# Part 5: Reflection Report — Data Analysis and Streamlit Project

## 1. What I Learned

Through this project, I learned how to use the Pandas library to load, explore, and clean data efficiently. I gained practical experience working with DataFrames, handling missing values using functions such as dropna() and fillna(), and reading datasets using pd.read\_csv(). Additionally, I learned how to use Streamlit to create an interactive and visually engaging data application. This helped me understand how Python can be extended beyond notebooks into real-time web-based data visualization tools.

## 2. Tools and Technologies Used

* Python 3.x
* Pandas for data handling and analysis
* Matplotlib for data visualization
* Streamlit for building the user interface and dashboard
* VS Code / Command Prompt for running and testing the project

## 3. Challenges Faced

Initially, I faced an issue where the 'streamlit' command was not recognized because the Python Scripts folder was not added to the system PATH. After troubleshooting and installing Streamlit properly, I was able to run the application successfully. Another challenge was understanding how to update the DataFrame dynamically and display plots interactively in Streamlit, but documentation and testing helped me resolve that.

## 4. Insights and Key Takeaways

* Streamlit makes data visualization fast and accessible without needing HTML or JavaScript.
* Pandas is extremely powerful for cleaning and transforming tabular data.
* Integrating visualization tools (like Matplotlib) inside Streamlit bridges the gap between data analysis and web presentation.
* Debugging environment and dependency issues is a valuable technical skill.

## 5. Future Improvements

* Add more interactivity using widgets such as sliders, filters, and file uploaders.
* Integrate additional visualization libraries like Plotly or Seaborn for better insights.
* Deploy the Streamlit app to the web using Streamlit Cloud or Render for accessibility.

## 6. Conclusion

This assignment enhanced my skills in data analysis, visualization, and web app development using Python. I now feel more confident in analyzing datasets and building interactive dashboards, which are essential skills in data science and AI-driven applications.