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Developing Automated Trading Systems

Bowei Wei
Worcester Polytechnic Institute

Essam R. Al-Mansouri
Worcester Polytechnic Institute

Isabella Sanchez
Worcester Polytechnic Institute

Thomas John Paolillo
Worcester Polytechnic Institute

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Trading and Investment: Developing Autotrading Systems

An Interactive Qualifying Project

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by

Tom Paolillo

Essam Al-Mansouri

Isabella Sanchez

Bowei Wei

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Report Submitted to:

Professor Hossein Hakim

Professor Michael Radzicki

Worcester Polytechnic Institute

Abstract

The purpose of this Interactive Qualifying Project was to design four independent trading systems that operate on different time frames and strategies. After all four systems were developed, they were combined into a system of systems, to which simulated money was allocated based on the quality of each system. The results of these systems will be presented and analyzed individually and together as a system of systems in this report, and the background information needed to understand the work completed in this project will be presented and explained.

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1. Introduction

Modern day trading and investing has grown and developed dramatically over the last few decades, especially with help from the invention and widespread use of the internet. The internet has provided a level of accessibility to the average person that had been previously confined to professional traders and investors. Nowadays any person with access to the internet can gain the knowledge to trade or invest in whatever they choose, be it stocks, bonds, currency trading, etc. and has the ability to obtain a more financially secure future for themselves.

The increase in non-professional traders and investors has greatly impacted advancements in trading software. Although manual trading is prevalent, there is now a wide variety of trading platforms and advancements in software that allow people to use and develop programmed trading strategies. In this manner, a trader can define rules for a trading strategy and test their strategy on historical data. This of course does not guarantee that the trading strategy will have the same results in the future but gives a somewhat realistic expectation of a strategy's performance.

This Interactive Qualifying Project details a basic understanding of trading and investing, with a particular emphasis on trading currencies in the Foreign Exchange Market (commonly referred to as Forex). The project outlines individual team member's early efforts in manual trading and further focus and development of sophisticated automated trading strategies, as well as our approach in creating a combined system of systems.

2. Background Information

2.1. Trading & Investing

Trading and investing are two distinct methods of profiting from the financial market.

Investors typically buy and hold stocks, mutual funds, bonds, and other assets over a long period of time, gradually amassing wealth. Investors will "ride out" fluctuations in the market with the expectation that their positions will improve in the long run. During this time, investors enjoy some unique benefits such as interest, dividends, and stock splits. The most commonly invested financial asset is equity, which consistently beats cash, bonds, and other mainstream investments except in bearish market years.[1]

Examples of Portfolio types:

- **Index Tracker Portfolios**: Set up to mirror the Dow Jones or S&P 500 index, they will be constructed to exactly follow movements in those indices.

- **High Dividend Portfolios**: Made up of stocks with above average dividend yields

- **Blue Chip Investment Portfolios**: Not limited as strictly as the tracker portfolios, but comprising only the largest and top rated stocks. [2]

Traders make profit in the short term, buying and selling much more frequently than investors. By entering and exiting trades within the volatility of the market rather than riding it out, traders attempt to generate greater returns than investors. Traders will attempt to buy low and sell high or sell high and buy to cover at a lower price. This allows traders to profit off of the market regardless of its direction, provided they predict its movement correctly. To lessen the risk of making a bad prediction, traders often use stop losses, a rule that exits a current position if a certain amount is lost. [1]

Examples of trading styles:

- **Position Trader**: Positions are held from months to years.

- **Swing Trader**: Look at a company's fundamentals when considering trades in a longer term than those mentioned below. Positions are held from days to weeks.

- **Day Trader**: Look to buy a stock at the low point of the day (or sell at the high) and close that position for a profit the same day. They aim to have no open positions overnight.

- **Scalp Trader**: Make dozens of trades every day and try to make a very small profit on each. They will also close the position quickly if it goes the wrong way in order to limit losses. [2]

2.2. Order Types

There are numerous types of orders that can be used for trading. It should first be noted that a long trade refers to a trade in which you buy the base currency with the expectation that you will profit from its rise in value and a short trade refers to a trade in which you sell the base currency with the expectation that you will profit from its decline in value. Short and long trades/positions will be commonly used later on in this report. The following order types defined are common order types that are used in this report. A Market Order is a trade order which buys or sells at the best current market price. A Limit Entry Order is an order that either buys below the market or sells above the market at a certain price. A Stop Entry Order is an order that buys above the market or sells below the market at a certain price. A Stop-Loss Order is an order that prevents additional losses if the price goes against you and is set at a price that you would not be willing to risk any more money. A Trailing Stop Order is a type of Stop-Loss Order that moves with the price as it changes, by a certain percentage or a specific amount of rise or fall in price. [3]

2.3. Manual Trading vs. Automated Trading

Manual trading is trading that involves human decision-making for entering and exiting trades. With the help of indicators, the manual trader still make their decision by their own. The advantage of manual trading is being able to take fundamental and sentiment analysis into consideration unlike a trading program that can't truly understand news articles and predict its consequences on the market. This method requires that people stand by the computer 24/7 which makes it a disadvantage. So, that way, a lot of opportunities for investing or exiting the market are missed.

Different from manual trading, automated trading is trading that depends on the data coming from indicators. Since the code can only follow the rules, the automated strategy will just focus on the fluctuation on the graph. In the manual trading, the decision is depended on the trader. While the automated trading needs to receive the information that already comes from the market. So the automated trading is delayed at the very first. But since the code can be ran 24-7, catching and reacting to the sudden increments are quite easy for the automated strategy.

2.4. Brokers & Leverage

Brokers refers to firms that provide traders with the ability to buy and sell assets, like stocks or currencies, in the market. In exchange for their service, they usually charge a small commission per trade or charge different prices for buying or selling, or both. For example, a broker offers a trader both the option to buy a stock at 1.5$ per share (the ask price), and the option to sell it at 1.4$ per share (the bid price), profiting from the difference of bid and ask prices (the spread).

Different brokers offer different leverage ratios. Leveraged accounts enables a trader to control large amounts of money using only a fraction as a deposit. For example, trading with a leverage of 50:1, an investor that is trying to buy 100,000 shares of the currency pair USDJPY only needs a deposit of $2,000 instead of the full $100,000 if they had been trading with no leverage.

Leverage also has its risks, of course. If the price moves against the trader, they may find their account's balance quickly depleted. For example, let's compare two hypothetical investors, Investor A and Investor B, both of them start with an initial balance of $1000 and place nearly identical trades, except, Investor B trades with a leverage of 50:1, while Investor A trades with no leverage (i.e 1:1). In a scenario where Investor A loses $10 in a trade (1% of initial investment), Investor B would actually lose $500 (50% of initial investment).

2.5. Software (MT4 and TradeStation)

MT4 and TradeStation are software trading platforms for traders. Because our goal is to have an automated trading strategy, we considered both software for this project. However, we ultimately decided to solely use TradeStation for a few reasons.

Despite TradeStation locking us down to only a single broker, while almost all brokers support MT4 and MT5, TradeStation did not require expensive or inaccurate third party software for historical data, it also had an easier scripting environment for most members of our group (even though less

capable), a more informative analysis of a strategy's performance results, and it would allow us to solve TradeStation software related problems with other teams and our advisors.

If the need arises to switch brokers or if we face crippling software limitations, the strategies can then be reprogrammed for MQL to run on MT4 or MT5 systems.

2.6. Asset Classes

2.6.1. Currencies

Trading currencies takes place in the largest financial market in the world, the foreign exchange (Forex) market. Trading currencies can be a little unintuitive and confusing at first, considering that money is traded for money instead of a physical product. [4]

One way to think about currency trading is to imagine each country as a company, and their currency as shares in the company stock. However, unlike stock trading, a currency is traded in pairs, and the value of the "shares" or currency you buy (base currency) is determined relative to a different currency that you sell (quote currency).

For example, if I bought (i.e. went long) 100,000 shares of the pair USD/JPY and the exchange rate, at the time, for a single dollar was 1.7 japanese yen. That simply means I bought 100,000 U.S dollars for 170,000 JPY. In other words, I bought the base currency (USD) and sold the quote currency (JPY).

If the economy of U.S becomes stronger relative to the Japanese economy (for example, the price of a single dollar becomes 2.5 JPY), I am able to sell the 100,000 U.S dollars I previously bought, for a sum of Japanese yen larger than my initial investment (In this example, I would end up with 80,000 JPY profit).

In another scenario, I sell (i.e short) shares of the pair USD/JPY. That would simply mean I sold U.S dollars for JPY. In other words, I sold the base currency (USD) and bought the quote currency (JPY). I only profit if the currency I bought becomes stronger relative to the one I sold. In this example, I am

betting the Japanese economy gets stronger as the U.S economy gets weaker. [5]

2.6.2. Stocks

A stock is a share in the ownership of a company. It represents the part of ownership in a company's profit and the assets; in other words, everyone who holds the stock of a company is a partial owner of the company. Although, being a stockholder of a company grants partial ownership, only holders who own a high percentage of stock can vote for the future of and heavily influence the company. The more shares someone has, the more effective their influence is.

The reasons people invest stock are the dividends and the change of the total value of the company. The dividends is the shared profit from companies with their owners. And the change of the total value of the company is directly related to the stock price. So when people realize the potential of the company, they enter the market by buying the stocks and wait for the best time to sell this ownership after the progress of the company with a high price.

2.6.3. Bonds

A bond is a debt investment in which an investor loans money to an entity (typically corporate of governmental) which borrows the funds for a defined period of time at a variable or fixed interest rate. Bonds are used by entities to fund projects, maintain ongoing operations, or refinance other existing debts. This deal is made with the implication that the entity's return will outweigh the original loan and accumulated interest, making both parties profitable in the long term. The time at which the issuer must return the loan funds to the holder is known as the maturity date. The interest rate the holder earns is known as the coupon. [6]

2.6.4. Options

An option is a financial derivative that represents a contract sold by one party (option writer) to another party (option holder). The buyer in this contract has the option to buy (call) or sell (put) a security or other financial asset at an agreed-upon price (the strike price) up to or during a certain date (exercise date). A buyer would want to buy a call option if they predicted a certain price to increase, whereas they would buy a put option if they predicted a certain price to decrease. Because the buyer has the option, but not the obligation, to fulfill their put or call options, there obviously has to be a drawback, otherwise, what reason would there be for someone to sell an option? This drawback is the cost of the option the buyer pays to the seller. The contract requires the buyer to invest a sum of money usually derived from how risky/safe the option is. This investment is what incentivizes the sellers of options; they essentially bet that the buyer won't profit enough from the option to offset the cost of the option. [7]

2.6.5. Mutual Funds

A mutual fund is a type of Investment Company that pools money from a variety of investors to invest in securities such as stocks, bonds, futures, options, etc. This can prove to be quite beneficial considering that mutual funds are usually professionally managed, have diverse portfolios of securities, and maintain particular investment objectives in order to be successful in producing capital gain for the investor. [8]

2.7. Market Conditions

2.7.1. Volatile

Volatile Markets are characterized by sharp, unpredictable increases and decreases in price. It cannot be determined if the market's overall trend is moving upwards or downwards because the movement is too unpredictable. Volatility is mainly a varying characteristic that affects all markets at different times, often shortly following a single extreme change. Certain strategies try to take advantage

of this market condition, trading with high risk as a lot of money could be won or lost in a short period of time. However, many strategies try to avoid trading in volatile markets to prevent additional risk. [9]
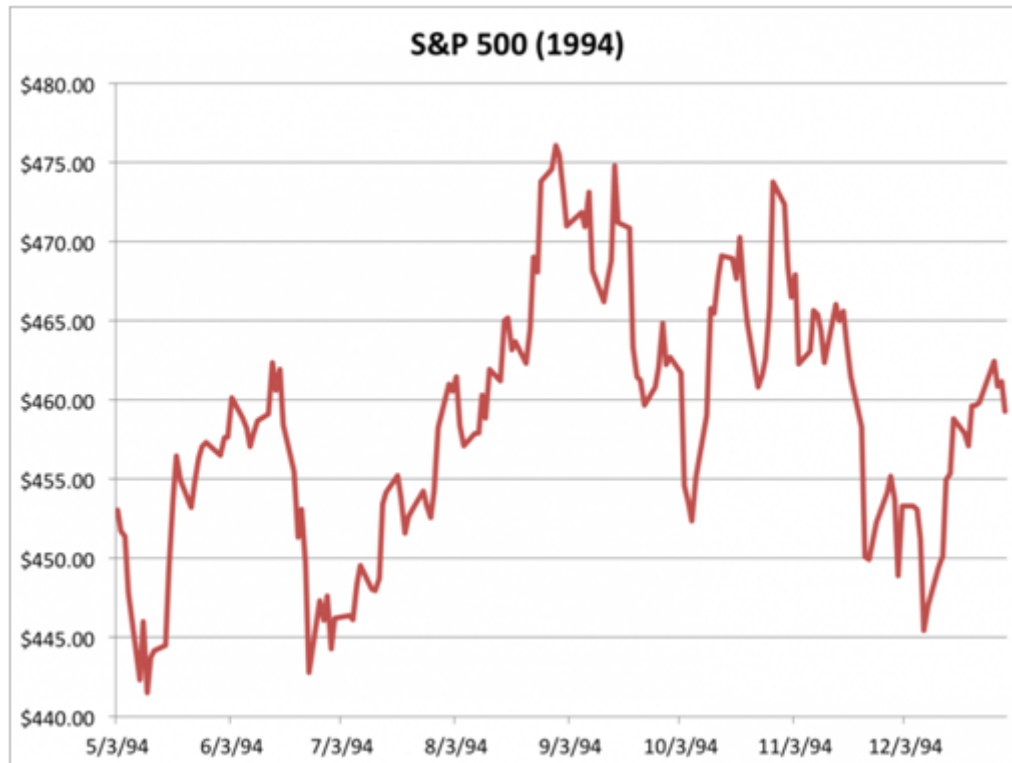
Figure 1: Example of a Voltile Market [10]

2.7.2. Trending

A trending market is a market in which price is generally moving in a particular direction over time. Trends tend to be illustrated as uptrends (bullish) and downtrends (bearish), where a bullish market trend generally displays a period of rising prices and a bearish market trend generally displays a period of falling prices. There are a variety of indicators that can help determine whether a market is trending, such as Average Directional Index (ADX), Moving Averages, and Bollinger Bands, all of which will be defined in sections to come. [11]

Figure 2: Trending Market [12]

2.8. Trading Tools & Indicators

2.8.1. Support & Resistance

Support and resistance are general areas that attempt to contain a graph's recent activity. The support area is the area at which the graph rarely if ever goes beneath. This is used to predict when a trend will turn around; following the logic that if it never crossed below the support before, it's less likely to cross now. The resistance area is the area at which the graph rarely if ever goes above. This can be used to make the same predictions as the support line, going in the opposite direction. While these indicators attempt to contain recent graph trends, trends can easily change, adding risk in trusting this method of prediction. When a graph does cross and continue increasing above the resistance or decreasing below the support, it is called a breakout. Once a breakout occurs, the graph tends to settle at a new range and new support and resistance areas are constantly recalculated and redrawn to best represent the graph's containment. [13]
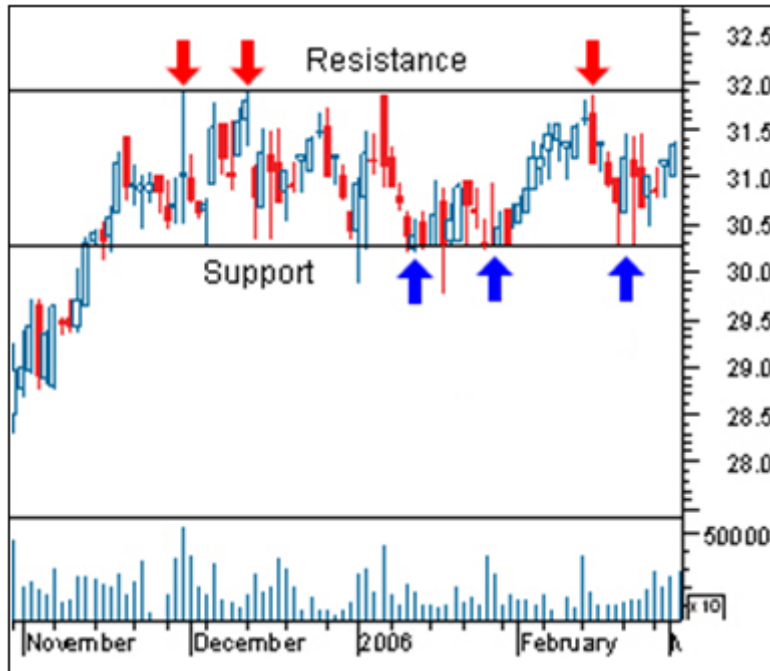
Figure 3: Example of Resistance and Support [13]

Support and resistance lines won't always show a horizontal containment. They can be used in trending markets to show the direction of the graphs while still containing the high and low points of the graph on a slant.

Figure 4: Trend Lines [14]

2.8.2. Bollinger Bands

Bollinger Bands are a technical tool used to show market trends and more specifically as an estimate for support and resistance areas. Bollinger Bands are trend lines that are created by calculating a moving average and standard deviation over a certain number of bars and then moving some number of standard deviations away from the average. The typical default for Bollinger Bands is 2 standard deviations below the average to represent the support and 2 standard deviations above the average to represent the resistance. Because they are based on a moving average, this representation of support and resistance is dynamic and able to represent a constantly changing market with reasonable accuracy. This accuracy can increase or decrease by varying the number of bars the moving average is based on, this comes with the tradeoff of worse ability to predict future trends. [15]

2.8.3. Fibonacci Lines

Fibonacci retracement lines are levels that use the ratios found in the Fibonacci sequence in order to identify potential support and resistance levels as well as reversal patterns. To apply Fibonacci retracement lines, it is first necessary to find the previous swing high (defined as a candlestick with at least two lower highs on both the left and the right of itself) and swing low (defined as a candlestick with at least two higher lows on both the left and the right of itself), and apply the tool to your chart according to the trend. In the case of a downtrend, you apply the Fibonacci retracement levels tool from the swing high to the swing low, and from the swing low to the swing high for uptrends. It is very beneficial to use Fibonacci retracement lines with other indicators and patterns such as other support and resistance lines, trend lines, and even Japanese Candlesticks in order to increase your chance at correctly predicting when reversals will occur or determining which lines might be the most reliable support or resistance levels to base your entry into the market. [16]
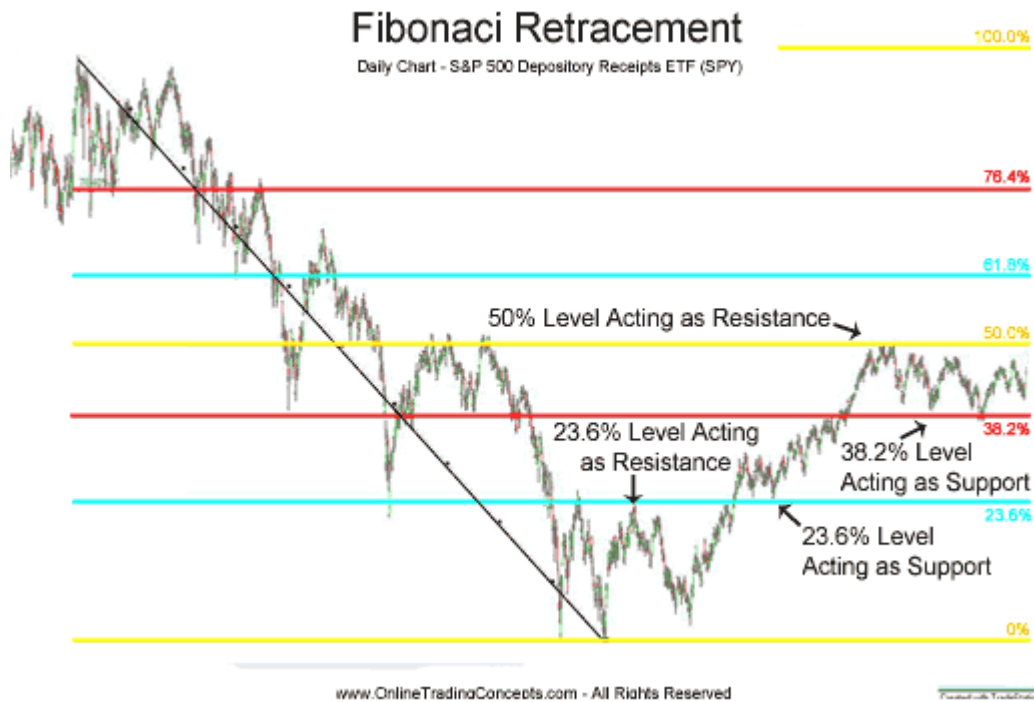
Figure 5: Fibonacci Retracement Levels [17]

2.8.4. Moving Averages

A moving average is a calculation mainly used in statistics to analyze a series of data points. The calculation is simply the average of the last X data points in a series. As an example of one of it's applications, let's consider a scenario where a scientist measures the temperature every day at the same time and plots it as a blue line on a graph. At first, it looks jaggedy with no real trend, but after using a moving average (plotted as red line), you can start to see an upward trend suggesting that it's getting warmer.
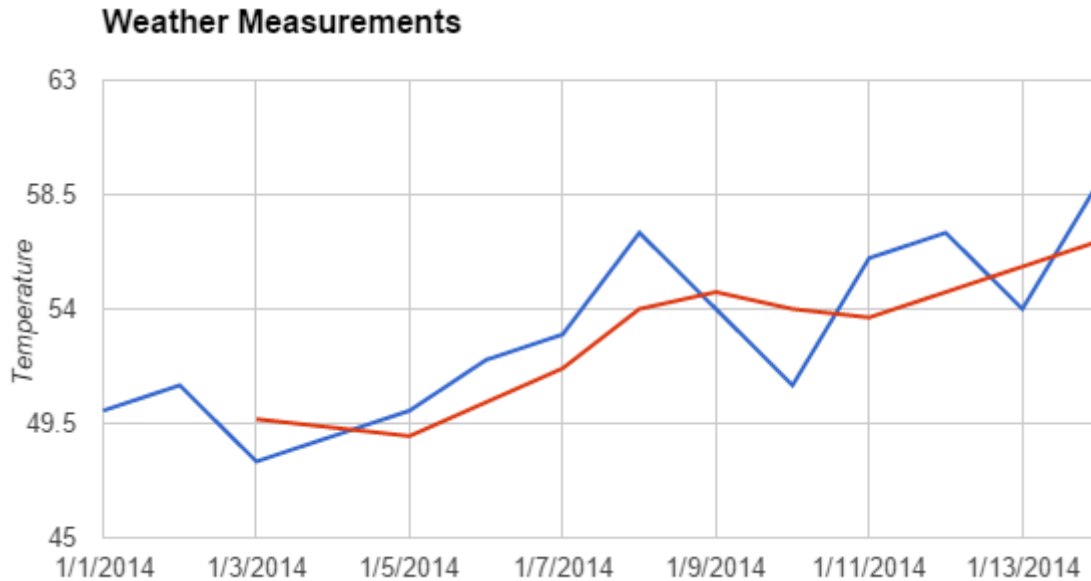
Figure 6: An example application of a moving average

This method can similarly be applied to prices during trading to help find trend patterns.

2.8.5. Average True Range

Developed by J. Welles Wilder, the Average True Range (ATR) is an indicator that measures volatility. Wilder started the concept with a term called True Range (TR) which is the max of the following rules:

Rule 1: Current High less the current low

Rule 2: Current High less the previous Close (absolute value)

Rule 3: Current Low less the previous Close (absolute value)

The important point is that the TR only focused on the distance between the two bars instead of direction. So all the TR is the absolute value of the result. Since true range and ATR are calculated by subtracting prices, the volatility they compute does not change when historical prices are back-adjusted by adding or subtracting a constant to every price.

The calculation of ATR has two steps: true range calculation and ATR calculation.

True range = max[(high-low), abs(high-close(prev), abs(low-close(prev)]

ATR= (TR1+TR2+...+TRn)/n

2.8.6. Stochastic Indicator

A stochastic indicator is an indicator used in trading to help identify if an asset class is overbought or oversold. If an asset is overbought, it is expected to fall in price, and go up in price if oversold. The indicator ranges from 0 to 100, higher numbers meaning overbought and lower numbers meaning oversold. A moving average can be used on the indicator to smooth it's results.

2.8.7. Relative Strength Index

RSI is a technical momentum indicator that compares the magnitude of recent gains to recent losses in an attempt to determine overbought and oversold conditions of an asset. The RSI has a range from 0 to 100. If the RSI is approaching 100, it indicated that the asset is overbought or overestimated, predicting that the prices are expected to fall. Likewise, if the RSI is approaching 0, then it indicates that the asset is oversold, predicting that the prices are expected to rise. [18]

2.8.8. Average Directional Index

Average Directional Movement Index (ADX) is the strength indicator for the moving average. This index is almost always used with the Minus Directional indicator (-DI) and the Plus Directional indicator. These three indicators represent a group of directional movement indicators which is designed by Welles Wilder.

