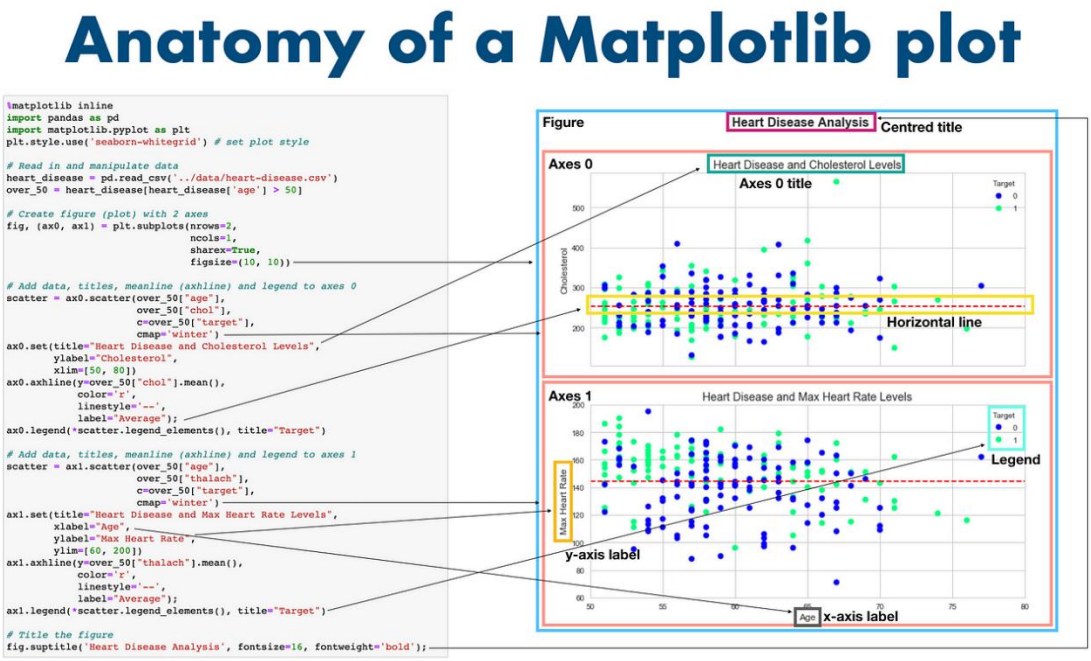
Anatomy of a Matplotlib plot – code mapping



Anatomy of a Matplotlib Plot - Code Mapping

Matplotlib plots are built upon a hierarchical structure, primarily consisting of a **Figure** and one or more **Axes**. Understanding this hierarchy is key to customizing your plots.

1. **Figure (The Canvas):**
    - **What it is:** The Figure is the **entire window or canvas** that contains all the plot elements. It's the top-level container for your visualization. You can think of it as the piece of paper on which you're drawing.
    - **Code Mapping:**
        - fig, (ax0, ax1) = plt.subplots(nrows=2, ncols=1, sharex=True, figsize=(10, 10))
        - Here, fig is the Matplotlib Figure object. The figsize argument controls the overall dimensions of this canvas.

- **Why it's required:** It's the fundamental container. You need a Figure to display any plot. It's also where you'd set a "super title" for the entire set of subplots.

2. **Axes (The Plotting Area / Subplot):**
    - **What it is:** An Axes object is the **actual plotting area** where your data is drawn. It contains the x-axis, y-axis, data points, lines, labels, title for that specific plot, and other visual elements. A single Figure can contain multiple Axes objects, arranged as subplots.
    - **Code Mapping:**
        - fig, (ax0, ax1) = plt.subplots(...)
        - Here, ax0 and ax1 are individual Axes objects. In this example, ax0 represents the top plot ("Heart Disease and Cholesterol Levels"), and ax1 represents the bottom plot ("Heart Disease and Max Heart Rate Levels").
    - **Why it's required:** This is where your data visualization actually happens. Each Axes object is an independent plot that can be customized individually.
3. **Axes Title:**
    - **What it is:** A descriptive title for an individual Axes (subplot), explaining what that specific plot is about.
    - **Code Mapping:**
        - ax0.set_title("Heart Disease and Cholesterol Levels")
        - ax1.set_title("Heart Disease and Max Heart Rate Levels")
    - **Why it's required:** Provides context for each subplot, helping the viewer understand the specific data being presented.
4. **X-axis Label:**
    - **What it is:** A label describing the variable represented on the horizontal axis of a specific Axes.

- **Code Mapping:**
  - ax1.set_xlabel("Age")
- **Why it's required:** Clearly indicates what the values on the x-axis represent, making the plot interpretable.

5. **Y-axis Label:**
   - **What it is:** A label describing the variable represented on the vertical axis of a specific Axes.
   - **Code Mapping:**
     - ax0.set_ylabel("Cholesterol")
     - ax1.set_ylabel("Max Heart Rate")
   - **Why it's required:** Clearly indicates what the values on the y-axis represent.
6. **X-axis and Y-axis Ticks/Tick Labels:**
   - **What they are:** The marks along the axes (ticks) and the numerical or categorical labels associated with them.
   - **Code Mapping:** While not explicitly shown with set_xticks or set_yticks in this snippet, the xlim and ylim calls implicitly affect the range of ticks. Matplotlib automatically generates ticks based on the data range.
     - ax0.set_ylim([150, 350])
   - **Why they're required:** Provide scale and specific values for interpreting data points on the plot.
7. **Legend:**
   - **What it is:** A key that explains what different colors, markers, or line styles in the plot represent, especially when multiple categories or series are plotted.
   - **Code Mapping:**
     - ax0.legend(scatter.legend_elements(), title="Target")

        - ax1.legend(scatter.legend_elements(), title="Target")
    - **Why it's required:** Essential for understanding multi-variate plots where different visual encodings are used to represent distinct groups or data series.

8. **Plot Elements (e.g., Scatter Points, Lines):**
    - **What they are:** The actual visual representations of your data points (e.g., individual dots in a scatter plot, lines connecting points in a line plot).
    - **Code Mapping:**
        - scatter = ax0.scatter(over_50['Age'], over_50['Cholesterol'], ...)
        - ax0.axhline(y=over_50['Cholesterol'].mean(), ...) (for the horizontal line)
    - **Why they're required:** This is the data itself, visually encoded.
9. **Figure Super Title:**
    - **What it is:** A main title for the entire Figure, typically used when there are multiple subplots to give an overarching theme.
    - **Code Mapping:**
        - fig.suptitle('Heart Disease Analysis', fontsize=16, fontweight='bold')
    - **Why it's required:** Provides a unified title for the entire visualization, especially useful when combining several related subplots.

By understanding these components and their corresponding code, you gain the ability to precisely control and customize every aspect of your Matplotlib plots, making them highly effective for data analysis and communication.