procedure (a test used to visualize blood flow).
11. **thal**: Thalassemia (Blood Disorder Indicator)
    * Describes the results from a thallium stress test, which can show abnormalities in blood flow to the heart.
      + **1**: Normal
      + **2**: Fixed defect (no reversible defect)
      + **3**: Reversible defect (blood flow is normal during rest but abnormal during exercise)
12. **target**: Heart Disease Presence
    * The target variable indicating whether the patient has heart disease.
      + **1**: Yes (presence of heart disease)
      + **0**: No (absence of heart disease)

**Summary of Interpretations:**

* **Descriptive Analysis** helps you understand the basic characteristics of your dataset.
* **Correlation/Covariance** reveals relationships between features, such as cholesterol and heart disease risk.
* **Classification Analysis** allows you to predict heart disease presence and evaluate model performance.
* **Risk Factor Analysis** identifies the most significant contributors to heart disease.
* **EDA** visually explores relationships between variables.
* **Clustering** helps group patients with similar health profiles.
* **Feature Importance** highlights the most predictive features.
* **ROC Curve/AUC** evaluates how well the model predicts heart disease.