There's some special characteristics about this indicator. The ADX is a one directional indicator which only shows the strength of the trending without consideration for trend direction.

Figure 7: ADX indicator

2.8.9. Keltner Channel

Keltner Channel is a technical analysis indicator showing a central moving average line plus channel lines at a distance above and below. The indicator is named after Chester W, Keltner (1909-1998) who described it in his 1960 book How to Make Money in Commodities. In his book, he called it the ten-day moving average trading rule. And the others developed the strategy with more options. Keltner Channel is used to signal price breakouts, show trend, and give overbought and oversold readings.

3. Trading System

3.1. Methodology of Developing a Trading System

3.1.1. Setup

Set-ups are sets of conditions that need to be satisfied before entering a position. They are used to makes sure the market is as favorable as possible before entering so that risk is minimized and/or profit is maximized. [19]

Examples of data that can be used as factors in designing set-ups:

• Time

• Price data from a higher time frame

• Fundamental data

• Volume data

• Open interest data

• Inter-market data

[20]

3.1.2. Trigger

A trigger is the final condition that is met to enter the market. A strategy must contain a trigger, otherwise there would be no way to ever enter the market. Multiple trigger could also be used to make different types of entries under different conditions, such as whether to go short or long. If there are any set-ups in a strategy, they must all be satisfied before the trigger condition can be met.

3.1.3. Entry

An entry is when a trader or investor opens any type of transaction in the financial market. The entry point at which this happens is usually determined by set-ups and triggers to minimize risk and maximum potential profit by evaluating recent trends and drawing on patterns.

3.1.4. Exit

An exit is when a trader or investor closes any type of transaction in the financial market. Exit points are used to minimize risk by stopping losses as early as possible and maximize profits by extending profitable positions as long as possible.

3.1.5. Position Sizing

Position size refers to the dollar value that is being invested into a trade. It is crucial to take into consideration your account size and risk tolerance when determining what position size you determine is appropriate to take for a trade. It is important to settle on a logical level to place a stop for your trade in order for you to be able to stop your losses if the price goes against your favor but also place it far enough from your entry price that it would not be disturbed by normal market movement. As previously mentioned, account size is another critical component to consider when deciding what position size to take for a trade. You must determine the dollar amount or percentage of your account that you are willing to risk, along with a reasonably placed stop in order to then calculate your optimal position size. [20]

3.1.6. Time Interval

Comparing a 30 minute chart to a 4 hour chart, one can quickly see that the bars are probably bigger, a trend is perhaps stronger, the support and resistance lines to consider are different, moving

averages don't react as fast, opportunities for trades are less frequent, and the the prices aren't as volatile.

These are only a few of the differences between two charts running on different time intervals.

Most automated strategies and manual traders use chart patterns to trade. A strategy that trades based on a

15 bar moving average in a 30 minute time frame, for example, would most likely perform very

differently trading in a daily chart. It's very important to know what time interval is appropriate for any

given strategy.

3.1.7. Money Management

Money management is a process encompassing handling investments, budgeting, banking

and handling taxes. Since the size of an investment is directly related proportionally to the

potential loss and profit, it is definitely one of the most important elements in forex trading as

well as trading the financial market in general. A larger position size will naturally yield higher

profit but also pose greater risk.

An effective money management system needs the investor to have a money plan

including the maximum allowed lose for each trade. In other words, the trader should only risk a

tolerable amount of their capital to ensure the they still retain enough to continue trading, even if

they suffer a streak of losses. So the money management is the part that limit the maximum loss

and profit.

3.2. Types of Trading Strategies

3.2.1. Breakout

Breakout strategies are strategies that are designed for volatile markets. A volatile market is

identified by unexpected unusually large price movements, resulting in long full bars (no or small tails

and heads).

Indicators or other signs of a volatile market are broken strong resistance and support lines, wide bollinger bands, a large gap between a slow and fast moving averages, gaps in the chart (bar opens far from the last bar's close).

3.2.2. Trend Following

Trend follow strategies work well during markets that are trending up or down with consistency over a longer period of time. A trending market is identified by a consistent upward or downward price movement with small short lived corrections and smooth moving average lines.

Trend following strategies usually have long periods of losses, followed by a big winning trade. For this reason, trend following strategies are always in the market, in an attempt to avoid missing big moves. Otherwise the trading system might not be able to survive the long periods of loss and significant drawdown. These strategies usually perform better on longer timeframes.

3.2.3. Support & Resistance

Support and resistance strategies are most profitable in directionless markets. During directionless markets, strong support and resistance lines are likely to develop and be tested multiple times, making these strategies much more likely to successfully predict a retracement which is key for optimal entry, stop loss, and take profit points levels.

Because of it's inherent weakness relying on retracements and directionless markets, these strategies usually miss all big moves or, even worse, place orders in the opposite direction resulting in an overall losing strategy.

3.3. Individual Strategies

3.3.1. Tom's Strategy

Introduction

Before I wrote any code in EasyLanguage to automate trading, I just traded manually to understand the basics of Tradestation. I would look for patterns in graphs where there was some resemblance to a sin curve and then try buying at one of the new low points in hopes that the pattern would continue. While the system at that time was obviously crude and not well thought-out, the underlying concept would be the basis for my final working strategy.

I developed several strategies and indicators while exploring possible ideas to gain an edge in the forex market. The first strategy that I tried was a simple moving averages crossover strategy. I used it as a starting point to expand off of while learning the basics rules of easylanguage. Even though it was a basic and very well known strategy, it performed fairly well, although the depreciating yen had a strong influence on its performance considering the USDJPY was on a steady rise when I tested this strategy.

Another strategy I experimented with was the Triple Bar Buy strategy. This strategy was also fairly simple, but was slightly more advanced considering it included a set-up. The strategy would look for consecutive bars that were either profitable or unprofitable. If there were three consecutive profitable bars, it would go long. If there were three consecutive unprofitable bars, it would go short. It would exit at the first bar that moved in the unfavorable direction of the trade. This allowed it to ride out winners if they rose quickly and quickly got out of losing positions after only 1 bar. This didn't allow for much leniency when it came to drawdown. Because it got

out so quick, the individual winning trades generally held much more weight than the individual losing ones, but the losing trade rate was so high that it offset this. The strategy performed well in some markets and very poorly in other; it was too unpredictable in general.

The final strategy I worked on went through several months of small changes and optimizations. The strategy used Bollinger Bands to estimate the support and resistance areas of a graph and would use them as entrance conditions. The strategy used a set-up condition that was satisfied when the price decreased close enough to the support or increased close enough to the resistance. The "close enough" metric was calculated by taking the difference between Bollinger Bands and multiplying it by a flat percentage. Using a percentage of the difference to calculate proximity to the support and resistance lines made sure the strategy had similar results regardless of how wide or skinny the Bollinger Bands were, because the metric would adjust proportionally. After the price reaches close enough to one of the bands and satisfies the set-up, it still has to activate the trigger to enter. The trigger is activated after one bar closes in a profitable direction. So if the price moved towards the resistance, the strategy would wait to see a bar close at a lower price before shorting; and the opposite would be true if the price moved towards the support. This prevents immediately entering the market when a breakout is possible. The fact that the trend is showing even minimal signs of turning around increases confidence that the trend won't breakout of the resistance or support areas. Once the strategy enters the market, there are only 2 possible exits. It creates a stop loss at 90 dollars and a profit target at 250 dollars. The exit now no longer uses the Bollinger Bands as an influence, but instead has set targets that it will always take as either a loss or profit. The small stop loss makes sure that the strategy avoids large losses while it lets profitable trades run up a to a higher amount. This means that because winning trades are weighted about 2.78 times more than losing ones, the strategy only needs to maintain a

profitable trade rate of 26.5% to be profitable overall. When this is combined with the trigger and set-up based on the Bollinger Bands, the strategy is consistently able to achieve a rate higher than this threshold.

I tested most of my strategies in the forex market with the 7 major currency pairs. Forex was more convenient because I could think of it as a simple ratio: when one currency is predicted to weaken or strengthen, its pairings would see similar or inverse change depending on the pair order. I prefered this dynamic more than the stock market, which more complex. The opening time of the market was also favorable for me. Forex being open all day better suited my strategy than the stock market's 9:30 AM to 4:00 PM window.

Parameters

The code and flowchart for the Bollinger Bands strategy can be found in appendices A1 and B1 respectively The following are the variables and parameter settings the strategy ran within:

Time Interval: 60 min

Position Size: 1 standard lot

Standard deviations up (Resistance) = 3

Standard deviations down (Support) = -1

Proximity Rate = 0.04 = 4%

Stop Loss = 90

Profit Target = 250

Bar length = 15

Optimization

My attempt for all my strategies was for them to be profitable across most if not all major currency pairs. I wanted to develop a strategy that performed decently in most market conditions rather than one that performed extremely well under constrained conditions. One of the issues that I ran into regarding this was that normal optimization methods would optimize for a specific chart, which could cause curve-fitting. Curve fitting would achieve the opposite of what I intended, it would optimize the strategy to perform best under the market conditions of one specific currency pair, but it wouldn't take into account its performance across the board with all currency pairs. To circumvent this, I would use Tradestation to optimize across all currency pairs and perform a manual optimization by taking a hybrid of optimized parameters and comparing results to achieve the highest average profit across all currency pairs. The final optimization used a more sophisticated automated optimization called walk-forward optimization. Due to the nature of this tool, I could only optimize for one currency pair, but the process functioned in a way that would minimize if not prevent curve-fitting. The currency pair I used for the optimization was AUDUSD because it was the most profitable of the 7 major pairs.

The inputs that I used in my final strategy changed quite a bit over the testing period, both from specific optimizations and changes I made to how the strategy fundamentally worked. The final settings resulted from the Tradestation walk-forward optimization tool, which considered a range of possibilities for the parameters mentioned above. Some results of the

optimization can be seen below. The cluster analysis is used to find the parameters that function across varying conditions. This is done to prevent curve fitting because it's unrealistic to assume market conditions will never change. Centering the parameters within a cluster of profitable outcomes shows that slight variations in conditions won't result in an unprofitable scenario. The strategy might not reach its maximum profit possible under the given conditions, but clustering will grant confidence that the strategy will perform similarly under somewhat similar conditions.
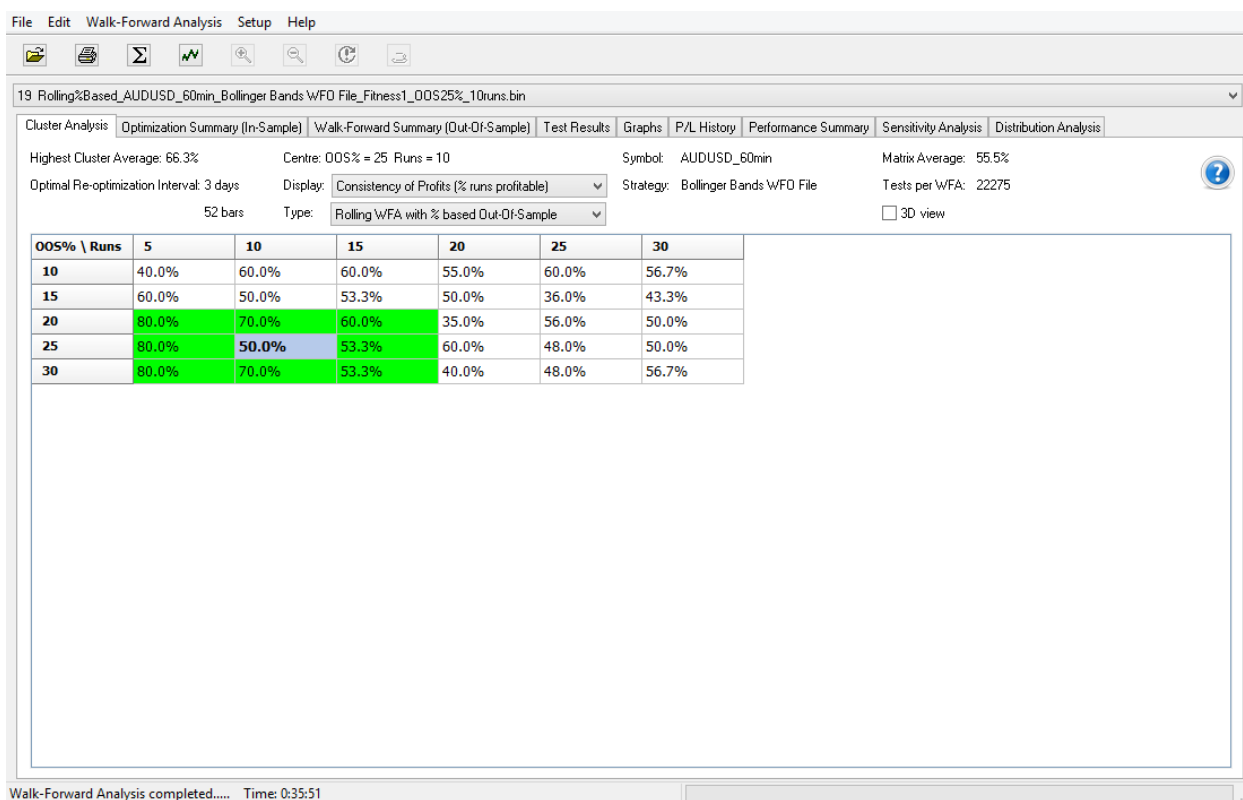
Figure 8: Results of Walkforward Analysis
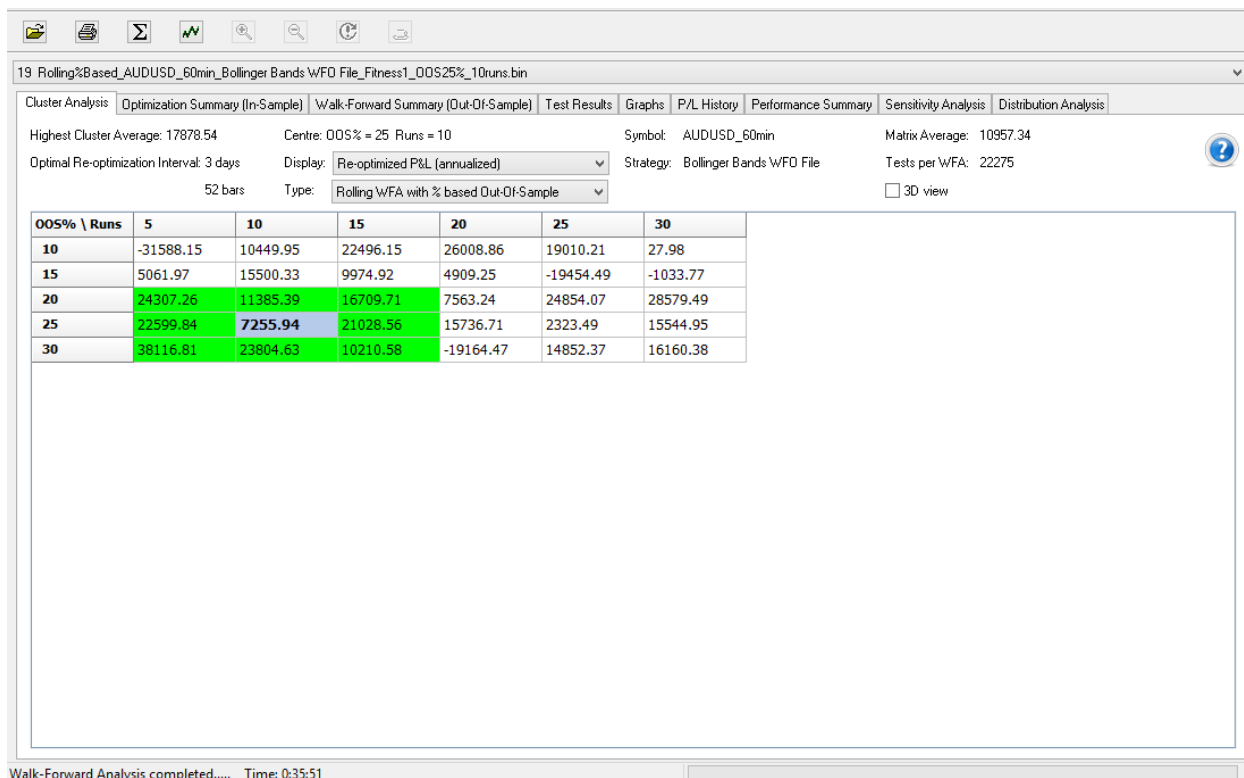
Figure 9: Results of Walkforward Analysis

Monte Carlo Analysis

The Monte Carlo was used as an analysis tool that took in a list of trades and relevant data and made predictions of the strategy's performance through extrapolation. The data given was a list of trades over roughly a 50 day period gathered from the performance data of my walk-forward optimized strategy. The Monte Carlo allowed us to runs assurance tests; for example putting all losing trades in a row to see if my capital could survive the worst possible outcome of my strategy. In other words, if I have 50 wins and 50 losses but the losses come first, will my total capital survive to let me continue trading to make the winning trades?

However, one of the most significant results from the tests was the confidence cone. Because the strategy had been optimized on past data, we can't be confident that it will perform similarly on live data. This test cuts the trade list in two parts. The left portion remains the same

while the right portion's data is dropped and new data extrapolated from the left portion takes its place. A confidence cone is then drawn from the intersection of the portions, showing whether the extrapolated data is reasonable or not. If the data fits within the cone, it can be said with 95% confidence that the strategy will perform live similarly to the results gathered through testing past data. The graph resulting from this process can be seen below:
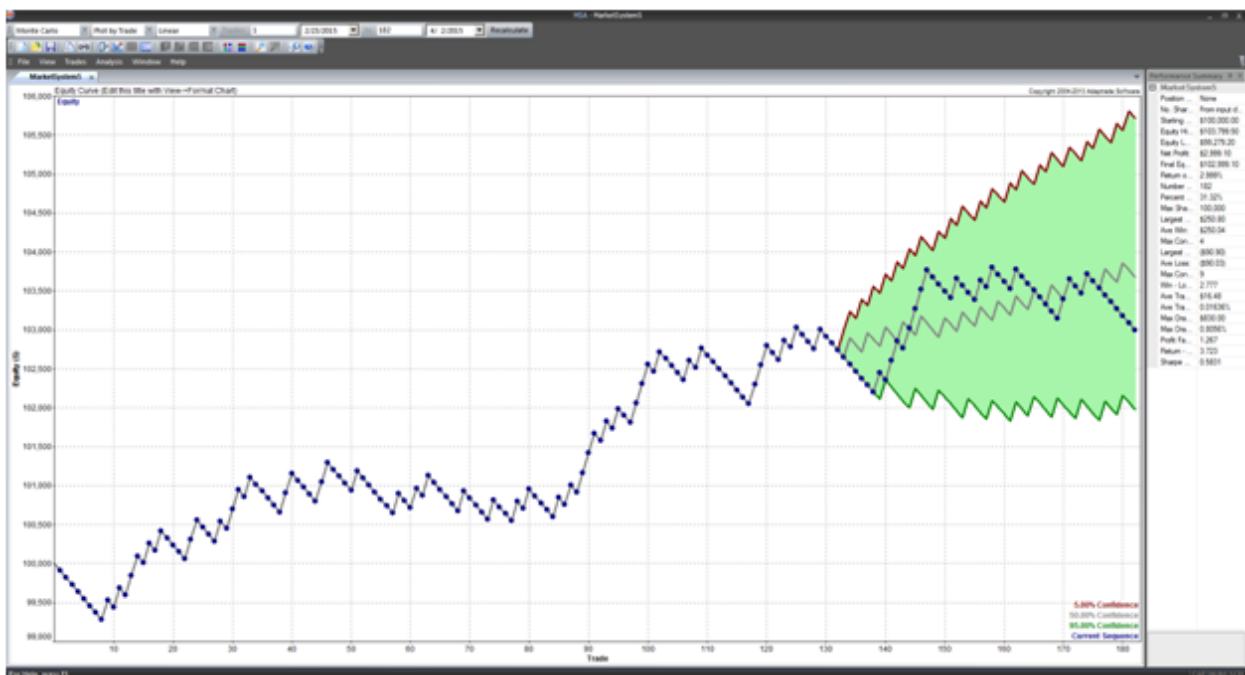
Figure 10: Results of Monte Carlo predictions

The final result from further optimization and extrapolation of the Monte Carlo resulted resulted in a $29,991 profit, equating to a return rate of 0.29991 keeping in mind that my starting capital was $100,000. The maximum drawdown experienced was 7.21%, which is fairly reasonable as we aimed to keep drawdown under 10% as a general rule of thumb.
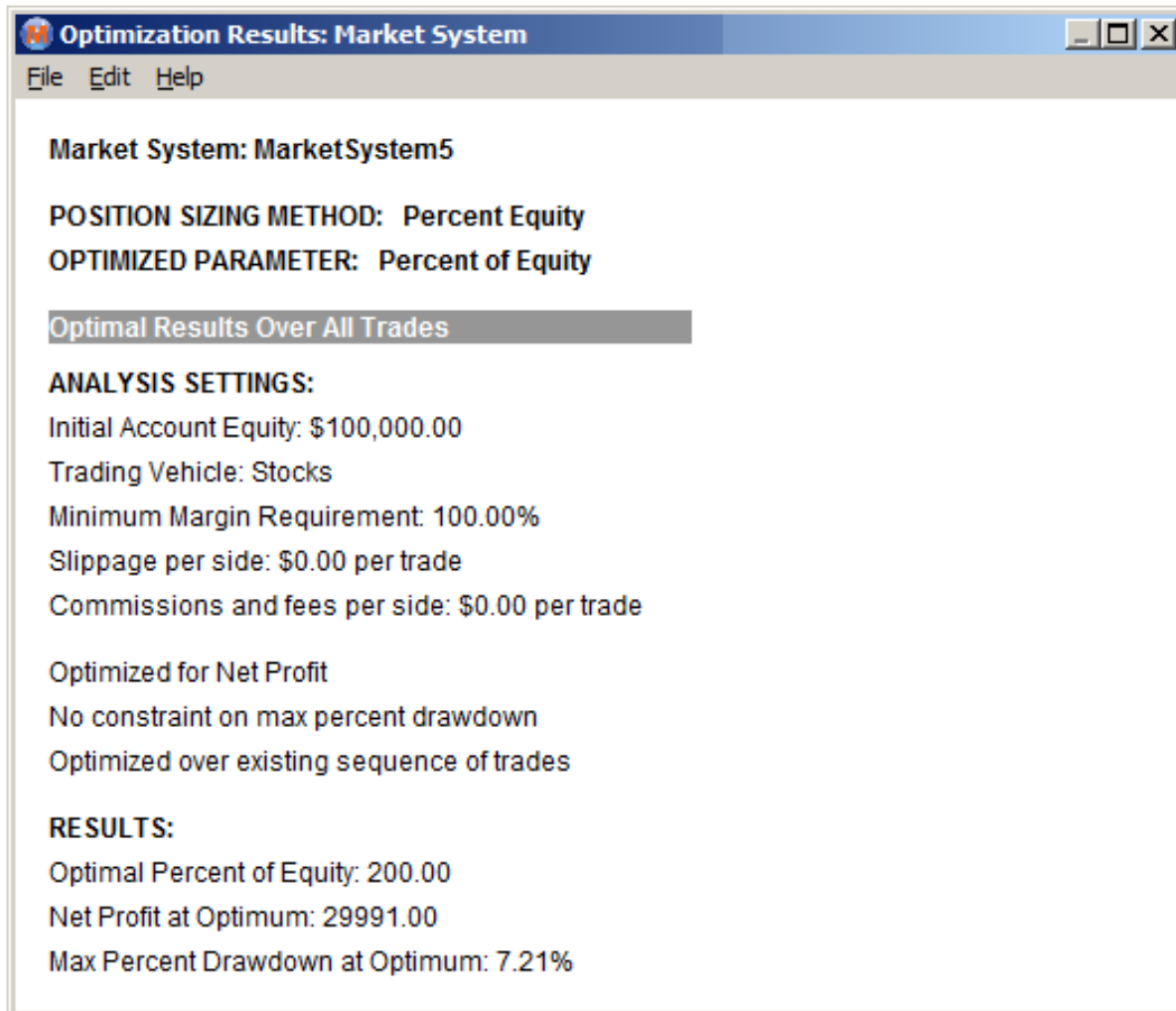
Figure 11: Monte Carlo optimization results

3.3.2. Bowei's Strategy

Methodology:

At the beginning of the project, my goal was to invent a trading system for the trending situation for the currencies like USDJPY, which keep up trending for the whole 2014. The main reason I choose to trade in trending is that the frequent fluctuation is too complicated for me to handle. The indicators need to be very accurate and sensitive in very small amount of time so that the strategy won't miss any point of entry. Precise judgement for the automated strategy in a very short amount of time needs to have a huge amount of tests to keep the high percentage of accuracy. Based on the current speed of process, it's far impossible to reach a qualified accuracy.

Currency Choice:

Determining which currency to should trade is an important process. Here's a brief description of the process we followed.

