1. Data Extraction
   1. Available cryptocurrency price dataset from API (Around 44 cryptocurrencies)
2. Data Transformation
   1. Transform price into daily percentage return
3. Load Data
   1. Import the dataset into the local database or save as csv files
4. Volatility Correlation Matrix (To avoid investing on highly correlated cryptocurrencies)
   1. Calculate the correlation matrix across cryptocurrencies using daily returns(volatilities)
   2. Visualise the correlation matrix
5. Value at Risk
   1. Calculate tomorrow’s 95% 1-day VaR across all the cryptocurrencies (Use the worst 5% scenario of average return with the same weight on each cryptocurrency in the past 300 days)
   2. Use the 200 days prior to the training dataset to do backtesting. The validation metric (accuracy) will be how many days that the calculated VaR exceeds the return (Lose more than expectation). If the percentage is greater than 5% (Breaks our 95% confidence), we can say that the risk is underestimated.
6. K-means clustering (See if we can improve the VaR prediction with clustering, generate cluster specific trading strategies, or adjust the VaR for each cluster)
   1. Dimensionality reduction: PCA or resample the time series data (change the time frequency).
   2. Instead of using Euclidean distance for the clustering, we are using the DTW (dynamic time wrapping) distance to handle the shape-based distance. We cluster the cryptocurrencies using their shape of daily return (changes or volatilities).
   3. Visualise the result of clustering
   4. Calculate the VaR of each cluster
   5. Use the 200 days prior to the training dataset to do backtesting on each cluster.
7. Compare the result between the VaR before clustering and after clustering
8. Generate trading strategies
   1. Avoid investing or invest less on the cluster with a bad VaR estimation (accuracy) and invest more on the better VaR estimation.
   2. Invest more on the better VaR and less on the worse VaR.
   3. Avoid investing on highly correlated cryptocurrencies.