Backtesting Common Risk Management Practices/Strategies on Historical Data

Possible Areas to Focus on:

- **Value at Risk (VaR) Calculation**
  - Estimate the maximum potential losses from a specific portfolio over a certain time frame with a given confidence level.
  - Expand my grasp on VaR and learn how to apply it to the present. Compare various methodologies with different confidence levels.
    - "Variance-Covariance Method", "Monte Carlo Simulation"
- **Optimizing Portfolios with Specific Risk Constraints**
  - Optimize specific allocations inside a portfolio to minimize risk based on a particular return goal.
  - Use tools I have experience in, such as Mean-Variance Optimization and shape Ratio, or simply apply specific constraints where needed.
  - Explore how impactful and practical it is to apply constraints based on the desired result instead of a less "protective" form of risk management.
- **Simple Stress Test**
  - Put a portfolio through simulated market extremes and hypothetical scenarios.
  - Simulate market shocks, significant drops in major stock prices, and interest rate spikes, and observe.
  - Potentially come up with custom stress test scenarios that could be re-applied as a benchmark for risk, performance, and prevention.
- **Credit Risk Modeling**
  - Calculate the probability of default (PD) for a company or group of companies and calculate potential losses.
  - Use common practice models like, Logistic Regression, Z-score, or Mertons Model to look at credit risk.
  - Potentially compare credit risk across regions, or include more specific macroeconomic factors to enhance the accuracy of the model.
- **Hedging Strategies**
  - Create my "own" hedging strategies aimed towards mitigating risk in a portfolio.
  - Take advantage of derivative tools like options or futures to play against specific risks, like interest rate or currency risk.
  - Compare the strategies and optimize from there for the minimum risk possible.
- **Liquidity Risk Assessment**
  - Evaluate the potential liquidity risks there could be with specific portfolios.

- Calculate liquidity-adjusted risk measures or simulate the impact of large trades on market prices.
- Look at the various effects of “liquidity shocks” on different asset classes or compare the liquidity risk between portfolios.