To maximize profits from the trending situation, the currency have to pass three tests: the frequency of being trendy, the liquidity for trading effectively and stability of the trending. Determining whether the currency passes these tests needs to analyze a large amount of previous data. In the seven most popular currency pairs: EURUSD USDJPY NZDUSD AUDUSD GBPUSD CHFUSD CADUSD, average directional index (ADX) seems to be the best way to seek for the trending market. However, ADX can only detect and evaluate a single trending situation. After the upgrade, the average ADX for the two year timeline include the weighted average based on the time fixed all the problems. The reason of choosing ADX is that unlike DMI, the ADX only shows the positive integer for both upward and downward trending, since both of them are counted in the strategy.

Strategy Choice:

At first, triple moving average strategy has been used as a good choice for beginners, which sets up a channel and trigger the buy or sell options if the crossover occurs. But after numerous experiments, the triple moving average shows its weakness. The channel is not updated sensitively enough. This shortness directly leads to a problem that it cannot detect and follow the trending situation very fast. So the triple moving average strategy was replaced by a whole new weighted moving average strategy. The weight of each data is depended on the time. The later data has more weight in the calculation so that the channel will be more sensitive to the sudden data change. Based on the 2015 less trendy USDJPY, the aim has changed into the smaller size trending situation. But in the small trending graph, more precise channel is required in order to catch each trends. Clearly, weighted moving average is not accurate enough. So the updated strategy was created to a weighted Keltner Channel strategy using weighted exponential average in calculation instead of the normal average. Based on the exponential moving average, the weighted Keltner channel was developed using a multiple of Wilder's average true range (ATR) for the bands to keep the channel more accurate and smaller comparing to the weighted moving average on the graph.

Introduction:

With the focus of trending profit, the trending strategies are the best choices for trading. Among the trending strategies, two strategies seem to be similar and effective, the Bollinger Band and Keltner Channel. Before examining the differences it is important to understand that these indicators are both used to gauge volatility. Buy and sell signals are generated by each indicator when the price of the underlying asset surpasses the upper or lower channel and crosses

back above or below the key channel level. For bulls, a move below the lower channel signals oversold conditions, and buy signals are generated when the price rises back above the lower channel. For the bears, sell signals are generated when the price move above the upper band and then closes back below. The only difference between these two strategies is that the channel created by Bollinger Band uses standard deviation, the channel of Keltner Channel is created by average true range. Since Keltner Channel used the average true rage instead of the standard deviation, the Keltner Channel has a narrower channel than the Bollinger Band does. As the graph showed, because of the narrower channel, the stock is more easily crossover the channel so that we may get more buy and sell signals than the Bollinger Band does. In the trending strategy, it is important to have more signals in order to confirm the signal. So that way, Keltner Channel was chosen instead of Bollinger Band as the key strategy in this situation.

Figure 12: Keltner Channel versus Bollinger Bands

Entry:

Entry is only if next bar hits the highest high of the last 3 bars for going long.

Entry is only if next bar hits the lowest low of the last 5 bars for going short. Based on the optimization, 5 bars seems to work better when going short.

Exit:

Exit has two options. When the bar crosses below the upper band, we exit the market. Or the loss reached 3000, the stop loss forced the trading stop.

The entry point is optimized by the walking forward analysis. The time frame for experiment is from 5 to 60. Because the weight is less than 1% for the oldest data grabbed from above the 60 minutes bar, any calculation taken from above this bar is meaningless. If the time frame is less than 5, the main channel is too unstable to predict the trends.

The bars waiting for entry and exit are optimized at the same time in the graph. Based on the optimized channel, the number of bars for entry is counted by the average number of bars that have exceed the channel in a single trend. This process classifies the percentage of profit by the number of bars exceeding the channel. In this way, the simple classification uses a high percentage of bars exceeding the channel to confirm trends. This makes it easy to measure the likelihood of producing a winning trade.

After the optimization, the process must settle the stop loss. If the stop loss is settled too low, it could interrupt ongoing trades and make a winning bid into a loss. If the stop loss is settled too high, it would never be used. As a result, the stop loss should only be used to stop extremely large losses.

The stop loss is determined based on the history of trades, which includes the simulations of the USDJPY & GBPUSD for last ten years. After collecting data from the history of trades, a 95 percent confidence interval is used to determine the stop loss, so it has little influence on most trades but still makes a restriction for the extremely large loss.

Results

   After using the upgraded long period ADX tests, the trend strength of the two year period

could be measured by data so that it's easy to identify which is the most trendy currency for

trades. And here's the performances of each currency pairs. [21]

ADX Value	Trend Strength
0-25	Absent or Weak Trend
25-50	Strong Trend
50-75	Very Strong Trend
75-100	Extremely Strong Trend

Currency	ADX Value (Rounded to integer)	Trend Strength
EURUSD	26	Strong Trend
USDJPY	54	Very Strong Trend
NZDUSD	23	Absent or Weak Trend
AUDUSD	25	Strong Trend
GBPUSD	45	Very Strong Trend
CHFUSD	18	Absent or Weak Trend
CADUSD	22	Absent or Weak Trend

According to the previous tests, USDJPY and GBPUSD seem to be the two best choices for trending trades.

Here's the result for optimization of the specific data required for strategy.

Number of bar exceed the channel in a single trade for entry	Number of times counted as uptrend	Percentage of winning
1	158	31.587%
2	348	32.945%
3	795	61.256%
4	657	59.374%
5 or more	214	63.842

According to the graph above, between the 2 and 3 bars, there's a sudden increment in percentage of winning. So the entry point is settled as waiting until 3 bars crossover the channel for uptrending.

Number of bar exceed the channel in a single trade for exit	Percentage of winning
1	32.979%
2	40.658%
3	51.599%
4	57.378%
5	59.245%
6	58.671%
7 or more	57.134%

From the data showed above, waiting for 5 bars to exit the market seem to be the best choices. And the stop loss is settled at 2570 based on the simulation of previous two years USDJPY and GBPUSD.

Walk Forward and Monte Carlo Analysis:

As shown below in figure, the Walk Forward Analysis for the final strategy trading GBPUSD was successful. In the total of 30 simulations, only five of them fail the test.

Cluster Analysis | Optimization Summary (In-Sample) | Walk-Forward Summary (Out-Of-Sample) | Test Results | Graphs | P/L History

Highest Cluster Average: 5908.47   Centre: OOS% = 15 Runs = 10   Symbol: GBPUSD_

Optimal Re-optimization Interval: 0 days   Display: Re-optimized P&L (annualized)   Strategy: New Test1

44 bars   Type: Anchored WFA with % based Out-Of-Sample

OOS% \ Runs	5	10	15	20	25	30
10	9,838.24	11,018.81	1,736.30	3,775.85	4,074.20	5,129.34
15	6,127.81	5,512.16	3,155.50	5,129.34	3,492.99	3,492.99
20	10,541.94	2,558.80	2,686.64	-916.39	3,244.36	-1,151.16
25	2,034.66	8,446.76	-1,217.06	4,437.60	-1,864.43	4,411.68
30	7,404.97	2,727.40	7,136.78	1,750.83	4,411.68	-37.11

Figure 13: Walk forward analysis for GBPUSD

The Monte Carlo Analysis for the GBPUSD trading, shown below, shows a 24.52% annual rate of return. The analysis shows that the probability of keeping 11.34% rate of return is 100%. The probability of high profit gets smaller and smaller since the risk increase. The probability of earning 17.69% in a year is still kept about 90%. Based on the expected value calculation, the total expected rate of return is around 18.44%. In another word, for the next year trading, the profit is about 18.44% which is a successful trading.
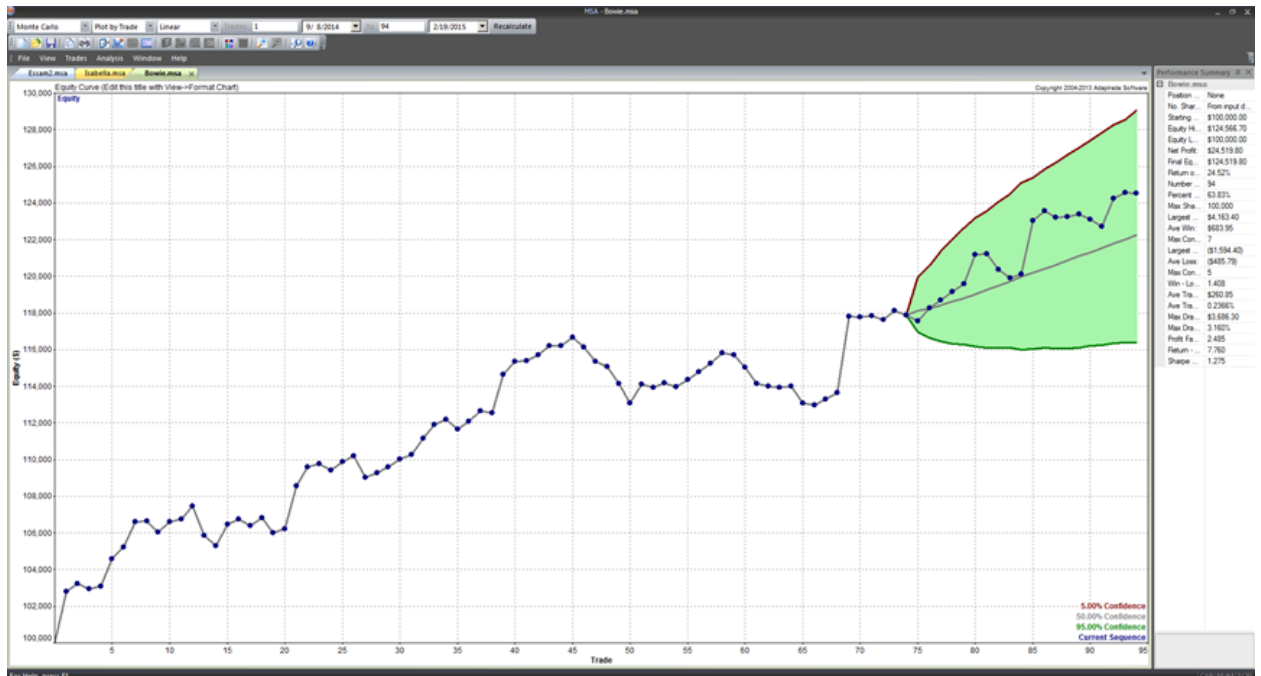
Figure 14: Monte carlo prediction
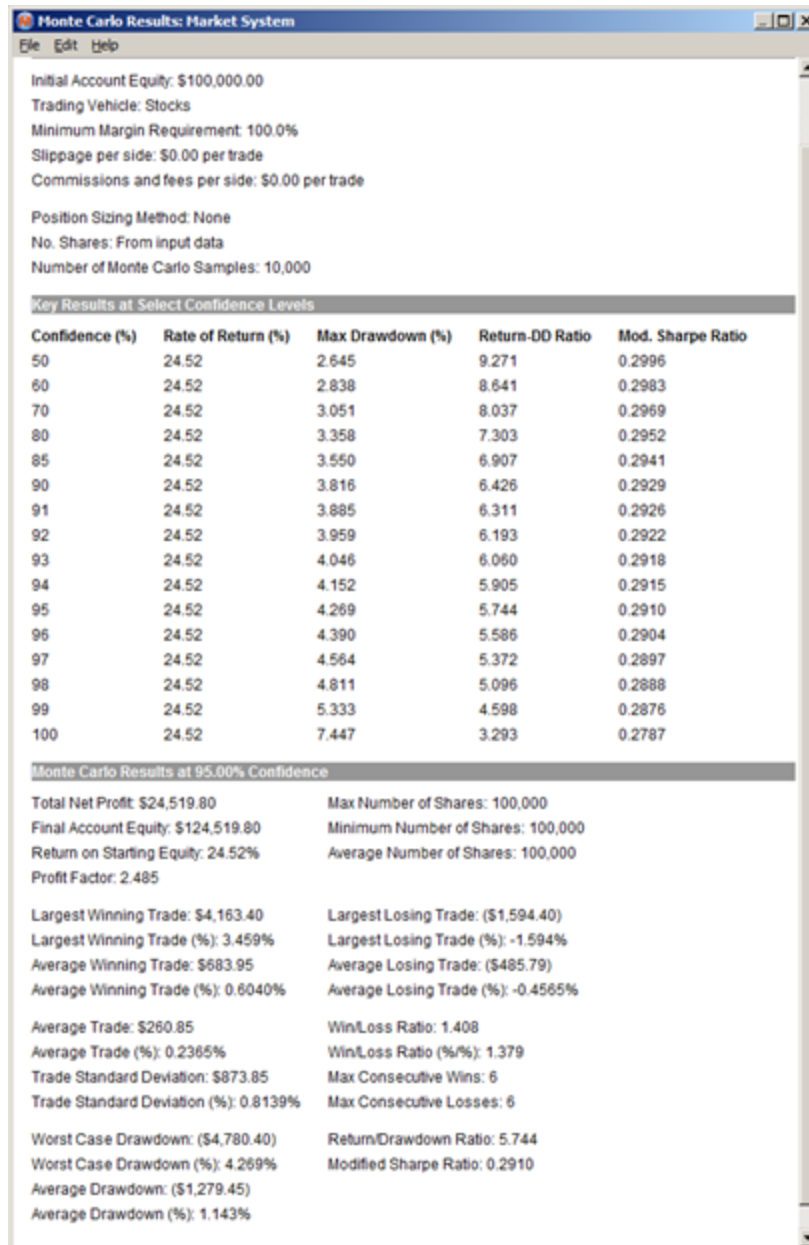
Figure 15: Monte carlo analysis

3.3.3. Isabella's Strategy

Introduction

Most of my early efforts in trading were focused on manual trading in the the Forex market through the electronic trading platform, TradeStation. I applied several of the chart patterns that I had learned such as wedge patterns, Japanese Candlestick patterns, Fibonacci Retracement Levels, and more in order to identify trends and reversals. Throughout the course of this project, I attempted to make one manual trade per week. This proved to be a great advantage because it required me to regularly keep informed of current news and the state of the economy and in turn gave me a better overall understanding of currency trading. These manual trades can be seen in Appendix D2.

My later efforts were focused primarily on automated trading and developing various trading strategies that fit certain conditions. One of my earliest strategies ended up being the strategy that I optimized and developed the most over the course of this project. However I did create a few other strategies in my attempts to create a variety of profitable and reliable strategies that might work under various different conditions.

One of the strategies that I created was done so with the intention of having it trade often. Although this was a simple concept for a strategy, I hoped to be able to create a strategy that I could trade in a trending market since I had already created a relatively sophisticated strategy that traded during breakouts, which will be discussed later on in this report. This strategy was based on swing highs and swing lows and traded GBPJPY on a 15 minute time frame.

For this Swing High/Swing Low strategy, I use the most recent swing highs and swing lows in the last 50 bars, where the swing high (SH) is defined as a bar that has highs higher than the neighboring 5 bars on the left and right and the swing low (SL) is defined as a bar that has lows lower than the neighboring 5 bars on the left and right. The basis of the strategy is that it

buys if the bar closest to a swing low and sells if the bar is closest to a swing high, while first closing any open trades before making a new trade. The code and flowchart for this strategy can be seen in the appendix. My goal was for the strategy to trade often, but it unfortunately only made profit with strict conditions that prevented most trades.

Another strategy that I developed kept the idea of using swing highs and swing lows. My goal for this strategy was to create a strategy that might perform well in a directionless market and again, one that traded more often and consistently than the other strategies I had developed. The strategy created a trend channel using two moving averages that used highs and lows instead of bar closing price. During its early testing it was not as profitable as the Swing High/Swing Low strategy mentioned above or my London Breakout strategy that I will discuss later on in the report. Despite this fact, during a 10 day period it made over 100 trades which was more than both of the other strategies during the same 10 day period. In my efforts to optimize this strategy, I experimented with different time frames, currency pairs, moving averages, ATR (Average True Range), and more. The final product after further development and optimization left me with a strategy that used the high and low of the last 10 bars to calculate two exponential moving averages that act as a trend channel. It traded GBPJPY on a 10 minute time frame. The general idea of how the Channel Trading strategy trades is that if the bar close breaks the upper exponential moving average, the strategy will sell with the expectation that the price will fall and stay within the trend channel, and if the bar close breaks the lower exponential moving average, the strategy will buy with the expectation that the price will rise and stay within the channel. Similar to the Swing High/Swing Low strategy, any open trades are closed before opening a new trade, thus the strategy does not have stop loss or take profit levels. The code and flowchart for this strategy can be seen in the appendix.

Although I was pleased with the results of this strategy, I ceased any further development after I noticed that another team member had a strategy that used Keltner Channels. At the time, I had never heard of and was unaware at how surprisingly similar Keltner Channels are to the Channel Trading strategy that I had created. Despite the fact that I was very interested in pursuing further development, due to time constrictions, I did not want to spend more time on a strategy that was too similar to that of another team member because we wanted our future combined system of systems to be diverse.

The main automated strategy that I dedicated my time towards developing and optimizing was my London Breakout strategy. This strategy was based on the idea in the London Breakout strategy that the high and low of the 4 hours prior to the start of the London Session are considered very strong support and resistance lines. The basic idea of the London Breakout strategy is that if the close price breaks either of the lines, you would expect it to continue in its direction with momentum. In addition to these basic aspects of the London Breakout strategy, I implemented a number of conditions that the program needed to meet in order to make a trade.

The following are the conditions that my London Breakout strategy follows:
- The weekly range must be higher than 30 pips but less than 80 pips to enter the market.
  - Where the weekly range is defined as the difference between the high and low of the 4 hours prior to the start of the London Session.
- The closing price must be higher than 4% of the weekly range above the weekly high but less than 15% of the weekly range above the weekly high to buy.
  - The strategy takes profit at the 138.2% Fibonacci Extension Level of the weekly range.

- ○ The strategy places a stop loss at the 61.2% Fibonacci Retracement Level of the weekly range, below the weekly high.
- The closing price must be lower than 4% of the weekly range below the weekly low but higher than 15% of the weekly range below the weekly low to sell.
  - ○ The strategy takes profit at the 38.2% Fibonacci Retracement Level of the weekly range,.
  - ○ The strategy places a stop loss at the 161.2% Fibonacci Extension Level of the weekly range.

This London Breakout strategy trades on GBPJPY under a 5 minute time frame. The code and the flowchart of the code can be seen in the appendix.

Specific percentages for most parameters were selected using a combination of walk forward optimization and what I personally felt comfortable with. The currency and time frame were selected after manual trial and error.

Figure 16: Visual presentation of the London Breakout strategy

Looking at Figure 16 above shows a good visual representation of how my automated strategy trades. The blue box displays the range of the 4 hour period before the London Session starts. The Fibonacci Retracement Levels which are used for the take profit and stop loss levels, are also displayed for the weekly range. As you can see, the closing price of the bar broke the weekly high as well as fit the condition of needing to be higher than 4% of the weekly range above the weekly high but below 15% of the weekly range above the weekly high. Thus, the strategy opens a long trade and hit the take profit level at the 138.2% extension line.

This strategy went through a number of adjustments before reaching its current and final form. Early on, I went through a great deal of trial and error to find which hours worked best to base the strategy on, the decision to implement Fibonacci Retracement Lines, and several of the other conditions that it currently follows. Once I had settled on the parameters that my strategy would have, I optimized and tested other aspects of the strategy. For example, I tested the the strategy under several different time frames before finding that smaller time frames worked best and finally deciding on using a 5 minute time frame. I also ran the strategy based on all three different session in the Forex market (Tokyo, London, and New York), trading GBPJPY when basing the strategy on the Tokyo and London sessions and USDJPY when basing the strategy on the New York session. When testing about a one month period, the strategy when based on the New York session surprisingly proved to be the most profitable, with the London session based being second most profitable and the Tokyo session based being the least profitable of the three. Although the New York session based was the most profitable for the tested period, I decided to continue basing my breakout strategy on the London session since I had already tested and optimized the strategy based around the London Session and had also tested it for a larger time period and found it to be relatively reliable. All of these processes can be seen in appendix D2.

The following figures show the Monte Carlo Analysis which analyzed a list of trades from my London Breakout system and produced the following figures.
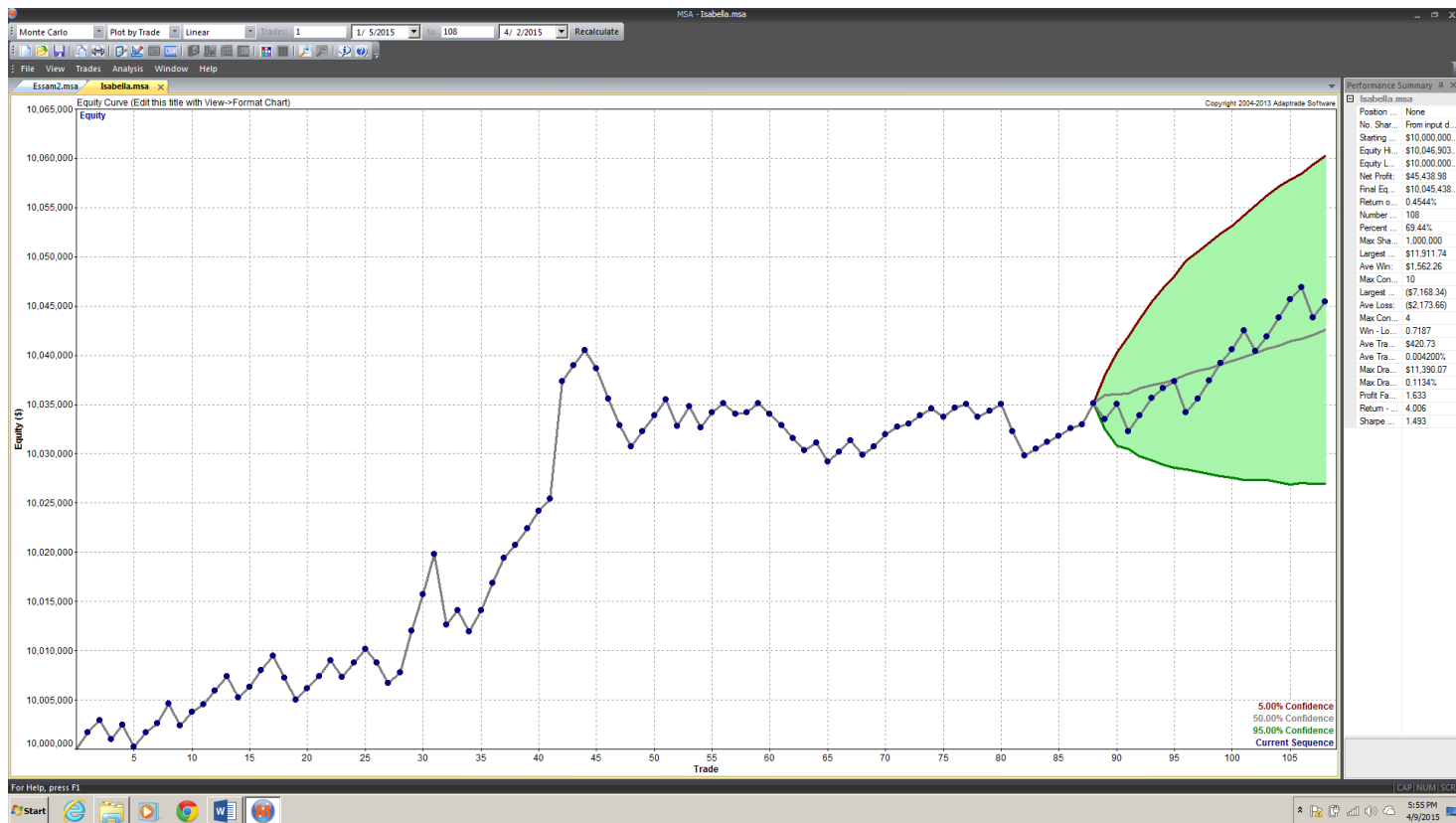
Figure 17: Monte carlo prediction

Optimization Results: Market System

File   Edit   Help

Market System: Isabella.msa

POSITION SIZING METHOD: Percent Equity
OPTIMIZED PARAMETER: Percent of Equity

Optimal Results Over All Trades

ANALYSIS SETTINGS:
Initial Account Equity: $20,000,000.00
Trading Vehicle: Stocks
Minimum Margin Requirement: 100.00%
Slippage per side: $0.00 per trade
Commissions and fees per side: $0.00 per trade

Optimized for Net Profit
No constraint on max percent drawdown
Optimized over existing sequence of trades

RESULTS:
Optimal Percent of Equity: 200.00
Net Profit at Optimum: 513026.77
Max Percent Drawdown at Optimum: 0.62%

Figure 18: Monte carlo analysis

3.3.4. Essam's Strategy

Introduction

In the development of my individual system you'll find that I spent most of my time focusing on developing automated trading strategies in the Forex market. More specifically, I focused on applying statistics or machine learning techniques in developing these strategies.

I actually did my fair share of successful manual trades based on some technical indicators and fundamental data, however, I find that trading manually is almost unscientific, uncalculated, and heavily influenced by underlying human behavior that even the trader is not aware of. I found myself reading a piece of news and then finding just the right technical indicators that confirms what I expect, instead of using the technical indicators to actually learn anything I didn't think I already know. And even more worrying, I found myself blaming any losses I had to bad luck, instead of my confirmation bias.

