Problem Statement:

You work for a hedge fund and are an analyst assigned the task to analyse the dataset of historical stock market data to explore potential investments as well as assess trends in the markets.

- Dataset: https://www.kaggle.com/datasets/camnugent/sandp500

- Task
  - Data Cleaning and Preparation
  - Use your preferred data analysis tool to import your dataset, for instance, Python and Pandas, etc.
  - Handling missing values: Identify and handle missing values appropriately (for instance, imputation, removal).
  - Data type conversion: Ensure data types are appropriate (for instance, dates converted to datetime format).
  - Outlier detection and handling: Identify and handle outliers if any (for instance, capping, flooring, or removal).

- Exploratory Data Analysis (EDA):
- Univariate analysis:
  - Analyze numerical variables using descriptive statistics (mean, median, mode, standard deviation, etc.).
  - Plot the histogram and box plot of the stock prices, returns, and volatility.
- Bivariate analysis:
  - Plot the relationship between stock prices and market indices through scatter plots and correlation matrices.
  - Plot the relationship between stock returns and volatility through scatter plots and correlation matrices.
- Time Series Analysis:
  - Plot the time series of stock prices and returns on line charts.
  - Calculate and plot moving averages and exponential moving averages.
  - Extract and discuss trends, seasonality, and cyclical effects in the data.

- Data Visualization:
  - Create graphics: Produce informative communicative graphics to narrate the story of your findings.
  - Apply the appropriate charts, for example, lines, bars, scatter plot, histograms, to bring attention to specific data

- Customize by labeling, titling, and legends in any visualization

- Conclusion and Recommendation:
  - Investment opportunity Identification: identify the performance of equities with high potential growth
  - Market trend analysis: some risks and opportunities can be identified.
  - Actionable recommendation: Suggest actionable recommendations to the hedge fund based on your findings.

- Submission Guidelines:
  - Format for the presentation: Deliver your findings in a presentation format, PowerPoint or Google Slides
  - Content for the presentation:
  - Presentation of the introduction to the problem and dataset
  - Presentation of data cleaning and preparation steps
  - Findings from exploratory data analysis
  - Data visualization
  - Key takeaways and suggestions
  - Conclusion

- Grading: Your report will be graded according to the following:
  - Data pre-processing: Precision, effectiveness, and dealing with missing values and outliers.
  - Exploratory data analysis: Depth of analysis, appropriate choice of statistical measures, and interpretation of the results.
  - Data visualization: Accuracy, effectiveness, and suitable visualization techniques.
  - Insights and recommendations: Quality of insights, relevancy to the problem statement, and practical recommendations.
  - Presentation skills: Clarity in presentation and effective use of visuals. You should be able to present your findings clearly to an audience.
  - With this assignment, you will effectively be able to show a proficiency in financial data analysis, time series analysis, and deriving actionable insights for investments.