

For this project, I explored the **matplotlib** package, a Python library used for creating interactive visualizations. This library can be used for a wide variety of plots including line plots, bar charts, scatter plots, and histograms. It is useful for exploring relationships in datasets, discovering trends, and comparing categories, which raw data does not allow for. The matplotlib library can also be integrated alongside other Python tools such as Pandas and NumPy. The methods that I used in the code were **plt.plot()**, **plt.bar()**, and **plt.scatter()**. The first example was a line plot, created using **plt.plot()**. It displayed the company's annual revenue from 2018 to 2023. Each year was represented on the x-axis and the company's annual revenue (in millions of USD) was represented on the y-axis. Gridlines were used to improve the plot's readability. The second example was a bar chart, created using **plt.bar()** and used to compare categorical data. The x-axis represented the product categories, and the y-axis represented the number of units sold (in hundreds). The third example was a scatter plot created using **plt.scatter()**. It was used to visualize the relationship between two variables, sales and profit. The x-axis showed the total sales (in units) and the y-axis showed the profit earned in thousands (in USD). For the line plot, I called the *create_line_plot()* function and passed years and revenue as the arguments. I created a list for the years and a list for the revenue. For the bar chart, I used an if-else conditional statement to check if there was sales data to create the bar chart. The *sales-data* dictionary stores and organizes the sales data with the product categories as the key and the units sold as the value. For the scatter plot, I created a list for sales and one for profit. I used a for loop to iterate

through each value from the *sales_vs_profit_data* tuple and append it either the sales or profit lists. Lastly, I used a tuple to store the values for the sales and profit data. The methods described above can be used in real-world settings to solve data problems. The line plot can be used to monitor website traffic based on the time of day. It also helps visualize air quality or temperature changes over time. The bar chart can be used in marketing to determine the effectiveness of ad campaigns across different social media platforms. It can also be used in a restaurant to determine which menu items are popular among customers. The scatter plot is applicable in healthcare when comparing two numerical variables such as emergency room wait time and patient satisfaction.