It became clear to me that manual trading is simply not compatible with my personality as a trader when I was writing a report detailing my reasoning behind a losing trade that I made earlier this week, and stumbled across an article about how all the projections and announcements pointed to the price moving in the direction it did instead of how I predicted. That article made perfect sense to me, then what was I thinking when I made the trade? The problem is that a lot of news can be interpreted in different ways, and no matter what direction the prices move in eventually, anyone can end up taking a second look and find reasons as to why that happened. It is not easy to understand fundamental data with a scientific approach. Even more difficult, is to test how a trader would have performed during previous years had you been trading based on news, economists projections or similar. It simply doesn't work. Even if a trader manages to simulate years of manual trading by simply trading based on historical

information, they most probably can't do it again, given the exact same data. I needed not a human mind, I needed a robot. How else can I truly develop a trading system based on an actual tested conditions/rules and be able to see exactly how each new idea would have performed and how it compares to others?

Why I Preferred Machine Learning

I knew this could mean I will be abandoning fundamental analysis and focusing on price action or technical analysis. This obviously came with its own set of challenges. Initially I was trying to create a neural network that can recognize known candlestick patterns or other patterns that I learned about on babypips.com. However, this would mean I need to go back into historical data and label the patterns for the neural network to learn to recognize. Sounds simple enough. Except, I found that I actually would need to first "define" it, which is not plausible, and the exact reason why I chose to use neural networks in the first place! This problem sounds very shallow on the surface but it really isn't. For example, let's assume for a second a programmer came across a book with pages full of what seems like random scribbling, lines and lines of connected chicken scratch that might not even mean anything. Now the programmer tries to create a program that would recognize the alphabetical letter A if it recognizes it in the scribbles. How would he go about doing that? First the programmer probably has to teach the program what is the letter A, so that it can begin to recognize it. This is where it goes from simple to really complicated. It has two long lines leaning on each other with a line connecting them around the middle. How long do the two lines have to be? How long does the line connecting them have to be? And how far up or far down should it be? How long do the lines have to be compared to each other? How wide must the letter be? What if the middle line just barely didn't

fully connect the two sides, is that still an A? What if the whole thing is slanted, is *that* still an A? And if yes, when does it stop being an A?

And this is normally solvable, by getting thousands of samples of the letter A from hundreds of people and thousands of samples of what isn't an A, and a program can be made to approximate to better recognize the letter. However, in the case of Forex charts, the charts are not deliberately drawn this way, there is no one purpose or intention, a single mind, even if the lines on the graph draws out similar patterns every now and then, where does the pattern start and where does it end? For example, how many bars going up in price and how many bars following going down in price does it require to constitute a swing high?

In situations like these, one can only approximate. Neural networks are great at approximating. In fact, neural networks are so good at reading handwritten letters or digits that it surpasses humans in accuracy [23]. In addition to a neural network's superhuman ability to read, neural networks has been shown to be able to predict the next plausible word in a phrase under that context, make entirely new sentences that are grammatically correct and context related, and group related words together simply by reading thousands of Wikipedia pages. [23]

The First Trading Strategy & How It Progressed

My first strategy was only a stepping stone. It did not implement machine learning techniques, at least not at first. It was as simple as can be. It quite literally just buys if a bar closed higher than it opened, and sells if it closed lower (i.e the strategy bought at green bars, sold at red bar). It sounds pointless to even try a system that simple, surprisingly, it made profit.

TradeStation Performance Summary Collapse ⌃

	All Trades	Long Trades	Short Trades
Total Net Profit	$242,738.18	$187,760.21	$54,977.96
Gross Profit	$822,492.24	$446,359.95	$376,132.29
Gross Loss	($579,754.07)	($258,599.74)	($321,154.33)
Profit Factor	1.42	1.73	1.17
Roll Over Credit	($5,291.24)	($357.58)	($4,933.67)
Open Position P/L	$2,747.86	$2,747.86	$0.00
Select Total Net Profit	$199,225.69	$144,247.73	$54,977.96
Select Gross Profit	$778,979.76	$402,847.47	$376,132.29
Select Gross Loss	($579,754.07)	($258,599.74)	($321,154.33)
Select Profit Factor	1.34	1.56	1.17
Adjusted Total Net Profit	$147,693.03	$119,117.21	($10,620.05)
Adjusted Gross Profit	$759,409.97	$399,045.89	$334,339.81
Adjusted Gross Loss	($611,716.94)	($279,928.69)	($344,959.87)
Adjusted Profit Factor	1.24	1.43	0.97
Total Number of Trades	500	237	263
Percent Profitable	34.00%	37.55%	30.80%
Winning Trades	170	89	81
Losing Trades	329	147	182
Even Trades	1	1	0
Avg. Trade Net Profit	$485.48	$792.24	$209.04
Avg. Winning Trade	$4,838.19	$5,015.28	$4,643.61
Avg. Losing Trade	($1,762.17)	($1,759.18)	($1,764.58)
Ratio Avg. Win:Avg. Loss	2.75	2.85	2.63
Largest Winning Trade	$23,092.49	$23,092.49	$15,845.44
Largest Losing Trade	($4,262.35)	($4,167.32)	($4,262.35)

Figure 19: Strategy performance results

The stop loss was placed 50 pips away from the entry level, and no fixed take profit level. Instead of a take profit level, a "goal" of 50 pips was selected, and the profit was only realized if prices begin to retrace. For example, if I am in a buy trade and a red bar forms (close below open), and I had already reached my goal of 50 pips, the trade is closed. However, if the bar closing prices continued in my favor, the goal is raised to 100 pips and the stop loss is moved closer, to avoid losing unrealized profits in case of a retracement. I programmed this strategy in both MT4 and EasyLanguage, as one of my early efforts in deciding between the two platforms. The code is available in the appendix.

I spent hours attempting to improve this strategy using crossover moving averages, or many of the other indicators, however, no truly impressive improvement was made until I went

back to applying machine learning techniques. Instead of having the system buy at green and sell at red with no other conditions, I tried to implement, what is called, a Neuron. The hope was it learns over time to adapt to market conditions, and decide if it should buy or sell a bit more intelligently. It took multiple different moving averages and average true range as input, and outputs a number between 0 and 1, which represents the Neuron's confidence in its decision. A number closer to 1 means it is confident we should buy, and a number closer to 0 means it is confident we should sell.

Implementing Machine Learning Techniques

The strategy performed well, beating the previous system's Return to Drawdown Ratio by a significant amount. However, major improvements needed to be made before I could implement a full neural network (a network of neurons, connected to each other), instead of simply one neuron.

Initially I tried to program a full neural network myself but that proved to be a daunting task. I started looking for already built libraries, and although I never found what I was looking for, I found acceptable alternatives that can be used until I have a finished specific neural network implementation. I decided to use MATLAB's built in Neural Network functions, with some improvements to the library which I talk about in the journal in more detail.

Unfortunately this also meant I had to find a way to communicate between MATLAB and TradeStation, and without any existing ways that I could find, I decided to use MT4 and TradeStation's DLL import method. I created a DLL in C++ that can use the MATLAB Neural Network, and then through TradeStation/MT4 I import the DLL and use its predefined functions to train and test the neural network. However, until this DLL could be finished, I have to use a

much slower testing method of importing text files with prices, then importing it in MATLAB, and simulate live trading while saving the neural network's predictions to a text file, which I then import in TradeStation to test how it would have performed. The code for the DLL in C++, MATLAB, MT4, and TradeStation are all in the Appendix.

After tweaking the neural network settings and making some changes to the MATLAB library, I finally had a working system that should perform well even in changing markets, with the highest Return to Drawdown Ratio of all the strategies that I've developed during this academic year.

Monte Carlo analysis! But where is the walk forward analysis?

Unfortunately training and testing a neural network even once can take a few hours. Walk forward analysis required training and testing it many times, too many for the software to run within a reasonable amount of time on my laptop.
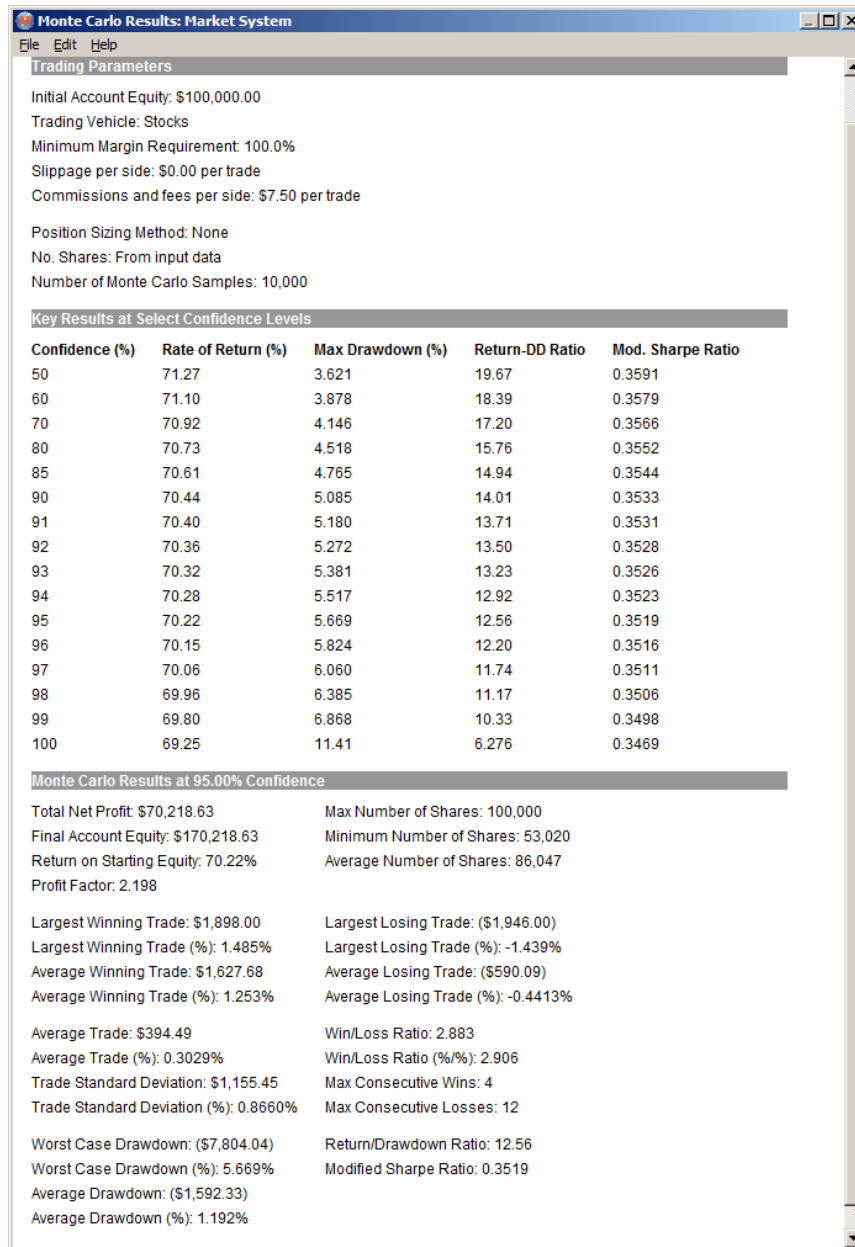
Figure 20: Monte carlo anaylsis

3.4. Combining Strategies

Each system is designed to run independently to the others so they can be run simultaneously. We experimented with combining set-ups, triggers, and entry/exit rules, but the resulting profits never exceeded the combined profits of the systems running individually. We attribute this to incompatible rules, too many rules causing the system to not trade often enough.

Because the systems have been optimized and tested individually, the conditions for their success aren't heavily related, meaning some may fall out of favor while others still have strong returns. Due to the dynamic nature of the financial market, we allocate funds dynamically to account for possible instability. We do this by using a system based on return/drawdown ratio as a representation of profit/risk.

The systems receive capital to invest in equal proportions to launch our system of systems. Every month, the return rate and maximum drawdown of each system is calculated. The capital is then redistributed in response to higher or lower rates of return and drawdowns in order to maximize profits for our more effective systems and minimize losses in our less effective systems. Capital is redistributed by changing position sizes, affecting how many standard lots are traded with each entry. The amount of capital invested is altered so that the drawdown of each strategy is between 5% and 10%. If the drawdown is above 10%, we offset that risk by reducing the amount of capital that system has access to. If the drawdown is below 5%, we increase the amount of capital that system has access to in order to increase profits while adding only negligible risk. While keeping the range of 5% to 10% drawdown in mind, we also have a rule that the sum of drawdown percentages should equal 30. This prevents everyone from having a drawdown percentage of 5 (low risk-low profit) or everyone from having a drawdown percentage of 10(high risk-high profit). The 30 sum rules makes sure there is a nice balance of the profit to risk tradeoff.

Below is a table of the return percentages, drawdown percentages, and return to drawdown rate of each system's Monte Carlo Analysis. These are used as the starting point as an example of how we would redistribute capital with respect to profit and risk.

	Return Percentage	Drawdown Percentage	Return to DD Ratio	Order Size
Essam's Strategy	71.2%	5.669%	12.56	100,000
Isabella's Strategy	45.434%	19.35%	2.348	100,000
Tom's Strategy	29.994%	7.21%	4.160	100,000
Bowei's Strategy	24.521%	4.269%	5.744	100,000

Note: Percentages are calculated assuming an initial balance of $100,000.

This second table shows the updated return percentages, drawdown percentages, and return to drawdown rates when controlled to minimize risk and maximize profits, containing drawdown between 5% and 10%. Essam and Bowei had the most profitable return to drawdown ratios, so they were given the most capital; enough to give them our maximum drawdown percentage, 10%. Isabella and Tom had lower return to drawdown rates, so their drawdown percentage was lessened to 5% by reducing their capital. In this case, there were 2 clear strategies that were more profitable than the other two, so the extreme of maximum 10% drawdowns (representing the risky but profitable) and minimum 5% drawdowns (representing safer but less profitable) was used. However, if at the end of the next month the return to drawdown rates were more similar, the drawdown percentages could all be reconfigured to the average of 7.5 for all strategies.

	Return Percentage	Drawdown Percentage	Return to DD Ratio	Order Size
Essam's Strategy	125.56%	10%	12.56	176,400
Isabella's Strategy	11.74%	5%	2.348	25,840
Tom's Strategy	20.8%	5%	4.160	69,350
Bowei's Strategy	57.44%	10%	5.744	234,250

Note: Percentages are calculated assuming an initial balance of $100,000.

4. Conclusion

The experience we've gained with the financial market for this Interactive Qualifying Project over the past academic year is invaluable to securing a successful financial future. Regardless if our majors or career expectations aren't related to the economic or financial market, having at least the basic understanding we've gained will set us a foot ahead of most other colleagues. The two of us being Computer Science majors have also gained more experience learning and applying a new coding language to tasks that are complex in theory and execution. Information about the asset classes, trending markets, the influence of news, and optimal portfolio and money management will benefit us by having realistic effects on how we handle our financial lives after leaving college.

5. Appendix

A. Easy Language Code

A1. Tom's Easy Language Code

Bollinger Band Strategy

```
// Name: Tom Paolillo - Bollinger Band Strategy
// Author: Tom Paolillo
Inputs:
            double BollingerPrice(Close),
            Length(15),
            double SDevsUp(3),
            double SDevsDown(-1),
            StopLoss(90),
            ProfitTarget(250),
            ProximitRate(0.04);

Variables:
            double Av(0), double SDev(0),
            double LowerBand(0),
            double UpperBand(0),
            double FixBollPrices(0),
            double Diff(0),
            Support_Met(false),
            Resistance_Met(false),
            Entrance_Price(0);

Av = AverageFC(BollingerPrice, Length);
SDev = StandardDev(BollingerPrice, Length, 1);
UpperBand = Av + SDevsUp * SDev;
LowerBand = Av + SDevsDown * SDev;
Diff = UpperBand - LowerBand;


If close <= LowerBand + (Diff * ProximitRate) then Begin
                        Support_Met = true;
            End;
If close >= UpperBand - (Diff * ProximitRate) then Begin
                        Resistance_Met = true;
            End;
If Support_Met and Marketposition(0) = 0 and close > Close of 1 bar ago then Begin
                        Buy("Long Entrance") next bar at market;
                        Support_Met = false;
                        Entrance_Price = close;
            End;
If Resistance_Met and Marketposition(0) = 0 and close < Close of 1 bar ago then
Begin
                    Sellshort("Short Entrance") next bar at market;
                    Resistance_Met = false;
                    Entrance_Price = close;
        End;
Setstopposition;
Setprofittarget(ProfitTarget);
Setstoploss(StopLoss);
```

Daily High & Low

```
//Name: Tom Paolillo - Daily High & Low
//Author: Tom Paolillo
variables:
Current_High(0),
Current_Low(0),
New_Day(true);

if dayofweek(date) = Monday or dayofweek(date) = Tuesday or dayofweek(date)
= Wednesday or dayofweek(date) = Thursday or dayofweek(date) = Friday then
    Begin
        if New_Day = true and time > 0000 then
                Begin
                        Current_High = close;
                        Current_Low = close;
                        New_Day = false;
                End;
        if New_Day = false then
                Begin
                        if close > Current_High then
                                Begin
                                        Current_High = close;
                                End;
                        if close < Current_Low then
                                Begin
                                        Current_Low = close;
                                End;

                        Plot1(Current_High, "High so far", green);
                        Plot2(Current_Low, "Low so far");
                End;
        if time > 2300 then
                Begin
                        New_Day = true;
                End;
    End;
```

Moving Averages Strategy

```
// Name: Tom Paolillo - Moving Averages Strategy
// Author: Tom Paolillo
Inputs:
    Ave_Length_1(10),
    Ave_Length_2(25),
    Number_Of_Shares(100000);
Variables:
Fast_Average(0),Slow_Average(0),Buy_Condition(false),Sell_Condition(false),L
ong_Position(false);

Fast_Average = XAverage(C, Ave_Length_1);
Slow_Average = XAverage(C, Ave_Length_2);

If Fast_Average < Slow_Average and Long_Position = false then
    Begin
        Buy_Condition = true;
    End;
If Slow_Average < Fast_Average and Long_Position then
    Begin
        Sell Condition = true;
    End;
If Buy_Condition then Begin
        Buy("Entrance Signal") Number_Of_Shares shares next bar at market;
        Buy_Condition = false;
        Long_Position = true;
    End;
If Sell_Condition then    Begin
        Sell("Exit Signal") Number_Of_Shares shares next bar at market;
        Sell_Condition = false;
        Long_Position = false;
    End;
```

Triple Bar Buy Strategy

```
// Name: Tom Paolillo - Triple Bar Buy Strategy
// Author: Tom Paolillo
Inputs:
Number_Of_Shares(100000);
If Close > Close of 1 bar ago and close of 1 bar ago > Close of 2 bars ago
and Marketposition(0) = 0 then
    Begin
        Buy("Entrance Signal") Number_Of_Shares shares next bar at market;
    End;



If Close < Close of 1 bar ago and Marketposition(0) <> 0 then
    Begin
        Sell("Exit Signal") next bar at market;
    End;
```

Best Time Of Day

```
//Name: Tom Paolillo - Best Time of Day
//Author: Tom Paolillo
variables:
Best_Hour(0),
Worst_Hour(0),
Best_Hour_Value(-10000),
Worst_Hour_Value(10000),
Current_Time(0),
Hour_Counter(0),
New_Day(true);

if dayofweek(date) <> Saturday and dayofweek(date) <> Sunday then
    Begin
        if New_Day = true and time > 0000 then
                Begin
                        Current_Time = 0;
                        Hour_Counter = 0;
                        Best_Hour = 0;
                        Worst_Hour = 0;
                        Best_Hour_Value = -10000;
                        Worst_Hour_Value = 10000;
                        New_Day = false;
                End;
        if New_Day = false then
                Begin
                        if close - open > Best_Hour_Value then
                                Begin
                                        Best_Hour_Value = close - open;
                                        Best_Hour = Hour_Counter;
                                End;
                        if close - open < Worst_Hour_Value then
                                Begin
                                        Worst_Hour_Value = close - open;
                                        Worst_Hour = Hour_Counter;
                                End;
                        if(time = Current_Time + 100) then
                        Begin
                                Hour_Counter = Hour_Counter + 1;
                        end;
                        Plot1(Best_Hour, "Best Time", green);
                        Plot2(Worst_Hour, "Worst Time");
                End;
        if time > 2300 then
                Begin
                        New_Day = true;
                End;
    End;
```

A2. Isabella's Easy Language Code

Swing High/Swing Low Strategy:

```
{Author: Isabella Sanchez isanchez@wpi.edu}
Variables:
    PivotLow(0), PivotHigh(0);
PivotLow = SwingLow(1, Low, 5, 50);
PivotHigh = SwingHigh(1, High, 5, 50);
If PivotLow <> -1 and PivotHigh <> -1 Then Begin
    If PivotLow < PivotHigh Then Begin
        If Marketposition = 0 Then Begin
              Buy this bar at Close;
        End
        Else Begin
              Buytocover this bar at close;
        End;
    End
    Else Begin
        If Marketposition = 0 Then Begin
              Sellshort this bar at Close;
        End
        Else Begin
              Sell this bar at Close;
        End;
    End;
End;
```

Trend Channel Strategy:

```
{Author: Isabella Sanchez isanchez@wpi.edu}
inputs: Price(Close);
variables:  WasOutside(0), Length( 10 ), NumATRs( 1.6 ), Displace( 0 ) ,
  Avg( 0 ), Shift( 0 ), LowerBand( 0 ), UpperBand( 0 ) ;

Avg = AverageFC( Price, Length ) ;
Shift = NumATRs * AvgTrueRange( Length ) ;
UpperBand = Avg + Shift ;
LowerBand = Avg - Shift ;

If (Close > UpperBand) Then Begin
    WasOutside = 1;
    Sell this bar at Close;
End
Else If (Close < LowerBand) Then Begin
    WasOutside = -1;
    Buytocover this bar at Close;
End;
```

```
If WasOutside = 1 and (Close < UpperBand) Then Begin
    Sellshort this bar at Close;
    WasOutside = 0;
End
Else If WasOutside = -1 and (Close > LowerBand) Then Begin
    Buy this bar at Close;
    WasOutside = 0;
End;
```

London Breakout Strategy:

```
{Author: Isabella Sanchez isanchez@wpi.edu}

Variables:
      MovingLength(3), LotSize(1000000), WeeklyLow(1000), WeeklyHigh(0),
CurrentDay(-1), CalcStage(0), BrokeRange(False), WeeklyRange(0),
ThisWeek(false), SL(0), TP(0);

CurrentDay = DayOfWeek(Date);

{Calculate the High and Low of the 4 hours prior to the London Session}
If (CurrentDay = 0 and Time >= 2300) or (CurrentDay = 1 and Time <= 0300)
Then
Begin

      If CurrentDay = 0 and Time = 2300 Then
      Begin
            CalcStage = 1;
            WeeklyLow = Low;
            WeeklyHigh = High;
            BrokeRange = False;
      End
      Else If CurrentDay = 1 and Time = 0300 and CalcStage = 1 Then
            CalcStage = 2; {Mark start of London session}

      If Low < WeeklyLow Then
            WeeklyLow = Low;

      If High > WeeklyHigh Then
            WeeklyHigh = High;

End;

{Make sure we already calculated weekly range and that we were inside the
weekly range}
If CalcStage = 2 and CurrentDay <= 4 and MarketPosition = 0 Then
Begin
      WeeklyRange = WeeklyHigh - WeeklyLow;
```

```
      If WeeklyRange > 0.3 and WeeklyRange < 0.8 Then Begin
            If (Close > (WeeklyHigh+(WeeklyRange*0.04))) and (Close <
(WeeklyHigh+(WeeklyRange*0.15))) Then
                  Begin
                        If BrokeRange = False Then
                        Begin
                              Buy LotSize contracts this bar at Close;
                              BrokeRange = True;
                              TP = (WeeklyHigh+(WeeklyRange*0.37)) - Close;
                              SL = Close - (WeeklyHigh-(WeeklyRange*0.61));
{Use Fibonacci retracement levels for TP and SL}
                        End;
                  End
            Else If (Close < (WeeklyLow-(WeeklyRange*0.04))) and (Close >
(WeeklyLow-(WeeklyRange*0.15))) Then
                  Begin
                        If BrokeRange = False Then
                        Begin
                              SellShort LotSize contracts this bar at Close;
                              BrokeRange = True;
                              TP = Close - (WeeklyLow-(WeeklyRange*0.37));
                              SL = (WeeklyLow + (WeeklyRange*0.61)) - Close;
                        End;
                  End
            Else If Close < WeeklyHigh and Close > WeeklyLow Then
                  BrokeRange = False; {No market orders are opened and we
are inside the weekly range!}
      End;

End;


{Set the Profit target and Dollar trailing}
If MarketPosition <> 0 Then
Begin
      SetStopContract;
      SetDollarTrailing(SL);
      SetProfitTarget(TP);
End;
```

