Interview Prep Document: Financial Portfolio Analysis Model

📅 Project Title:

Client Portfolio Analyzer (2015-2020)

🔍 Objective:

To design and implement a stock market analysis and portfolio recommendation system tailored for two investor profiles: - **Peter (Aggressive)** - **Patrick (Conservative)**

🔧 Tools and Libraries:

- **Python**: Core scripting
- **Pandas, NumPy**: Data handling & math
- **Seaborn, Matplotlib**: Visualization
- **Jupyter/PyCharm/VSCode**: Development

📂 Dataset:

Daily stock data (2015-10-01 to 2020-09-30) for 24 companies across 4 sectors + S&P500 - **Aviation**: AAL, ALGT, ALK, DAL, HA, LUV - **Finance**: BCS, CS, DB, GS, MS, WFC - **Healthcare**: BHC, JNJ, MRK, PFE, RHHBY, UNH - **Technology**: AAPL, AMZN, FB, GOOG, IBM, MSFT - **Index**: SP500

📅 Step-by-Step Pipeline:

🔗 STEP 1: ASK

Define the goal: analyze market behavior and provide portfolio advice tailored to two profiles.

⛏ STEP 2: ACQUIRE

- Loaded CSVs for each ticker from `./dataset`
- Cleaned columns to only: `Date`, `Close`, `Volume`
- Renamed columns like: `Close_MSFT`, `Volume_MSFT`, etc.

🧰 STEP 3: PROCESS

- Merged all stocks by sector, and joined into a full dataset
- Filtered timeframe: 2015-10-01 to 2020-09-30
- Ensured no missing values

📊 STEP 4: ANALYZE

- Calculated:
- Daily % returns
- Cumulative returns
- Volatility (std dev of returns)
- Correlation between stocks
- Saved outputs as CSVs:
  - `cumulative_returns.csv`
  - `volatility_ranking.csv`
  - `correlation_matrix.csv`

📊 STEP 5: SHARE (Visualization)

- Heatmaps of correlations (price, volume)
- Volume/price trends and histograms
- Normalized prices vs SP500
- Return distributions by sector
- Relative price (stock/SP500)
- Annualized returns, risks, and Sharpe ratio

💣 STEP 6: ACT (Recommendations)

Aggressive Portfolio (Peter)
Diversified, high-growth exposure: - AMZN (15%), MSFT (15%), AAPL (12%), FB (10%), GOOG (8%) - MRK (12%), JNJ (10%), RHHBY (10%), GS (5%), PFE (5%)

Conservative Portfolio (Patrick)
Stable, low-risk with decent returns: - AMZN (15%), MSFT (17%), AAPL (12%), GOOG (12%) - MRK (10%), JNJ (10%), RHHBY (12%), GS (4%), PFE (8%)

🕯️ Interview Talking Points:

- Explain **why 2015-2020**: consistent window pre-COVID
- Why normalize prices? => to compare stocks on a common scale
- How correlation helped? => to avoid redundancy in portfolios
- Importance of Sharpe Ratio? => risk-adjusted return
- Portfolio theory principle applied: **Diversification**

🩲 Extras:

- Future additions: predictive modeling (LSTM or ARIMA)
- Could scale this into a portfolio advisor dashboard

✉️**Tip:**

Save visuals in a `result/` folder for demo, show volatility and return charts if asked for insights.