# Viva

1. Introduction:
   1. What?
      1. Cryptocurrencies.
         1. Motivation – Reddit & forums followed by BTC & ETH whitepapers.
         2. Good. Jack Dorsey (Twitter CEO) Rule world by 2028.
         3. Bad. Elliot Management. Greatest scam in history.
         4. Irrelevancy.
   2. Why?
      1. Human imperfection:
         1. Emotions and biases.
         2. Fatigue and need to eat.
         3. Error.
   3. How?
      1. Market value constantly changing.
      2. Automate trading.
         1. Buy low sell high.
         2. Momentum.
      3. Desktop/laptop
         1. Java because X-platform
   4. Objectives:
      1. Automated trading.
      2. Removed human biases.
      3. Continuous.
      4. Remove human error.
      5. Automatic cash out.
      6. MoSCoW.
   5. Gathering data
      1. Cryptocurrency Exchange
         1. **G**lobal **D**igital **A**sset E**x**change – experience with parent company and Binance. They are faster.
      2. API get requests:
         1. 100 trades each.
         2. 4 per second.
         3. 4 currencies.
         4. Several unused fields – own regex parser to ignore.
   6. Data storage
      1. Oracle database.
         1. University supplied.
            1. Free.
            2. RDBMS.
            3. Experienced.
            4. Dependable.
         2. Quantity of data.
            1. 10,000 – 7 days of data

Persio did 3, 7 & 9.

7 and 9 most successful, not a lot of difference.

* + - * 1. Kept field sizes as small as reasonable.
    1. API
       1. Entity Framework.
          1. Essential but not core.
       2. Modifications.
       3. All essential – Gson.

1. Data collection:
   1. ScheduledExecutorService.
      1. Current.
      2. Historic.
         1. Gaps.
         2. Priority to current collection.
2. Collection complete:
   1. Merging.
   2. Growth calculation.
   3. Price prediction.
      1. Algorithms.
         1. Momentum
            1. https://latex.codecogs.com/gif.latex?%5Cfn_phv%20Growth%20%3D%20Price_%7Bn%7D%20-%20Price_%7Bn-1%7D
            2. https://latex.codecogs.com/gif.latex?%5Cfn_phv%20GrowthPercentage%20%3D%20%5Cfrac%7BGrowth%7D%7BPrice_%7Bn-1%7D%7D*100
      2. No outstanding algorithm.
   4. Benchmarking.
      1. Error.
      2. Profit from $100.
   5. User trading.
3. Without database:
   1. Same, longer start up.
   2. Application robustness.
4. JUnit – robustness.
5. JavaDoc – continuity if project expanded/sold.
6. User Testing.
7. Lessons / new skills
   1. Don’t underestimate live data collection.
   2. Automated trading profits are possible but also dependent on the market.
   3. Maven to handle dependencies.
   4. Refining problem solving skills.
8. Contributions
   1. Hybrid of available applications.
      1. Choose algorithm.
      2. From selection.
   2. Insight into relationship between recent and future value.
   3. Minimised negative aspects of volatility but able to benefit from growth.
9. Research into neural network
   1. LSTM or Convolutional architecture.
   2. Deeplearning4J.

# MoSCoW

Must have:

* The ability to collect live data from the GDAX API endpoint.
* The ability to make predictions of the next value based on the data collected with “**G**ood **O**ld-**F**ashioned **A**rtificial **I**ntelligence” predictions.
* The ability to collect historic data from the GDAX API to decrease the time required to collect enough data to make above predictions.
* The ability to store trading data so that minimal data collection is required at runtime.

Should have:

* The ability to detect gaps in held data and fill as follows:
  + Attempt to re-collect prices (in the event of a failed API call when storing data).
  + Fill with the average price of data either side of the gap.
* The ability to automatically trade based on predictions.
* The ability to make predictions of the next value based on the data collected with neural network predictions.
* The ability to display neural network accuracy;
  + And allow the user to manually retrain the neural network.

Could have:

* The ability to automatically retrain the neural network based on falling accuracy as training data becomes more historic.
* The ability to allow the user to input investment protection levels:
  + The ability to set single withdrawal of X when investment value reaches Y (i.e. withdraw initial investment when a large enough profit is made).
  + The ability to set regular withdrawals of X when investment value reaches Y (i.e. withdraw profit each time it reaches a large enough value).
  + The ability to halt trading if certain conditions are met (i.e. a loss threshold is reached within a certain time period);
    - Halting trading converts investment to base currency (USD).
    - The ability to set the base currency to another traded currency (i.e. the user’s “most trusted” cryptocurrency).

Would have:

* The ability to collect data from multiple sources and consider how accurate GDAX prices are.
* The ability to trade concurrently on multiple exchanges based on both likely growth and prices local to each exchange.
  + Due to the usual delay of cryptocurrency arriving at exchange wallets it would be unlikely that the system would swap value between exchanges. A value would need to be deposited into each exchange and traded based on global prices rather than the exchange’s price.

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# Preparation

1. Pull and test latest version on laptop