A3. Essam's Easy Language Code

First MT4 Trading Strategy

```
#property copyright "Copyright 2014, Essam Al-Mansouri."
#property version   "1.00"
#property strict

extern int DeltaPips = 240;
extern int StopLossPips = 350;
extern int TakeProfitPips = 600;
extern int TrailingTR = 150;
extern int TrailingDT = 140;
extern int LotSize = 1;
int Slippage = 3;
//End of user parameters

int MagicNumber = 610012;
int OnInit(){return(INIT_SUCCEEDED);}
void OnDeinit(const int reason){}
enum TradeType  // enumeration of named constants
{
   OPEN_BUYORDER = 1,
   OPEN_SELLORDER = 2,
   PENDING_BUYORDER = 4,
   PENDING_SELLORDER = 8
};
int GetOpenOrdersFlags()
{
    int ret = 0;
    for(int i = 0; i < OrdersTotal(); i++){
        if(OrderSelect(i, SELECT_BY_POS )){
             if(OrderMagicNumber() == MagicNumber){
                   switch(OrderType()){
                          case OP_BUY:
                                ret = ret | OPEN_BUYORDER;break;
                          case OP_SELL:
                                ret = ret | OPEN_SELLORDER;break;
                          case OP_BUYSTOP:
                                ret = ret | PENDING_BUYORDER;break;
                          case OP_SELLSTOP:
                                ret = ret | PENDING_SELLORDER;break;
                          default: Print("Error! Unexpected Order Type: ",
OrderType());
                   }
             }
        }
    }
    return ret;
}

void HandleOpenTrades(){
    for(int i = 0; i < OrdersTotal(); i++){
```

```
        if(OrderSelect(i, SELECT_BY_POS ) && OrderCloseTime() == 0 &&
OrderMagicNumber() == MagicNumber){
            if(OrderType() == OP_BUY){
                double trdelta = ((Ask - OrderOpenPrice())/Point);
                if(trdelta >= TrailingTR){
                    double newstoploss = NormalizeDouble((Ask -
(TrailingDT*Point)), Digits);
                    if(newstoploss > OrderStopLoss()){
                        if(!OrderModify(OrderTicket(),
OrderOpenPrice(), newstoploss,
                                        OrderTakeProfit(),
OrderExpiration(), clrNONE)){
                            Print("Order modify failed: ",
GetLastError());
                        }
                    }
                }
            }
            else if(OrderType() == OP_SELL){
                double trdelta = ((OrderOpenPrice() - Bid)/Point);
                if(trdelta >= TrailingTR){
                    double newstoploss = NormalizeDouble((Bid +
(TrailingDT*Point)), Digits);
                    if(newstoploss < OrderStopLoss()){
                        if(!OrderModify(OrderTicket(),
OrderOpenPrice(), newstoploss,
                                        OrderTakeProfit(),
OrderExpiration(), clrNONE)){
                            Print("Order modify failed: ",
GetLastError());
                        }
                    }
                }
            }
        }
    }
}


void OnTick(){
    static int ExtCountedBars = 0;
    if(Bars < 2) return; //if there is no previous bar, no trading
    RefreshRates();
    int orderflags = GetOpenOrdersFlags();
    if ((orderflags & (OPEN_BUYORDER | OPEN_SELLORDER)) == 0) {
        //a trade was active in this bar? let's wait a little bit then
        if(ExtCountedBars >= Bars) return;
        //if there is no open orders, check if we should create one
        if (Close[1] < Open[1] && ((orderflags & (PENDING_BUYORDER |
PENDING_SELLORDER)) == 0) && Ask > (Close[1]+DeltaPips*Point)) {
            //create a sell stop order
            int ticket = OrderSend(Symbol(), OP_SELLSTOP, LotSize, Low[1],
Slippage, Low[1] + StopLossPips*Point, Low[1] - TakeProfitPips*Point, NULL,
MagicNumber, TimeCurrent() + PeriodSeconds(), clrNONE);
            if(ticket < 0){
```

```
                Print("Error placing SELLLIMIT order: ", GetLastError());
            }
        }
        else if(Close[1] > Open[1] && ((orderflags & (PENDING_BUYORDER |
PENDING_SELLORDER)) == 0) && Bid < (Close[1]-DeltaPips*Point)) {
            //create a buy stop order
            int ticket = OrderSend(Symbol(), OP_BUYSTOP, LotSize, High[1],
Slippage, High[1] - StopLossPips*Point, High[1] + TakeProfitPips*Point,
NULL, MagicNumber, TimeCurrent() + PeriodSeconds(), clrNONE);
            if(ticket < 0){
                Print("Error placing BUYLIMIT order: ", GetLastError());
            }
        }
    }
    else {
        ExtCountedBars = Bars+1;
        HandleOpenTrades();
    }
    return;
}
```

First EasyLanguage Strategy (Buy Green, Sell Red)

```
{ Author: Essam Al-Mansouri }
Variables:
    TradePips(0.5), slprice(0), tpprice(0);

Condition1 = (Close > Open);
Condition2 = (Close <= Open);
Condition3 = (MarketPosition = 0);
Condition4 = (Close data2 < Open data2);

If Condition1 Then Begin
    While (MarketPosition = 1 and Close > tpprice)
    Begin
        tpprice = tpprice + TradePips;
        slprice = slprice + TradePips;
    End;
    If MarketPosition = -1 and Condition4 and Close <= tpprice Then
        BuyToCover this bar at Close;

End
Else If Condition2 Then Begin
    While (MarketPosition = -1 and Close <= tpprice)
    Begin
        tpprice = tpprice - TradePips;
        slprice = slprice - TradePips;
    End;
    If Marketposition = 1 and (not Condition4) and Close >= tpprice Then
        Sell this bar at Close;
End;

If MarketPosition = 1 and Close <= slprice Then Begin
    Sell this bar at Close;
End
Else If MarketPosition = -1 and Close >= slprice Then Begin
    BuyToCover this bar at Close;
End;

If Condition3 Then Begin
    If Condition1 Then Begin
        If Condition4 Then Begin
                Buy 400000 contracts this bar at Close;
        End
        Else
                Buy 1 contracts this bar at Close;
        tpprice = Close + TradePips;
        slprice = Close - TradePips;
        Sell next bar at slprice - TradePips or Lower;
    End
    Else If Condition2 Then Begin
        If Condition4 Then Begin
                SellShort 1 contracts this bar at Close;
```

```
        End
        Else
              SellShort 400000 contracts this bar at Close;
        tpprice = Close - TradePips;
        slprice = Close + TradePips;
        BuyToCover next bar at slprice + TradePips or Higher;
    End;
End;
If MarketPosition = 1 Then Begin
    Sell next bar at slprice - TradePips or Lower;
End
Else If MarketPosition = -1 Then Begin
    BuyToCover next bar at slprice + TradePips or Higher;
End;
```

Trading with Single Neuron

```
Using elsystem.collections;
Variables:
    LearningRate(0.01), Counter(0), CurrentPos(0), StartPos(0), ErrorV(0),
PBias(0), Pw1(0), Pw2(0), Pw3(0), Pw4(0), Pw5(0), Pw6(0),
    TradePips(0.1), slprice(0), tpprice(0);
Arrays:
    double MovAvg1[500000](0), double MovAvg2[500000](0), double
MovAvg3[500000](0), double MovAvg4[500000](0), double MovAvg5[500000](0),
double MovAvg6[500000](0), double POutput[500000](0), double
LearnTP[500000](0), double LearnSL[500000](0);

{weight = weight + alpha * (y - t) * input}
Once Begin
    PBias = 0.25 - Random(0.5);
    Pw1 = 0.25 - Random(0.5);
    Pw2 = 0.25 - Random(0.5);
    Pw3 = 0.25 - Random(0.5);
    Pw4 = 0.25 - Random(0.5);
    Pw5 = 0.25 - Random(0.5);
    Pw6 = 0.25 - Random(0.5);

End;

MovAvg1[CurrentPos] = (XAverage(Close, 5) - 75) / (150 - 75);
MovAvg2[CurrentPos] = (XAverage(Close, 6) - 75) / (150 - 75);
MovAvg3[CurrentPos] = AvgTrueRange(2);
MovAvg4[CurrentPos] = AvgTrueRange(6);
MovAvg5[CurrentPos] = (Average(Close, 5) - 75) / (150 - 75);
MovAvg6[CurrentPos] = (Average(Close, 6) - 75) / (150 - 75);

For Counter = StartPos To CurrentPos-1
Begin
    If LearnTP[Counter] < 0 and Low < AbsValue(LearnTP[Counter]) Then Begin
        //Hit Target Profit!!! Good job. It was a sell trade
        ErrorV = POutput[Counter];
    End
    Else If (LearnTP[Counter] > 0 and High > LearnTP[Counter]) Then Begin
        //Hit Target Profit!!! Good job. It was a buy trade
        ErrorV = POutput[Counter] - 1;
    End
    Else If (LearnSL[Counter] < 0 and High > AbsValue(LearnSL[Counter]))
Then Begin
        //Hit Stop Loss :( It was a sell trade
        ErrorV = POutput[Counter] - 1;
    End
    Else If (LearnSL[Counter] > 0 and Low < LearnSL[Counter]) Then Begin
        //Hit Stop Loss :( It was a buy trade
        ErrorV = POutput[Counter];
    End
    Else Begin
        Continue;
    End;
    PBias = PBias - LearningRate * ErrorV;
```

```
    Pw1 = Pw1 - LearningRate * ErrorV * MovAvg1[Counter];
    Pw2 = Pw2 - LearningRate * ErrorV * MovAvg2[Counter];
    Pw3 = Pw3 - LearningRate * ErrorV * MovAvg3[Counter];
    Pw4 = Pw4 - LearningRate * ErrorV * MovAvg4[Counter];
    Pw5 = Pw5 - LearningRate * ErrorV * MovAvg5[Counter];
    Pw6 = Pw6 - LearningRate * ErrorV * MovAvg6[Counter];
    StartPos = Counter + 1;
End;


POutput[CurrentPos] = 1 / (1 + ExpValue(-(PBias + Pw1 * MovAvg1[CurrentPos]
+ Pw2 * MovAvg2[CurrentPos] + Pw3 * MovAvg3[CurrentPos] + Pw4 *
MovAvg4[CurrentPos] + Pw5 * MovAvg5[CurrentPos] + Pw6 *
MovAvg6[CurrentPos])));
Condition1 = (POutput[CurrentPos] >= 0.5);
Condition2 = (POutput[CurrentPos] < 0.5);
Condition3 = (MarketPosition = 0);

If Condition1 Then Begin
    While (MarketPosition = 1 and Close > tpprice)
    Begin
       tpprice = tpprice + TradePips;
       slprice = slprice + TradePips;
    End;

    If MarketPosition = -1 Then Begin
        If Close <= tpprice Then Begin
             BuyToCover this bar at Close;
        End;
        {
        Else Begin
             If Close < (slprice - (TradePips/2)) Then slprice = slprice -
(TradePips/2);
             BuyToCover next bar at tpprice or lower;
        End;}
    End;

End

Else If Condition2 Then Begin
    While (MarketPosition = -1 and Close <= tpprice)
    Begin
       tpprice = tpprice - TradePips;
       slprice = slprice - TradePips;
    End;
    If MarketPosition = 1 Then Begin
        If Close >= tpprice Then Begin
             Sell this bar at Close;
        End;
        {
        Else Begin
             If Close > (slprice + (TradePips/2)) Then slprice = slprice +
(TradePips/2);
             Sell next bar at tpprice or higher;
        End;}
    End;
```

```
End;


If Condition1 Then Begin
    If Condition3 Then Begin

        Buy 400000 contracts this bar at Close;
        tpprice = Close + TradePips;
        slprice = Close - TradePips;
        Sell next bar at slprice or Lower;
    End;
    LearnTP[CurrentPos] = Close + TradePips;
    LearnSL[CurrentPos] = Close - TradePips;


End
Else If Condition2 Then Begin
    If Condition3 Then Begin
        SellShort 400000 contracts this bar at Close;
        tpprice = Close - TradePips;
        slprice = Close + TradePips;
        BuyToCover next bar at slprice or Higher;
    End;
    LearnTP[CurrentPos] = -(Close - TradePips);
    LearnSL[CurrentPos] = -(Close + TradePips);


End;


If MarketPosition = 1 Then Begin
    //Sell next bar at tpprice or Higher;
    Sell next bar at slprice or Lower;
End
Else If MarketPosition = -1 Then Begin
    //Buytocover next bar at tpprice or Lower;
    BuyToCover next bar at slprice or Higher;
End;
CurrentPos = CurrentPos + 1;
```

C++ Middleman for Matlab/TradeStation

```
#include <iostream>
#include <cstdio>
#include "main.h"

#include "engine.h"
#include <deque>
#include <stdexcept>
#define xsize 8
#define tsize 1
#define BUFSIZE 4096
```

```cpp
struct Example{
    double inputs[xsize];
    double outputs[tsize];
};


char buffer[BUFSIZE+1];


std::deque<Example*> g_trainingex;


Engine* getEngine(){
    static Engine *ep = NULL;
    if(ep == NULL && !(ep = engOpen(NULL))){
        throw std::runtime_error("Error starting Matlab engine.");
    }
    buffer[BUFSIZE] = '\0';
    engOutputBuffer(ep, buffer, BUFSIZE);
    return ep;
}


mxArray* getMatlabVar(const char* varname){
    Engine* ep = getEngine();
    return engGetVariable(ep, varname);
}


bool isMatlabVar(const char* varname){
    mxArray* result = NULL;
    bool ret = true;
    if((result = getMatlabVar(varname)) == NULL){
        ret = false;
    }
    mxDestroyArray(result);
    return ret;
}


/*
    AddTrainingExamples
    -- repeat until current time - few k

    isNeuralNetPrepared()
    AddTrainingExamples
    Train

    Predict
*/


DLL_EXPORT bool _stdcall isNeuralNetPrepared(){
    Engine* ep = getEngine();

    if(!isMatlabVar("LiveNet")){
        engEvalString(ep, "LiveNet = StartLiveNet();");
    }

    if(!isMatlabVar("LiveNet")){ //STILL doesn't exist?
        //throw std::runtime_error("Failed to prepare neural network");
```

```
        return false;
    }
    return true;


}
/*
DLL_EXPORT bool _stdcall isNeuralTrained(int pxsize, int ptsize){
    static bool init = false;
    if(init) return true;

    if(g_trainingex.size() < 50000) return false;
    Train(); GT-I9300
    RF1D10JRVLE
    init = true;
    return true;
}*/

DLL_EXPORT void _stdcall AddTrainingExample(double* inputs, double*
outputs){
    Example* tex = new Example();
    memcpy(&tex->inputs, inputs, (sizeof(tex->inputs)));
    memcpy(&tex->outputs, outputs, (sizeof(tex->outputs)));
    g_trainingex.push_back(tex);

    static int total_examples = 0;
    total_examples++;

    if(total_examples == 28600){
        Train();
    }
}

DLL_EXPORT void _stdcall Train(){
    //train here
    //create matrix of sources and matrix of targets
    //adapt
    //update current adaptations
    Engine* ep = getEngine();
    if(!isNeuralNetPrepared()){
        throw std::runtime_error("Failed to prepare neural network");
    }
    mxArray *train_source = NULL;
    mxArray *train_target = NULL;
    int numcols = g_trainingex.size();
    train_source = mxCreateDoubleMatrix(xsize, numcols, mxREAL);
    train_target = mxCreateDoubleMatrix(tsize, numcols, mxREAL);

    for(int i = 0; i < numcols; i++){
        Example *it = g_trainingex.at(i);
        memcpy((void*)(((double *)mxGetPr(train_source))+(i*xsize)), (void
*)it->inputs, (sizeof(it->inputs)));
        memcpy((void*)(((double *)mxGetPr(train_target))+(i*tsize)), (void
*)it->outputs, (sizeof(it->outputs)));

        delete it;
```

```
    }


    g_trainingex.clear();
    //TODO: clear g_trainingex from memory;
    engPutVariable(ep, "train_source", train_source);
    engPutVariable(ep, "train_target", train_target);

    //engEvalString(ep, "[LiveNet, y] = TrainLiveNet(LiveNet, train_source,
train_target);LiveNet.userdata.dropout = 0;"); //TODO: ACTUALLY TRAIN

    mxDestroyArray(train_source);
    mxDestroyArray(train_target);
}


// a sample exported function
DLL_EXPORT bool _stdcall AddSample(const double *in, int target)
{
    Engine* ep = getEngine();
    mxArray *inputs = mxCreateDoubleMatrix(xsize, 1, mxREAL);
    memcpy((void*)mxGetPr(inputs), (void*) in, sizeof(double)*xsize);
    engPutVariable(ep, "inx", inputs);
    engEvalString(ep, "prediction = LiveNet(inx);");
    mxArray *result = NULL;
    if ((result = engGetVariable(ep,"prediction")) == NULL) return false;

    memcpy((void*)buffer, (void*)mxGetPr(result), sizeof(double)*tsize);
    mxDestroyArray(result);
    mxDestroyArray(inputs);
    return true;
}


DLL_EXPORT bool _stdcall Predict(const double *in, double* buffer)
{
    Engine* ep = getEngine();
    mxArray *inputs = mxCreateDoubleMatrix(xsize, 1, mxREAL);
    memcpy((void*)mxGetPr(inputs), (void*) in, sizeof(double)*xsize);
    engPutVariable(ep, "inx", inputs);
    engEvalString(ep, "prediction = LiveNet(inx);");
    mxArray *result = NULL;
    if ((result = engGetVariable(ep,"prediction")) == NULL) return false;

    memcpy((void*)buffer, (void*)mxGetPr(result), sizeof(double)*tsize);
    mxDestroyArray(result);
    mxDestroyArray(inputs);
    return true;
}


extern "C" DLL_EXPORT BOOL APIENTRY DllMain(HINSTANCE hinstDLL, DWORD
fdwReason, LPVOID lpvReserved)
{
    switch (fdwReason)
    {
        case DLL_PROCESS_ATTACH:
            freopen("forexdll_output.txt","w",stdout);
```

```
            //std::cout << "Process Attach" << std::endl;
            break;

        case DLL_PROCESS_DETACH:
            // detach from process
            //std::cout << "Process Detach" << std::endl;
            break;

        case DLL_THREAD_ATTACH:

            //std::cout << "Thread Attach" << std::endl;
            // attach to thread
            break;

        case DLL_THREAD_DETACH:
            //std::cout << "Thread Detach" << std::endl;
            // detach from thread
            break;
    }
    return TRUE; // succesful
}
```

A4. Bowei's Easy Language Code

Triple Moving Average:

Part 1:

```
inputs: Price( Close ), FastLength( 12 ), MedLength( 144 ), SlowLength(169);
variables: FastAvg( 0 ), MedAvg( 0 ), SlowAvg( 0 ) ;
FastAvg = XAverage( Price, FastLength ) ;
MedAvg = XAverage( Price, MedLength ) ;
SlowAvg = XAverage( Price, SlowLength ) ;
Condition1 = Price > FastAvg and FastAvg > MedAvg and MedAvg > SlowAvg ;
if CurrentBar > 1 and Condition1 and Condition1[1] = false { CB > 1 check
used to
avoid spurious cross confirmation at CB = 1 }
then
Buy ( "XPCrsLE" ) next bar at market ;
Condition1 = Price < FastAvg and FastAvg < MedAvg and MedAvg < SlowAvg ;
if CurrentBar > 1 and Condition1 and Condition1[1] = false { CB > 1 check
used to
avoid spurious cross confirmation at CB = 1 }
then
Sell Short ( "XP3CrsSE" ) next bar at market ;
```

Part 2:

```
{Re-entry Long and Short}
[IntrabarOrderGeneration = false]
inputs:  Price( Close ), lengthweighted (1), Length( 20 ), NumATRs( 1.5 ),
price1(high), price3(low),
lengthhi(3), lengthlo(5), limitentry(-.00075);
variables:  Avg( 0 ), Shift( 0 ), UpperBand( 0 ), lowerband (0), avgwtd (0),
highesthigh(0), lowestlow(0);
AvgWtd = WAverage( Price, Lengthweighted ) ;
Avg = wAverage( Price, Length ) ;
Shift = NumATRs * AvgTrueRange( Length ) ;
UpperBand = Avg + Shift ;
lowerband = avg - shift;
highesthigh = highest (price1, lengthhi);
lowestlow = lowest (price3, lengthlo);
condition1 = avgwtd crosses over  lowerBand;
condition2 = avgwtd crosses under upperband;
```

Weighted Keltner Channel:

    1.   Re-entry Long and Short:

```
[IntrabarOrderGeneration = false]
inputs:  Price( Close ), lengthweighted (1), Length( 10 ), NumATRs ( 2 ),
price1(high), price3(low),
lengthhi(3), lengthlo(5), limitentry(-.00075);

variables:  Avg( 0 ), Shift( 0 ), UpperBand( 0 ), lowerband (0), avgwtd
(0),
highesthigh(0), lowestlow(0);



AvgWtd = WAverage( Price, Lengthweighted ) ;
Avg = wAverage( Price, Length ) ;
Shift = NumATRs * AvgTrueRange( Length ) ;
UpperBand = Avg + Shift ;
lowerband = avg - shift;
highesthigh = highest (price1, lengthhi);
lowestlow = lowest (price3, lengthlo);

condition1 = avgwtd crosses over lowerBand;

condition2 = avgwtd crosses under upperband;

if condition1  then
Buy ( "Re-entryL" ) next bar at highesthigh + limitentry stop ;

if condition2  then
Sell short ( "Re-entryS" ) next bar at lowestlow - limitentry stop ;
Setstopposition;
Setstoploss(2570);
```

    2.   Regular Keltner Long:

```
[IntrabarOrderGeneration = false]
inputs:  Price( Close ), Length(4 ), NumATRs( 2 ) ;
variables:  Avg( 0 ), Shift( 0 ), UpperBand( 0 ), Setup( false ),
CrossingHigh( 0 ) ;

Avg = wAverage( Price, Length ) ;
Shift = NumATRs * AvgTrueRange( Length ) ;
UpperBand = Avg + Shift ;

if CurrentBar > 1 and Price crosses over UpperBand then
{ CB > 1 check used to avoid spurious cross confirmation at CB = 1 }
     begin
     SetUp = true ;
     CrossingHigh = High ;
     end
else if Setup and ( Price < Avg or High >= CrossingHigh + 1 point ) then
```

```
     Setup = false ;
 if Setup then
     Buy ( "KltChLE" ) next bar at CrossingHigh + 1 point stop ;
Setstopposition;
Setstoploss(2570);
```

3. Keltner short:

```
    [IntrabarOrderGeneration = false]
    inputs:  Price( Close ), Length( 5 ), NumATRs( 1.5 ) ;
    variables:  Avg( 0 ), Shift( 0 ), LowerBand( 0 ), Setup( false ),
    CrossingLow( 0 ) ;

    Avg = wAverage( Price, Length ) ;
    Shift = NumATRs * AvgTrueRange( Length ) ;
    LowerBand = Avg - Shift ;

    if CurrentBar > 1 and Price crosses under LowerBand then
    { CB > 1 check used to avoid spurious cross confirmation at CB = 1 }
    begin
    SetUp = true ;
    CrossingLow = Low ;
    end
    else if Setup and ( Price > Avg or Low <= CrossingLow - 1 point ) then
    Setup = false ;
    { the Low <= condition being true indicates that a short must already
    have been
      triggered at this bar so this setup has been used up and needs to be
    negated;
      an example of a persisitent setup with an indefinite stop/limit
    trigger - setup
      has to be negated after entry confirmed; also see Pivot Reversal
    LE/SE and
      PercentR LE/SE }

    if Setup then
    Sell Short ( "KltChSE" ) next bar at CrossingLow - 1 point stop ;
Setstopposition;
Setstoploss(2570);
```

B. Flow Charts

Bollinger Bands Strategy:
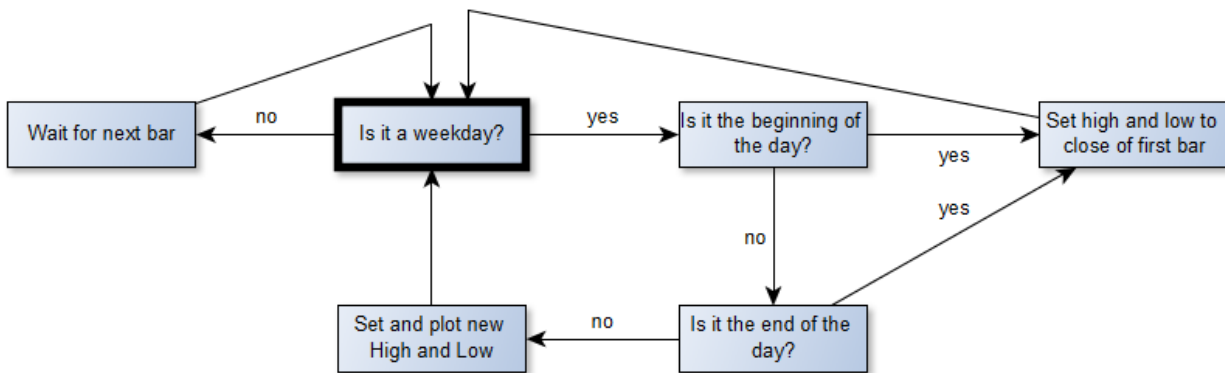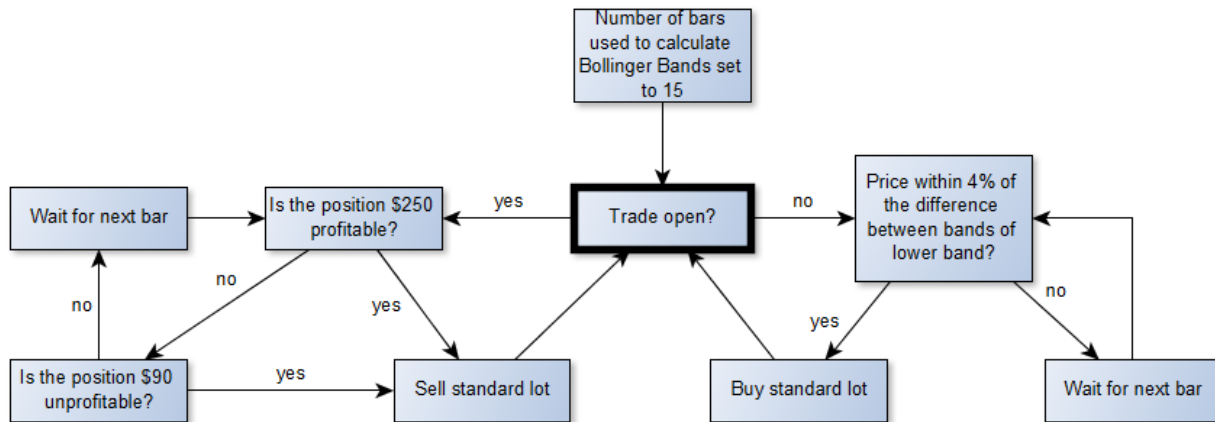
Daily High and Low Indicator:

Moving Averages Strategy:

Number of bars used to calculate fast MA is set to 10

Number of bars used to calculate slow MA is set to 25

Fast Moving Average < Slow Moving Average?

yes

Trade Open?

no

Fast Moving Average > Slow Moving Average?

no

yes

yes

no

Wait for next bar

Sell

Buy

Wait for next bar

Triple Bar Buy Strategy:

Wait for next bar

no

Were the last 3 bars profitable?

yes

Buy Standard lot

yes

Sell Standard lot

no

Was the last bar profitable?

Wait for next bar
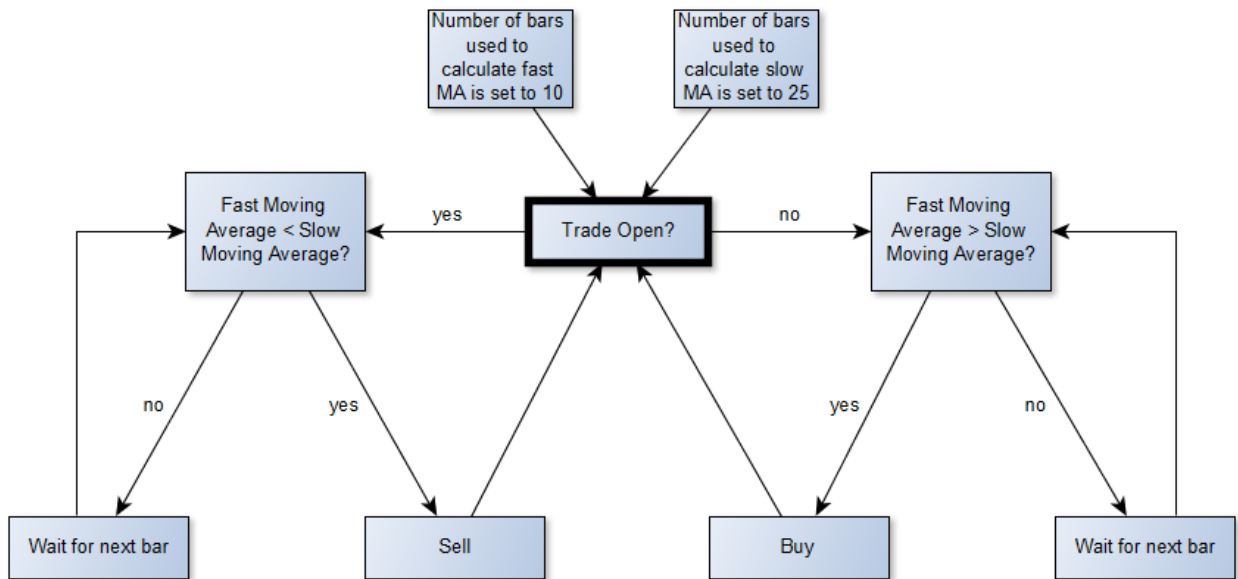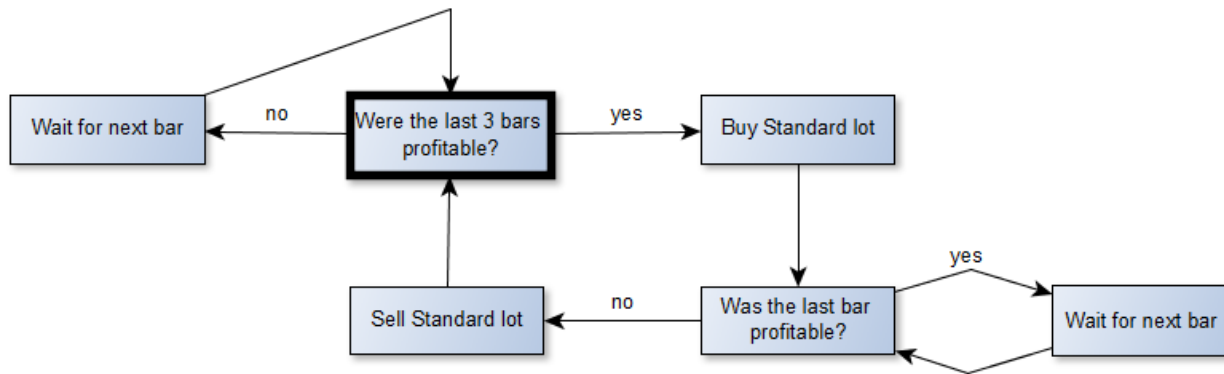
Best Time of Day Indicator:

Swing High/Swing Low:

Start on

No

SH and SL
exists

Which is SH
most recent?

Is there an
open buy

Yes

Is there an

SL

Wait until
next bar

Is there an

Close
trade

Open sell

Yes

Is there an
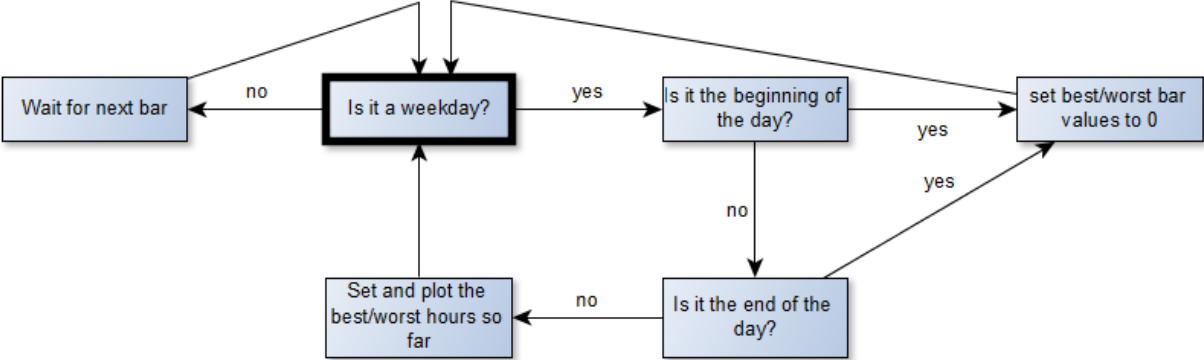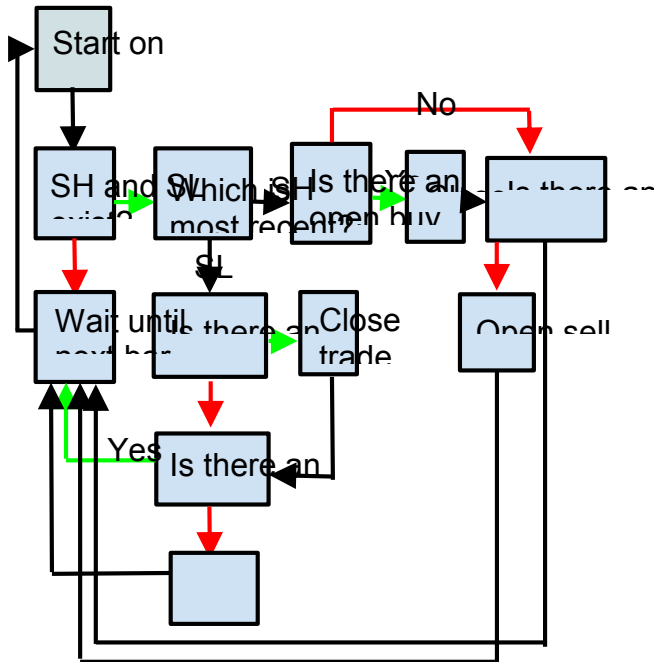
Trend Channel:

Note: MA refers to Exponential Moving Average

London Breakout:

LH: Highest price reached on Monday before London session starts
LW: Lowest price reached on Monday before London session starts.
London Range: Price difference between LH and LW.

Price broke LH?
Any active orders?
Wait until next bar closes

Open long trade.

Trailing stop is 61% of London Range.
Take Profit level is 37% of London Range.
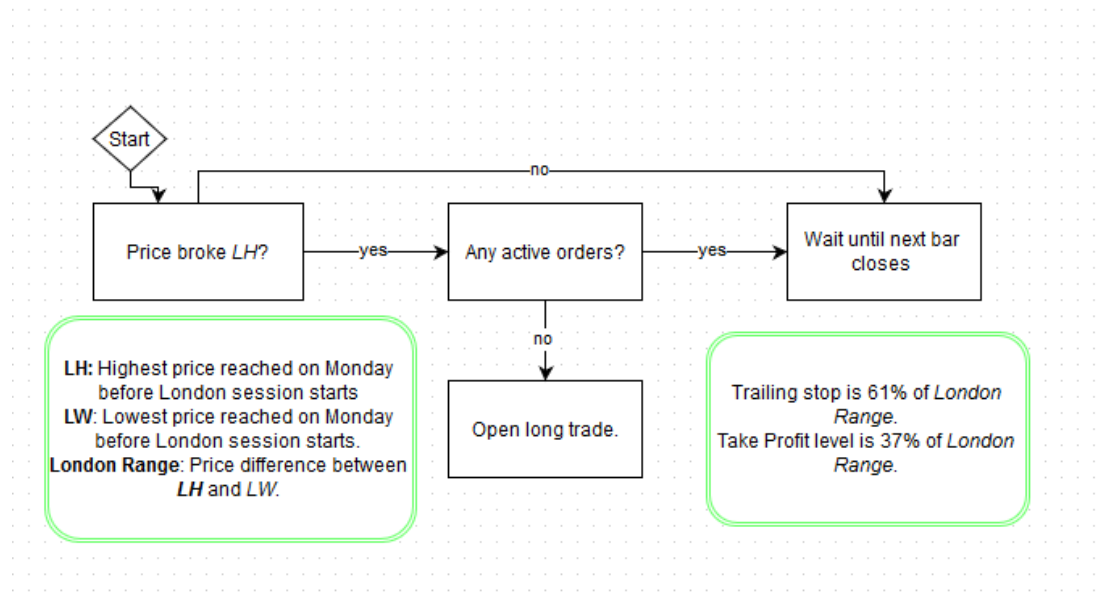
B3. Essam's Flow Charts

B4. Bowei's Flow Charts

Triple Moving Average:

```
                    yes              yes
  ┌───────┐   ┌──────────────┐  ┌──────────────┐   ┌───────┐
  │ Start │──▶│ Price > Fast │─▶│ Current      │──▶│  Buy  │
  └───────┘   │ Average?     │  │ Bar >1?      │   └───────┘
              └──────────────┘  └──────────────┘
                    no  │            no  │
                        ▼                ▼
              ┌──────────────┐   no   ┌──────────┐
              │ Current      │───────▶│   Run    │
              │ Bar >1 ?     │        │   again  │
              └──────────────┘        └──────────┘
                    yes
                        │
                        ▼
                   ┌───────┐
                   │ Sell  │
                   └───────┘
```

```
  ┌───────┐   ┌──────────────────┐  Yes   ┌───────────────────┐
  │ Start │──▶│ Weight Average < │──────▶ │ Buy at Highest    │
  └───────┘   │ Lower Band?      │        │ High + limitentry │
              └──────────────────┘        └───────────────────┘
                    No  │                          │
                        ▼                          ▼
              ┌──────────────────┐   No     ┌───────┐
              │ Weight Average > │────────▶ │ Stop  │
              │ Upper Band?      │          └───────┘
              └──────────────────┘
                    Yes │
                        ▼
              ┌──────────────────┐        ┌───────┐
              │ Short at Lowest  │──────▶ │ Stop  │
              │ Low -limitentry  │        └───────┘
              └──────────────────┘
```

Weighted Keltner Channel:

Start ⇒ Check WMA ⇒ Drop Below Lowerband ⇒ Go Long

Goes above Upperband

Stay in the middle of lower and upper band

Entry if next bar hits the highest of last three

Go Short

Long (Keltner (4,1.5))

Short (Keltner (5,1.5))

Stops: PT575, SL 210, $trail 340

Entry if next bar hits the lowest of last 5 bars

C. Monte Carlo Figures

C1. Tom's Monte Carlo Figures

Monte Carlo Results: Market System

File Edit Help

Trading Parameters

Initial Account Equity: $100,000.00
Trading Vehicle: Stocks
Minimum Margin Requirement: 100.0%
Slippage per side: $0.00 per trade
Commissions and fees per side: $0.00 per trade

Position Sizing Method: None
No. Shares: From input data
Number of Monte Carlo Samples: 10,000

Key Results at Select Confidence Levels

Confidence (%)	Rate of Return (%)	Max Drawdown (%)	Return-DD Ratio	Mod. Sharpe Ratio
50	2.999	1.355	2.214	0.1049
60	2.999	1.451	2.067	0.1047
70	2.999	1.567	1.914	0.1046
80	2.999	1.718	1.745	0.1044
85	2.999	1.820	1.648	0.1043
90	2.999	1.946	1.541	0.1042
91	2.999	1.976	1.518	0.1041
92	2.999	2.015	1.488	0.1041
93	2.999	2.060	1.456	0.1040
94	2.999	2.097	1.430	0.1040
95	2.999	2.149	1.396	0.1039
96	2.999	2.206	1.359	0.1039
97	2.999	2.283	1.314	0.1038
98	2.999	2.391	1.254	0.1037
99	2.999	2.580	1.162	0.1035
100	2.999	3.882	0.7725	0.1024

Monte Carlo Results at 95.00% Confidence

Total Net Profit: $2,999.10
Final Account Equity: $102,999.10
Return on Starting Equity: 2.999%
Profit Factor: 1.267

Max Number of Shares: 100,000
Minimum Number of Shares: 100,000
Average Number of Shares: 100,000

Largest Winning Trade: $250.80
Largest Winning Trade (%): 0.2500%
Average Winning Trade: $250.04
Average Winning Trade (%): 0.2447%

Largest Losing Trade: ($90.90)
Largest Losing Trade (%): -0.09152%
Average Losing Trade: ($90.03)
Average Losing Trade (%): -0.08963%

Average Trade: $16.48
Average Trade (%): 0.01636%
Trade Standard Deviation: $158.16
Trade Standard Deviation (%): 0.1574%

Win/Loss Ratio: 2.777
Win/Loss Ratio (%/%): 2.776
Max Consecutive Wins: 3
Max Consecutive Losses: 17

Worst Case Drawdown: ($2,200.70)
Worst Case Drawdown (%): 2.149%
Average Drawdown: ($494.67)
Average Drawdown (%): 0.4856%

Return/Drawdown Ratio: 1.396
Modified Sharpe Ratio: 0.1039
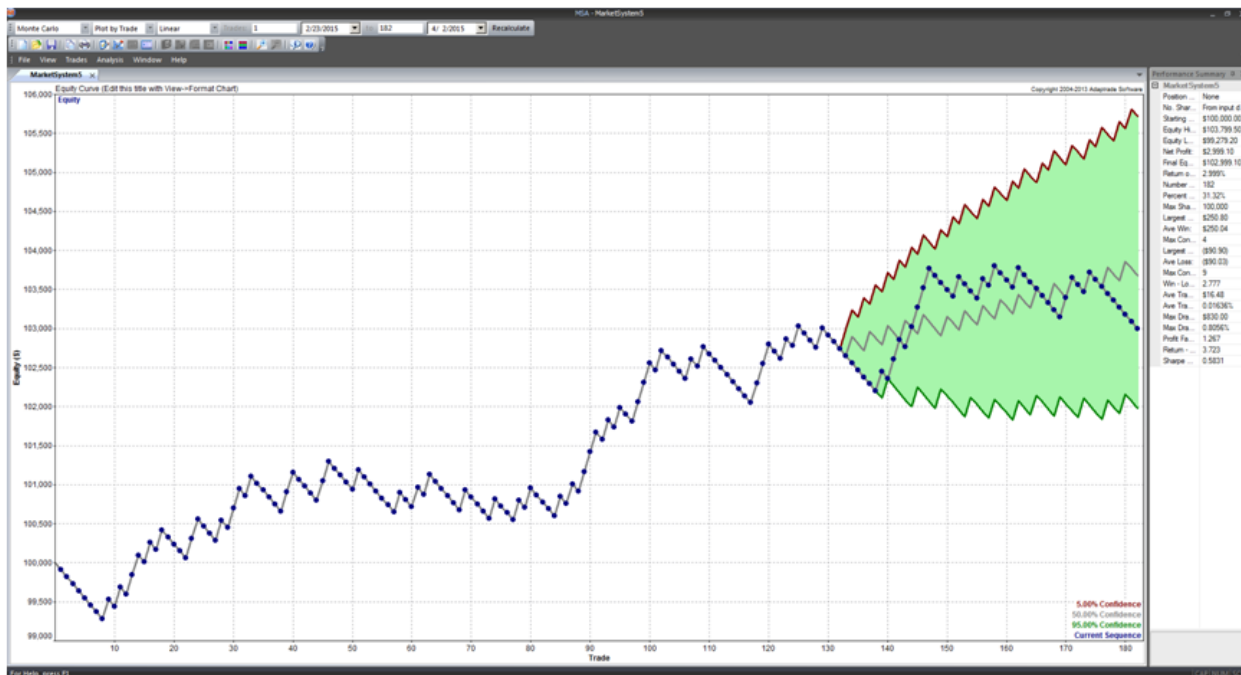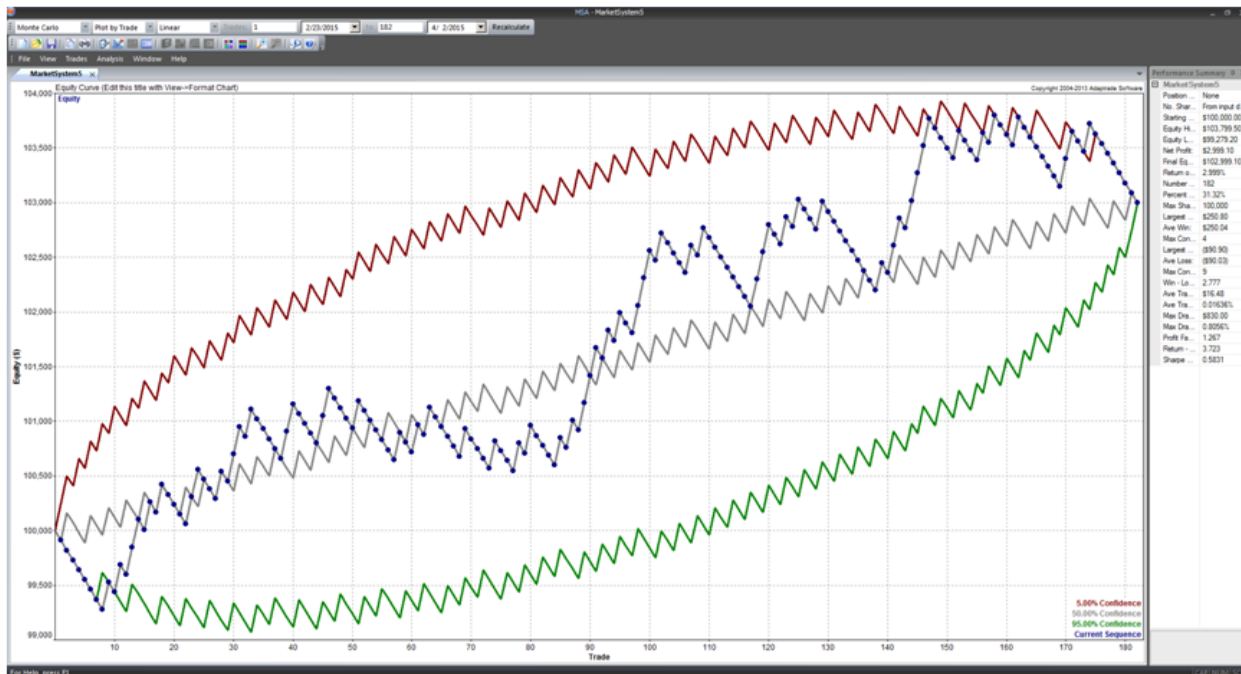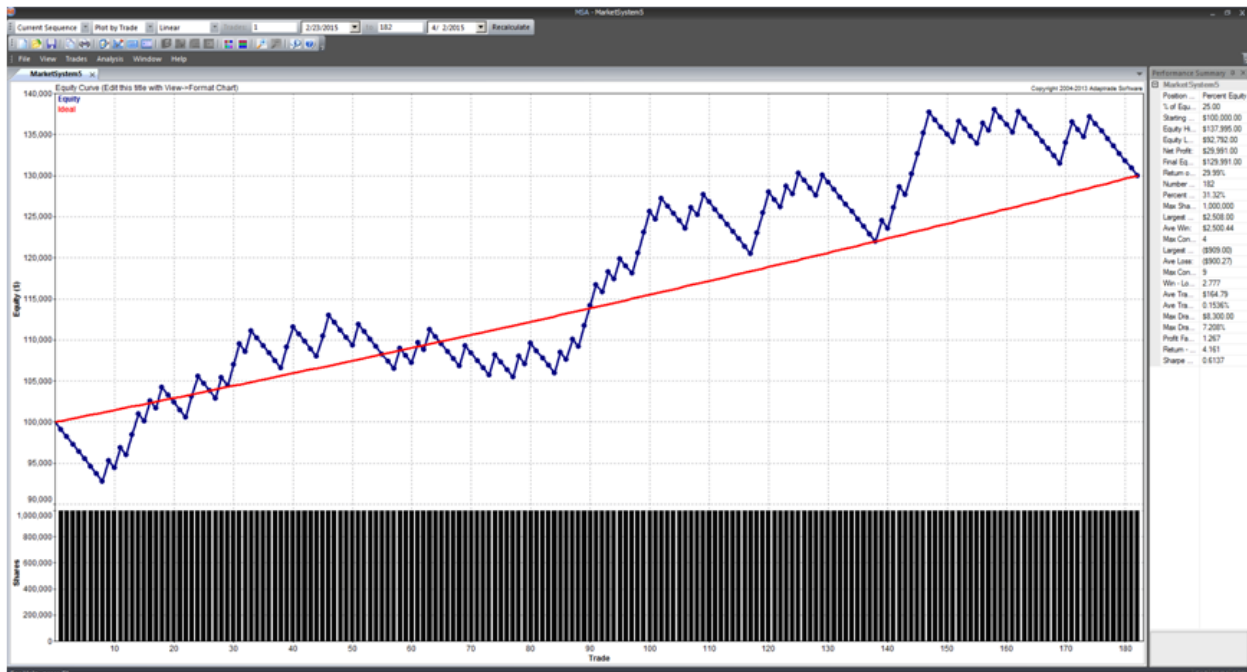
Optimization Results: Market System

File   Edit   Help

Market System: MarketSystem5

POSITION SIZING METHOD: Percent Equity

OPTIMIZED PARAMETER: Percent of Equity

Optimal Results Over All Trades

ANALYSIS SETTINGS:

Initial Account Equity: $100,000.00

Trading Vehicle: Stocks

Minimum Margin Requirement: 100.00%

Slippage per side: $0.00 per trade

Commissions and fees per side: $0.00 per trade

Optimized for Net Profit

No constraint on max percent drawdown

Optimized over existing sequence of trades

RESULTS:

Optimal Percent of Equity: 200.00

Net Profit at Optimum: 29991.00

Max Percent Drawdown at Optimum: 7.21%

C2. Isabella's Monte Carlo Figures
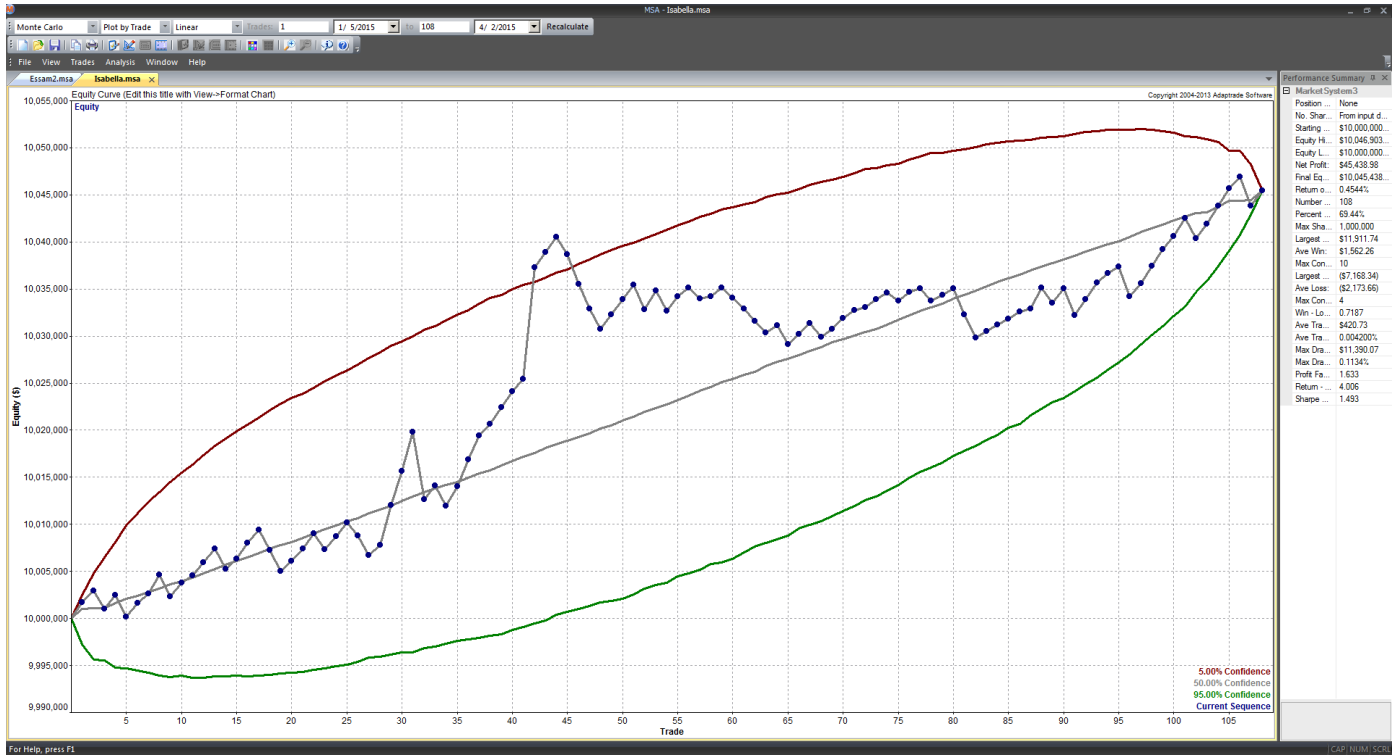
Monte Carlo Results: Market System

File Edit Help

Initial Account Equity: $10,000,000.00
Trading Vehicle: Stocks
Minimum Margin Requirement: 100.0%
Slippage per side: $0.00 per trade
Commissions and fees per side: $0.00 per trade

Position Sizing Method: None
No. Shares: From input data
Number of Monte Carlo Samples: 10,000

Key Results at Select Confidence Levels

Confidence (%)	Rate of Return (%)	Max Drawdown (%)	Return-DD Ratio	Mod. Sharpe Ratio
50	0.4261	0.1134	3.723	0.1783
60	0.4016	0.1134	3.495	0.1683
70	0.3763	0.1134	3.237	0.1577
80	0.3455	0.1195	2.878	0.1447
85	0.3277	0.1311	2.608	0.1366
90	0.3054	0.1472	2.161	0.1263
91	0.2997	0.1515	2.069	0.1239
92	0.2934	0.1555	1.963	0.1208
93	0.2863	0.1603	1.860	0.1178
94	0.2773	0.1658	1.747	0.1149
95	0.2695	0.1720	1.639	0.1114
96	0.2605	0.1800	1.502	0.1072
97	0.2477	0.1912	1.324	0.1011
98	0.2305	0.2054	1.169	0.09384
99	0.2036	0.2292	0.9217	0.08111
100	0.08307	0.3446	0.2570	0.03414

Monte Carlo Results at 95.00% Confidence

Total Net Profit: $26,952.97   Max Number of Shares: 1,000,000
Final Account Equity: $10,026,952.97   Minimum Number of Shares: 1,000,000
Return on Starting Equity: 0.2695%   Average Number of Shares: 1,000,000
Profit Factor: 1.335

Largest Winning Trade: $11,911.74   Largest Losing Trade: ($7,168.34)
Largest Winning Trade (%): 0.1188%   Largest Losing Trade (%): -0.07154%
Average Winning Trade: $1,476.69   Average Losing Trade: ($2,261.98)
Average Winning Trade (%): 0.01473%   Average Losing Trade (%): -0.02256%

Average Trade: $249.56   Win/Loss Ratio: 0.6754
Average Trade (%): 0.002495%   Win/Loss Ratio (%/%): 0.6758
Trade Standard Deviation: $2,512.41   Max Consecutive Wins: 10
Trade Standard Deviation (%): 0.02505%   Max Consecutive Losses: 4

Worst Case Drawdown: ($17,272.11)   Return/Drawdown Ratio: 1.639
Worst Case Drawdown (%): 0.1720%   Modified Sharpe Ratio: 0.1114
Average Drawdown: ($5,923.11)
Average Drawdown (%): 0.05909%

Optimization Results: Market System

File   Edit   Help

Market System: Isabella.msa

POSITION SIZING METHOD: Percent Equity

OPTIMIZED PARAMETER: Percent of Equity

Optimal Results Over All Trades

ANALYSIS SETTINGS:

Initial Account Equity: $20,000,000.00

Trading Vehicle: Stocks

Minimum Margin Requirement: 100.00%

Slippage per side: $0.00 per trade

Commissions and fees per side: $0.00 per trade

Optimized for Net Profit

No constraint on max percent drawdown

Optimized over existing sequence of trades

RESULTS:

Optimal Percent of Equity: 200.00

Net Profit at Optimum: 513026.77

Max Percent Drawdown at Optimum: 0.62%

Optimization Results: Market System

File Edit Help

Market System: Isabella.msa

POSITION SIZING METHOD: Percent Equity
OPTIMIZED PARAMETER: Percent of Equity

Optimal Results Over All Trades

ANALYSIS SETTINGS:
Initial Account Equity: $20,000,000.00
Trading Vehicle: Stocks
Minimum Margin Requirement: 100.00%
Slippage per side: $0.00 per trade
Commissions and fees per side: $0.00 per trade

Optimized for Net Profit
No constraint on max percent drawdown
Optimized over existing sequence of trades

RESULTS:
Optimal Percent of Equity: 200.00
Net Profit at Optimum: 513026.77
Max Percent Drawdown at Optimum: 0.62%

Optimization Results: Market System

File Edit Help

Market System: Isabella.msa

POSITION SIZING METHOD: Percent Volatility
OPTIMIZED PARAMETER: Percent of Volatility

Optimal Results Over All Trades

ANALYSIS SETTINGS:
Initial Account Equity: $20,000,000.00
Trading Vehicle: Stocks
Minimum Margin Requirement: 100.00%
Slippage per side: $0.00 per trade
Commissions and fees per side: $0.00 per trade

Optimized for Net Profit
No constraint on max percent drawdown
Optimized over existing sequence of trades

RESULTS:
Optimal Percent of Volatility: 0.1000
Net Profit at Optimum: 524559.55
Max Percent Drawdown at Optimum: 0.61%

Optimization Results: Market System

File   Edit   Help

Market System: Isabella.msa

POSITION SIZING METHOD: Percent Volatility
OPTIMIZED PARAMETER: Percent of Volatility

Optimal Results Over All Trades

ANALYSIS SETTINGS:
Initial Account Equity: $20,000,000.00
Trading Vehicle: Stocks
Minimum Margin Requirement: 100.00%
Slippage per side: $0.00 per trade
Commissions and fees per side: $0.00 per trade

Optimized for Return-DD Ratio
No constraint on max percent drawdown
Optimized over existing sequence of trades

RESULTS:
Optimal Percent of Volatility: 0.1000
Return-DD Ratio at Optimum: 4.327
Max Percent Drawdown at Optimum: 0.61%
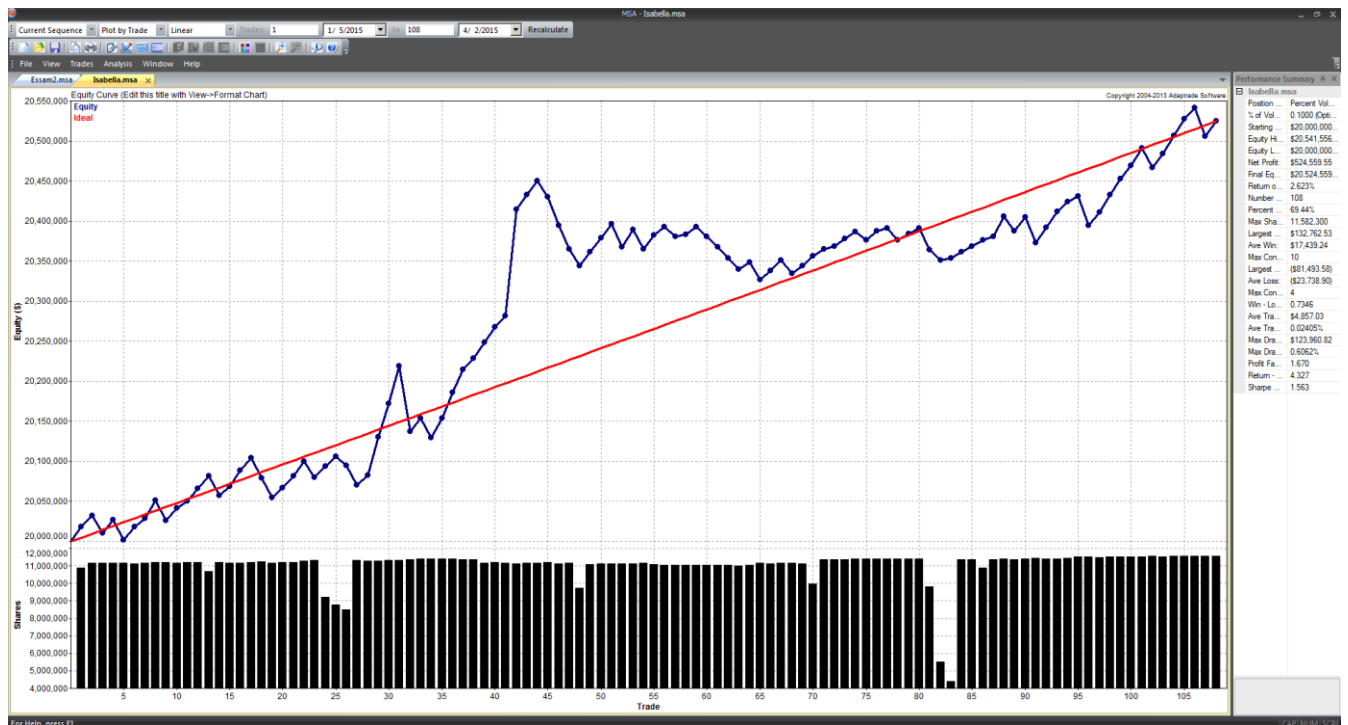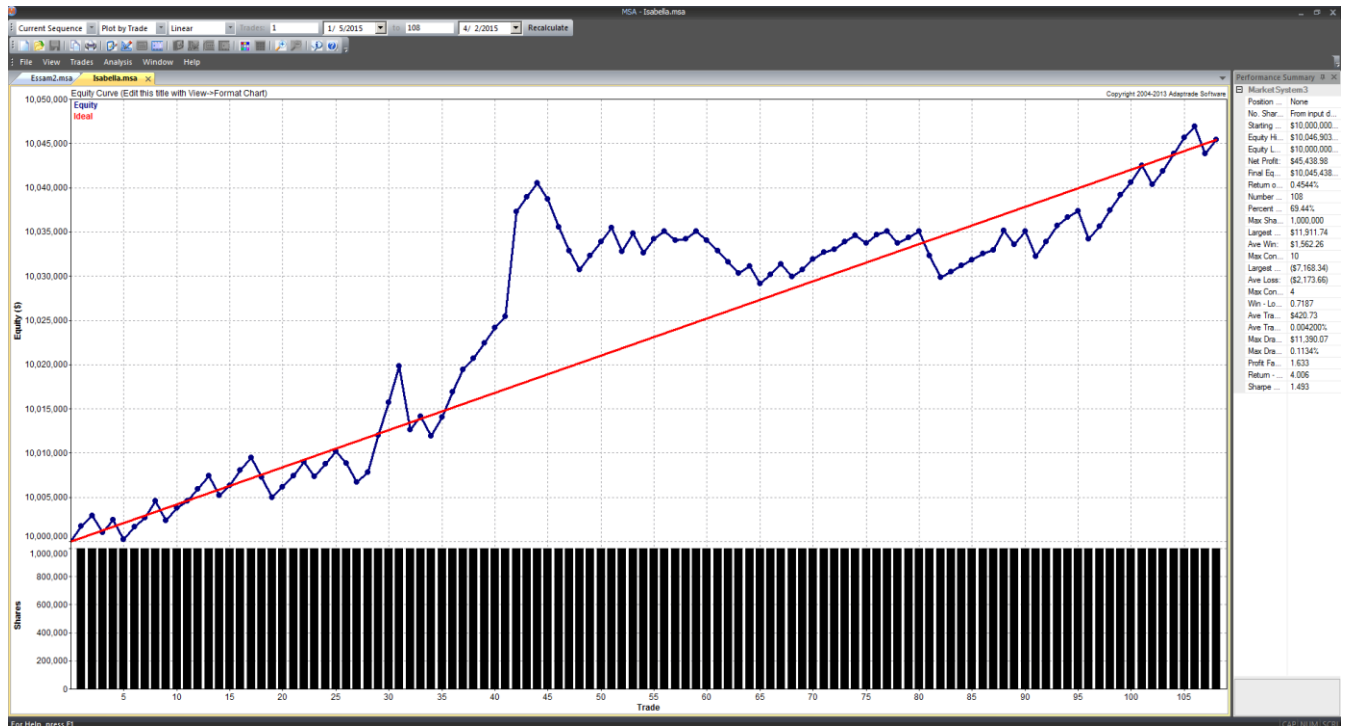
Monte Carlo Results: Market System

File   Edit   Help

Trading Parameters

Initial Account Equity: $10,000,000.00

Trading Vehicle: Stocks

Minimum Margin Requirement: 100.0%

Slippage per side: $0.00 per trade

Commissions and fees per side: $0.00 per trade

Position Sizing Method: None

No. Shares: From input data

Number of Monte Carlo Samples: 10,000

Key Results at Select Confidence Levels

Confidence (%)	Rate of Return (%)	Max Drawdown (%)	Return-DD Ratio	Mod. Sharpe Ratio
50	0.4544	0.1216	3.738	0.1934
60	0.4544	0.1300	3.496	0.1934
70	0.4544	0.1404	3.236	0.1933
80	0.4544	0.1536	2.958	0.1933
85	0.4544	0.1624	2.798	0.1933
90	0.4544	0.1747	2.601	0.1932
91	0.4544	0.1776	2.558	0.1932
92	0.4544	0.1808	2.513	0.1932
93	0.4544	0.1838	2.472	0.1932
94	0.4544	0.1877	2.420	0.1932
95	0.4544	0.1935	2.348	0.1932
96	0.4544	0.1995	2.278	0.1932
97	0.4544	0.2079	2.185	0.1932
98	0.4544	0.2184	2.081	0.1931
99	0.4544	0.2360	1.925	0.1931
100	0.4544	0.3562	1.276	0.1929

Monte Carlo Results at 95.00% Confidence

Total Net Profit: $45,438.98

Final Account Equity: $10,045,438.98

Return on Starting Equity: 0.4544%

Profit Factor: 1.633

Max Number of Shares: 1,000,000

Minimum Number of Shares: 1,000,000

Average Number of Shares: 1,000,000

Largest Winning Trade: $11,911.74

Largest Winning Trade (%): 0.1187%

Average Winning Trade: $1,562.26

Average Winning Trade (%): 0.01558%

Largest Losing Trade: ($7,168.34)

Largest Losing Trade (%): -0.07168%

Average Losing Trade: ($2,173.66)

Average Losing Trade (%): -0.02171%

Average Trade: $420.73

Average Trade (%): 0.004200%

Trade Standard Deviation: $2,176.45

Trade Standard Deviation (%): 0.02174%

Win/Loss Ratio: 0.7187

Win/Loss Ratio (%/%): 0.7185

Max Consecutive Wins: 7

Max Consecutive Losses: 5

Worst Case Drawdown: ($19,430.73)

Worst Case Drawdown (%): 0.1935%

Average Drawdown: ($6,062.13)

Average Drawdown (%): 0.06046%

Return/Drawdown Ratio: 2.348

Modified Sharpe Ratio: 0.1932

C3. Essam's Monte Carlo Figures
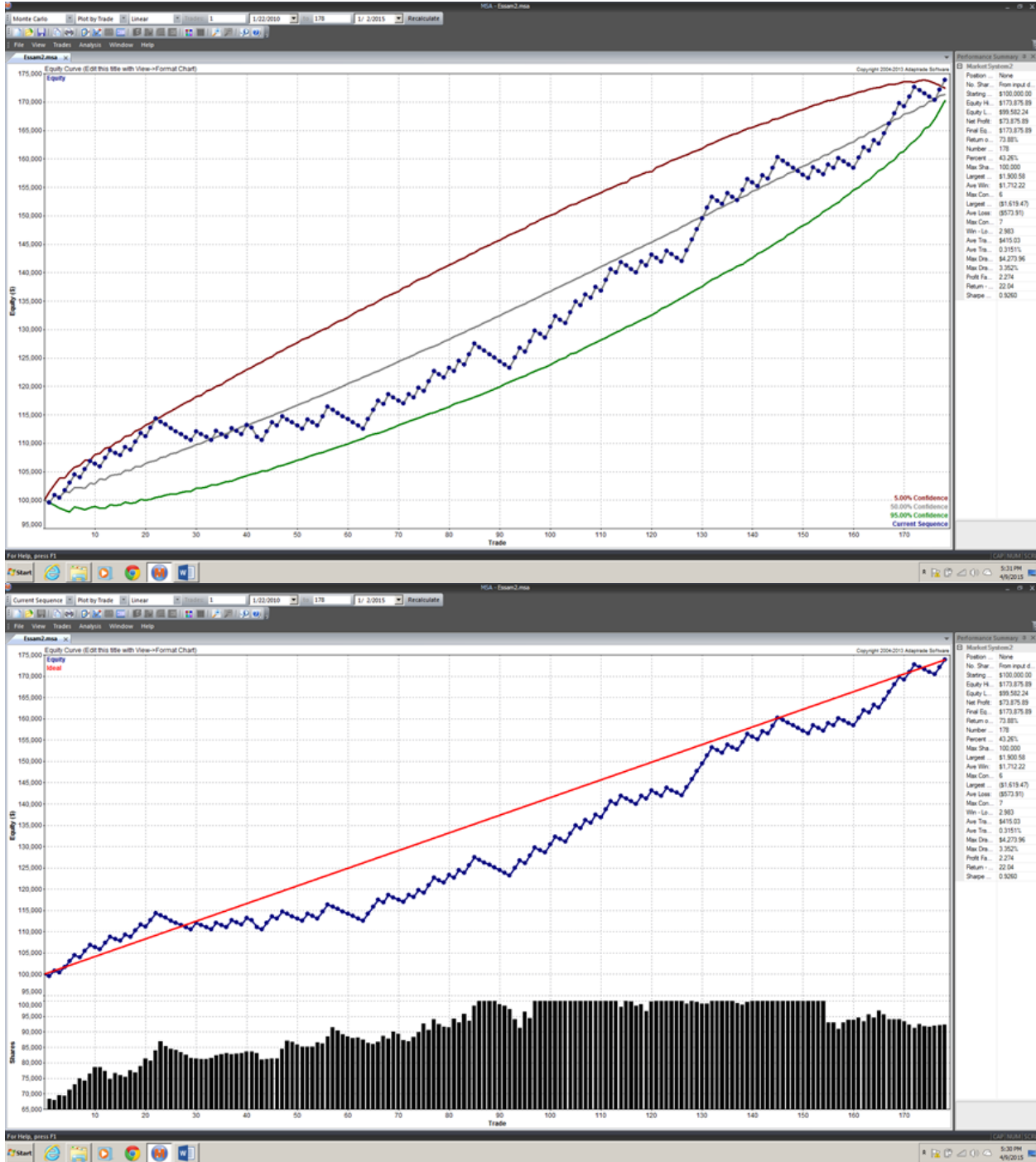
Monte Carlo Results: Market System

File Edit Help

Trading Parameters

Initial Account Equity: $100,000.00

Trading Vehicle: Stocks

Minimum Margin Requirement: 100.0%

Slippage per side: $0.00 per trade

Commissions and fees per side: $7.50 per trade

Position Sizing Method: None

No. Shares: From input data

Number of Monte Carlo Samples: 10,000

Key Results at Select Confidence Levels

Confidence (%)	Rate of Return (%)	Max Drawdown (%)	Return-DD Ratio	Mod. Sharpe Ratio
50	71.27	3.621	19.67	0.3591
60	71.10	3.878	18.39	0.3579
70	70.92	4.146	17.20	0.3566
80	70.73	4.518	15.76	0.3552
85	70.61	4.765	14.94	0.3544
90	70.44	5.085	14.01	0.3533
91	70.40	5.180	13.71	0.3531
92	70.36	5.272	13.50	0.3528
93	70.32	5.381	13.23	0.3526
94	70.28	5.517	12.92	0.3523
95	70.22	5.669	12.56	0.3519
96	70.15	5.824	12.20	0.3516
97	70.06	6.060	11.74	0.3511
98	69.96	6.385	11.17	0.3506
99	69.80	6.868	10.33	0.3498
100	69.25	11.41	6.276	0.3469

Monte Carlo Results at 95.00% Confidence

Total Net Profit: $70,218.63

Final Account Equity: $170,218.63

Return on Starting Equity: 70.22%

Profit Factor: 2.198

Max Number of Shares: 100,000

Minimum Number of Shares: 53,020

Average Number of Shares: 86,047

Largest Winning Trade: $1,898.00

Largest Winning Trade (%): 1.485%

Average Winning Trade: $1,627.68

Average Winning Trade (%): 1.253%

Largest Losing Trade: ($1,946.00)

Largest Losing Trade (%): -1.439%

Average Losing Trade: ($590.09)

Average Losing Trade (%): -0.4413%

Average Trade: $394.49

Average Trade (%): 0.3029%

Trade Standard Deviation: $1,155.45

Trade Standard Deviation (%): 0.8660%

Win/Loss Ratio: 2.883

Win/Loss Ratio (%/%): 2.906

Max Consecutive Wins: 4

Max Consecutive Losses: 12

Worst Case Drawdown: ($7,804.04)

Worst Case Drawdown (%): 5.669%

Average Drawdown: ($1,592.33)

Average Drawdown (%): 1.192%

Return/Drawdown Ratio: 12.56

Modified Sharpe Ratio: 0.3519
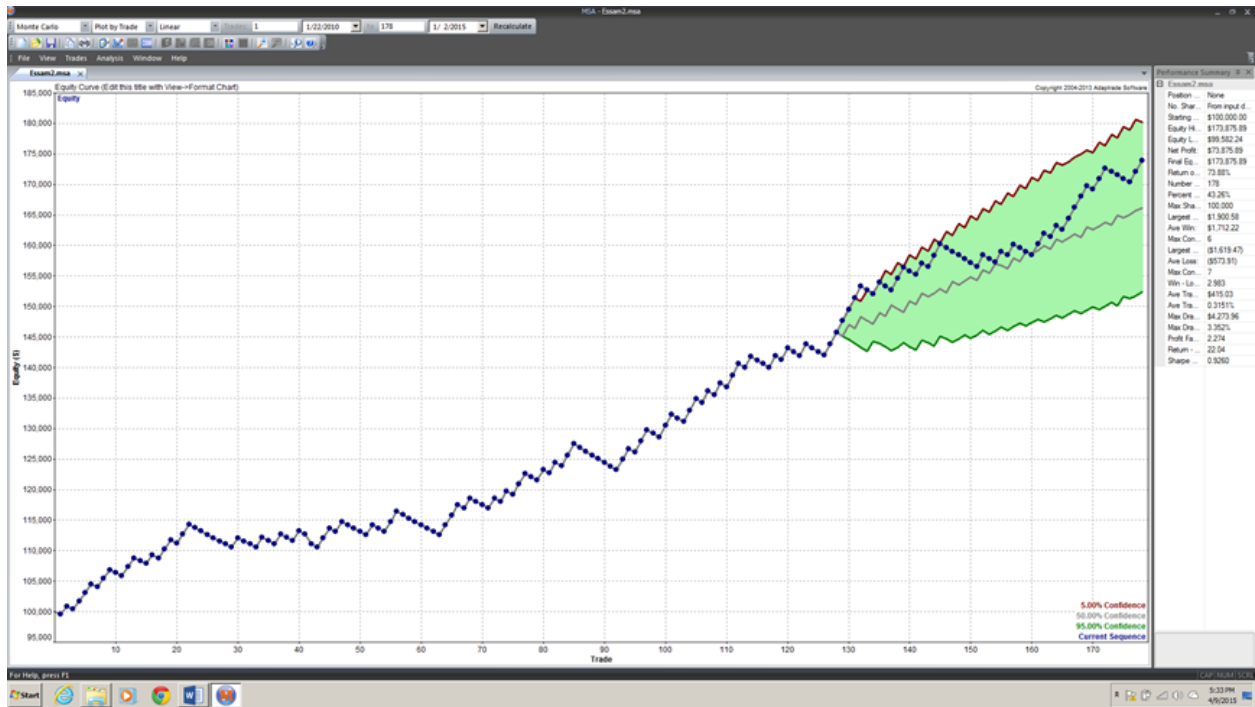
C4. Bowei's Monte Carlo Figures
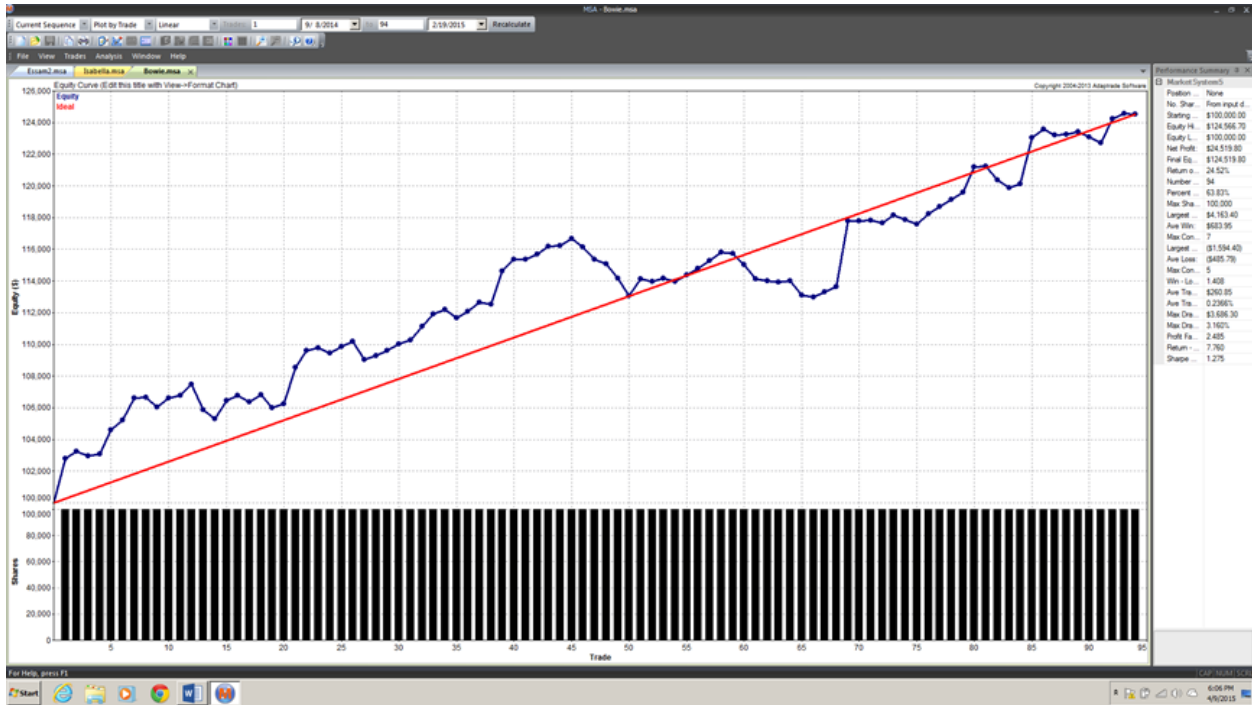
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┌─────────────────────────────────────────────────────────────────────────┐
│ ◉ Monte Carlo Results: Market System                          _ □ X       │
│ File  Edit  Help                                                          │
├─────────────────────────────────────────────────────────────────────────┤
│ Initial Account Equity: $100,000.00                                    ▲  │
│ Trading Vehicle: Stocks                                                   │
│ Minimum Margin Requirement: 100.0%                                        │
│ Slippage per side: $0.00 per trade                                        │
│ Commissions and fees per side: $0.00 per trade                           │
│                                                                           │
│ Position Sizing Method: None                                              │
│ No. Shares: From input data                                               │
│ Number of Monte Carlo Samples: 10,000                                     │
│                                                                           │
│ Key Results at Select Confidence Levels                                   │
│                                                                           │
│ Confidence (%)  Rate of Return (%)  Max Drawdown (%)  Return-DD Ratio  Mod. Sharpe Ratio │
│ 50              24.52               2.645             9.271            0.2996            │
│ 60              24.52               2.838             8.641            0.2983            │
│ 70              24.52               3.051             8.037            0.2969            │
│ 80              24.52               3.358             7.303            0.2952            │
│ 85              24.52               3.550             6.907            0.2941            │
│ 90              24.52               3.816             6.426            0.2929            │
│ 91              24.52               3.885             6.311            0.2926            │
│ 92              24.52               3.959             6.193            0.2922            │
│ 93              24.52               4.046             6.060            0.2918            │
│ 94              24.52               4.152             5.905            0.2915            │
│ 95              24.52               4.269             5.744            0.2910            │
│ 96              24.52               4.390             5.586            0.2904            │
│ 97              24.52               4.564             5.372            0.2897            │
│ 98              24.52               4.811             5.096            0.2888            │
│ 99              24.52               5.333             4.598            0.2876            │
│ 100             24.52               7.447             3.293            0.2787            │
│                                                                           │
│ Monte Carlo Results at 95.00% Confidence                                  │
│                                                                           │
│ Total Net Profit: $24,519.80           Max Number of Shares: 100,000      │
│ Final Account Equity: $124,519.80      Minimum Number of Shares: 100,000  │
│ Return on Starting Equity: 24.52%      Average Number of Shares: 100,000   │
│ Profit Factor: 2.485                                                      │
│                                                                           │
│ Largest Winning Trade: $4,163.40       Largest Losing Trade: ($1,594.40)  │
│ Largest Winning Trade (%): 3.459%      Largest Losing Trade (%): -1.594%  │
│ Average Winning Trade: $683.95         Average Losing Trade: ($485.79)    │
│ Average Winning Trade (%): 0.6040%     Average Losing Trade (%): -0.4565% │
│                                                                           │
│ Average Trade: $260.85                 Win/Loss Ratio: 1.408              │
│ Average Trade (%): 0.2365%             Win/Loss Ratio (%/%): 1.379        │
│ Trade Standard Deviation: $873.85      Max Consecutive Wins: 6            │
│ Trade Standard Deviation (%): 0.8139%  Max Consecutive Losses: 6          │
│                                                                           │
│ Worst Case Drawdown: ($4,780.40)       Return/Drawdown Ratio: 5.744       │
│ Worst Case Drawdown (%): 4.269%        Modified Sharpe Ratio: 0.2910      │
│ Average Drawdown: ($1,279.45)                                             │
│ Average Drawdown (%): 1.143%                                           ▼  │
└─────────────────────────────────────────────────────────────────────────┘
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Optimization Results: Market System                                    _ □ ×
File   Edit   Help

    Market System: Bowie.msa

    POSITION SIZING METHOD:   Percent Equity
    OPTIMIZED PARAMETER:   Percent of Equity

    Optimal Results Over All Trades

    ANALYSIS SETTINGS:
    Initial Account Equity: $1,000,000.00
    Trading Vehicle: Stocks
    Minimum Margin Requirement: 100.00%
    Slippage per side: $0.00 per trade
    Commissions and fees per side: $0.00 per trade

    Optimized for Net Profit
    No constraint on max percent drawdown
    Optimized over existing sequence of trades

    RESULTS:
    Optimal Percent of Equity: 200.00
    Net Profit at Optimum: 2451980.00
    Max Percent Drawdown at Optimum: 13.82%
```

D. Trade Journal

D1. Tom's Trade Journal

Tom Paolillo   Weekly Journal

Format of each entry:

-Weekly analysis of the general market conditions for asset classes I am trading.

-Coverage of the important news relevant to the asset classes I am trading.

-Describing the details of my trading activities.

-Performance report since 11/1/2014.

November 3, 2014:

The only market I was involved in this first week was the USDJPY. At the end of the previous week, it had quickly risen from about 109.00 to 112.500 to start this week. It then continued to steadily rise to a high of 115.500 and now rests at 114.616 at the end of this week. There was an increasing amount of variability towards the end of the week, and the USDJPY was showing downwards movement before the weekend, and could likely be even further down when it opens on Monday.

I happened to luck into a great situation with the USDJPY. The central bank of Japan and its main government pension fund said they were to pump trillions of yen into circulation last Friday. This news clearly effected the Japanese economy significantly. The addition of yen obviously cause the value of the yen to decrease. This in turn affected the currency parings involving yen, which I just happened to be on the right side of for the USDJPY. Since the announcement, the USDJPY has reflected this change in response to the news.

The moving averages strategy I developed seemed to be doing well. It made great profits for the previous data that I optimized it for, and it has been showing similar profit with the new figures that it hadn't seen before. Because of its success, I set it up to auto trade without my confirmation at the beginning of the week so it would just run and make trades while I went about my life. This was just a first step trial stage, so I only had it using about $1000 per trade and only on the USDJPY. I had the interval set to 10 minute bars because this strategy works well with a lot of noise and variability (which a lower interval will bring) as opposed to predicting large trends over longer time periods. It was fairly profitable, but that was likely

influenced by the fact that I got lucky with the USDJPY rising significantly. Although other Forex markets also made good profits, so my strategy still seems generally consistent across the board.

The beginning sum of money starting from November 1, 2014 is $97,903. This first week, I made a $797 profit and also an ongoing trade that did not close before the weekend that I will include in next week's report. My current total is $98,700.

Picture of the USDJPY over the week with my strategy's trades indicated on it:
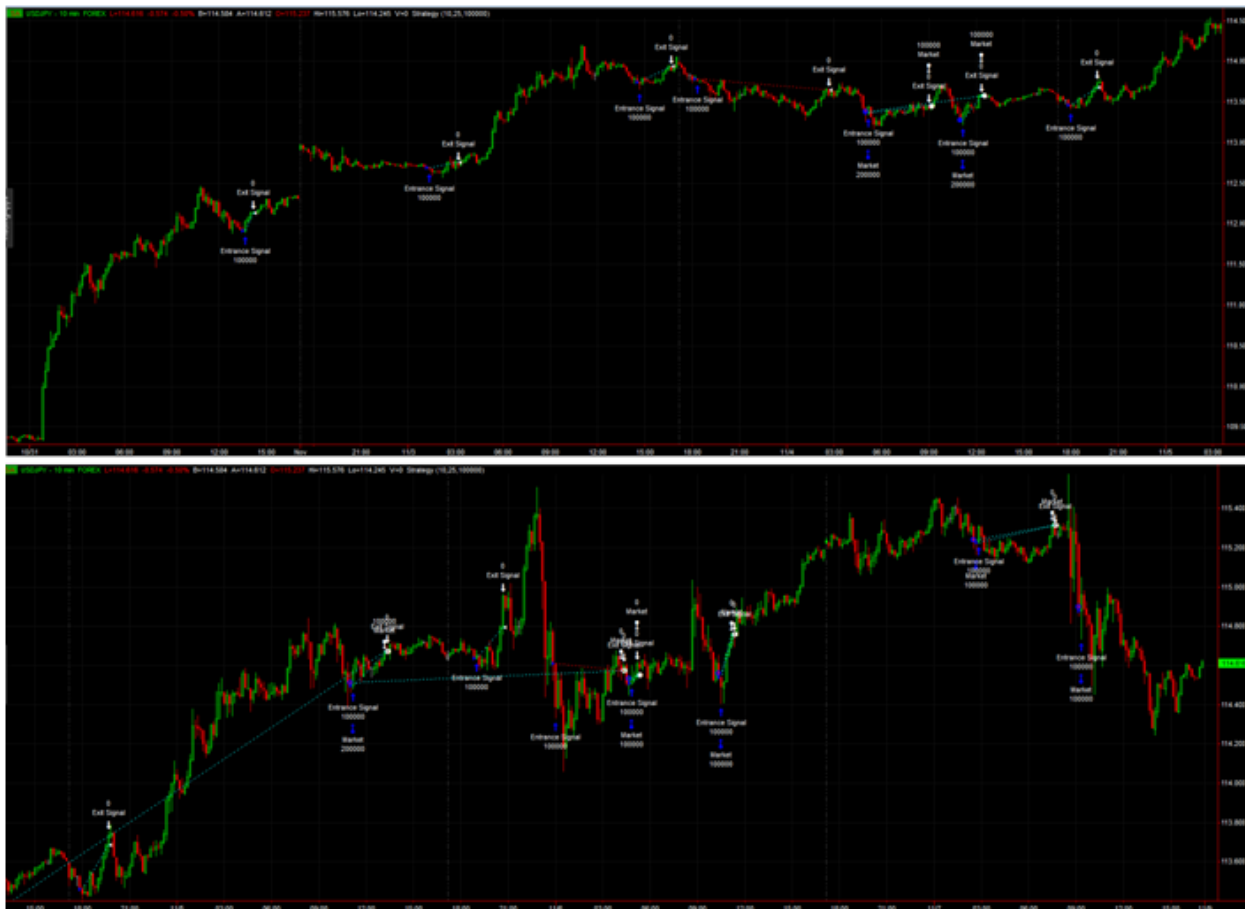
November 10, 2014:

This week I traded the USDCHF and USDCAD in addition to the USDJPY.

USDJPY: Riding the shockwave from the last few weeks, the USDJPY has still be steadily increasing. Despite a small dip to 114.00 early on in the week, it quickly picked up, reaching well into the 116.00s, barely reaching 117.00, and now sits at 116.50.

USDCHF: The USDCHF started the week at 0.965 and stayed close to that value with some slight variance throughout the week. On Friday, it took a nose dive and dropped to 0.96 and now rests at 0.9563.

USDCAD: The USDCAD has shown a downwards trending parabolic pattern. There are large, sudden increases, and large sudden drops followed by a short stabilization. The market began the week at 1.138, dropped to 1.128, rose to 1.138, then dropped to 1.128 again. It seems like a strategy using resistance and support levels would do well in the general pattern displayed over the last week.

There has been a trend of falling oil prices in Canada, currently at $74.20 per barrel. The cost of oil and price of currency often show to have a correlation with each other. As oil prices decrease, the Canadian dollar decreases in value as well. This partly affects the USDCAD market, forcing it upwards as the CAD falls. This isn't too evident from the 30 minute bars that I'm trading, but on a larger scale, an upward trending graph is beneficial for my strategy.

This week, I added my strategy to the USDCHF and USDCAD, which showed the next two highest net profits among the major currency pairings for my strategy. I hoped having my strategy span multiple markets would help cover some outlying bad trades and overall decrease the risk of putting all my eggs in one basket. After watching how the strategy traded and how the markets moved, I decided to go from a 10 minute bar to a 30 minute bar to reduce the variability, and since then I've been happy with the results, taking mostly positive trades. However, as it has been mentioned, Fridays and Mondays aren't the best for currency trading. At the beginning of the week, my strategy closed some bad entries it made the previous Friday in the USDJPY, losing over half the profit of the previous week. At the end of this week, 2 out of 3 of my long positions are also deep in the red as of now and I expect them to close in the red come Monday. It seems I slowly make between $700 to $1000 in profit, then lose most of it on Friday. The next week, I am going to update my strategy to abstain from trading after 12:00AM Friday until Monday. All open positions will be closed at 12:00AM Friday because I no longer trust the markets on Friday.

This week, I made a only a $30 profit from the previous week's ending figure, totaling $98,730. This means I have a $827 total profit from the beginning sum. The massive drop from last Friday really cut into the earnings from the entire week and, unfortunately, the same is likely to happen at the beginning of this week because I still had open trades on Friday.

Pictures of the currency pairs I traded over the week with my strategy's trades indicated on them:

November 17, 2014:

USDJPY: The USDJPY continues to steadily increase. It started near 116.50 and peaked at 118.84 near the middle of the week and then dropped back down and now lies around 118.00.

USDCHF: The USDCHF opened at 0.963 and quickly dropped to 0.958 and stayed in that general area for most of the week. Further into the week, it saw an amazing climb to 0.972 and has since fallen back slightly, resting around 0.967.

USDCAD: The USDCAD continued its pattern of smooth, parabolic rises and falls. Opening at 1.129, it takes a small dip to 1.126, then slowly climbs up to 1.136. It then takes a bit of a drop down, stabilizing at 1.130 for a day, then drops even more, down to 1.123, where it ends the week.

Support for an initiative to force the central bank of Switzerland to increase its holdings of gold fell, making it less likely it will pass in a vote later this month. The vote for the initiative dropped from 44% to 38% and the vote against the initiative rose from 39% to 47%. This could largely affect the Swiss Franc, which affects my trading of the USDCHF. It's something to keep an eye on when the actual vote is passed.

The Japanese economy has been boosted thanks to Abenomics. Japanese equities have been on the rise and the Nikkei-225 index is up more than 19% since mid-October. As an effect of Abenomics, the depreciation of yen is expected. This could mean higher gains for the USDJPY, which has been and hopefully will continue to be a main source of my profit.

Despite my experiences with the market last Friday, Monday picked up the slack and the $1000 accumulated loss I was expecting was significantly reduced to a few hundred with some currency pairings turning into a profit while others just reduced the loss amount. Because the strategy seems to handle the fluctuation from Friday to Monday somewhat well despite worries

seeing its prices at the end of Friday, I decided to keep it trading through Fridays. What I'm going to do instead to minimize loss is stop trading the USDCAD. It has had many lost trades in a row and over the last 3 to 4 weeks has official gone into the red profit-wise. I'm not 100% sure all the factors that went into this change considering it was the third highest netting market for my strategy at the beginning of the term, but for whatever reason, the market has changed to not being optimal for my strategy. One of the factors is possibly an overall downwards trend at longer time intervals which hurt my strategy that only goes long. For these reasons, I have now dropped the USDCAD. My USDJPY trading continues to be mostly profitable trades, bringing in about $200 a day. The USDCHF has more variation with both profitable and losing trades, but overall has a net profitability. This week the USDCHF shot up from 0.958 to 0.972, but my strategy exited from a long position 2 bars before this jump, missing out on a huge profit. This is unfortunate, but I can't complain seeing as my strategy had just made about $1000 between 4 trades in the USDCHF a few days leading up to this spike.

This week, I made only a $636 profit from the previous week's ending figure, totaling $99,366. This means I have a $1,463 total profit from the beginning sum.

Picture of the currency pairs I traded over the week with my strategy's trades indicated on them:
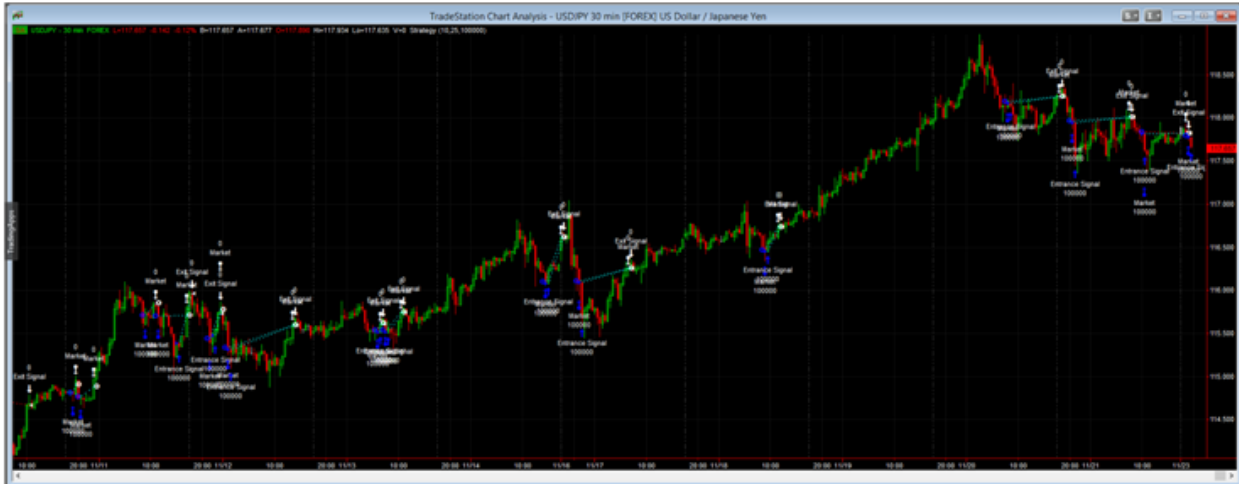
December 8, 2014:

USDJPY: The USDJPY finally began its downswing after peaking at 212.500. Despite some bumps that looked like false recoveries, the USDJPY fell pretty steadily. It reached down to 118.00 briefly before recovering for a short time and remaining near 119.500. After, it dropped again, down to 117.500. It climbed a bit higher towards the end of the week and ended at 118.500.

USDCHF: The USDCHF opened at 0.98200 and showed a similar fall to the USDJPY. It saw quick decline with a rhythmic pull back forcing the trend upwards for a few bars and then falling back down 5 times as much. This repeated throughout the week, eventually closing at 0.96500. Oil prices reached a five year low early in this week on Monday. US oil prices dropped 4.2%, or $2.79 per barrel from a $63.05 total and are down 36% for the year. The global benchmark,

Brent crude, is also down 4.2%, dropping $2.88 off their barrel cost of 66.19 and down 40% for the year. These developments have rattled currency markets and the effects seem unstable. This was my worst week due to the drops in both my active trading markets. Combined manual trading and auto trading losses this week summed $1,378. I had gone long in both markets before the drops and my auto trading system made similar trades. I was hoping to catch a bit more from the rising USDJPY specifically, but considering these trends and the other currency pairs involving the USD, it's clear the weakened USD inhibited the growth of the currency pairs. I started the week with $98,592 and ended with $97,214.

The images of the USDJPY and USDCHF charts for the week can be seen below:

January 19, 2015:

USDCHF: The USDCHF opened at 0.87 on Monday and closed at 0.87 on Friday. The graph looked similar to a sin curve; it rose slowly to 0.88, fell slowly to 0.85, then rose again to 0.875. There was very little variance.

The USDCHF took a major hit the other week with the sudden rise of the Swiss Franc. Investors lost upwards of hundreds of millions of dollars when the Swiss currency jumped by nearly 30% against the euro and 18% against the dollar in the minutes following the Swiss Nation Bank's decision to stop reining in the value of the franc against the euro.

This week, I attempted a manual trade in the USDCHF, hoping there was still some potential left after the massive drop off of the previous week. I was basing my prediction model off of the activity the USDJPY showed last term. There was a sharp rise, a small pullback down, and then a steady continual rise. I approached the USDCHF as the mirrored version of this scenario. There was a sharp drop and a small pullback up, so I anticipated a somewhat noisy but overall consistent decline. I was betting against the USDCHF, so I shorted a standard lot at around 0.87 and set a loss exit at 0.88 and a profit exit at 0.85. I left quite a bit of wiggle room because I anticipated the trend to decrease slowly over time and intended for the trade to be a somewhat long term investment. Unfortunately, as I've experienced before, my ability to spot trends and predict movement is, at least at this point, very unreliable. The USDCHF dipped down to give me a few hundred dollar profit, then rose to hit my stop loss after only one day, losing me $1,040. 93907

This week, I lost $1,040. My total is now $96,440, which means I'm $1,463 in the red since starting the account. The following graphs show the sudden decline, and my trading activity, of the USDCHF:

February 2, 2015:

GBPUSD: The GBPUSD opened at 1.503 and steadily rose through the week, reaching a height of 1.535 before dropping down to 1.525 on Friday to end the week.

USDCAD: The USDCAD opened at 1.2475 and experienced some wild swings throughout the week. It climbed to 1.265, fell to 1.240, climbed up to 1.260, fell to 1.240 again, and finally ended climbing up to 1.255.

USDCHF: The USDCHF opened at 0.927 and was fairly smooth and directionless throughout the week. It climbed to 0.929 on Monday, then fell down to 0.924, where it hovered around for the next few days. On Thursday, it rose to 0.930 but fell back down to 0.925 by the end of the week.

The USDCAD has corrected to the downside in trading on Thursday helped by rising oil prices. The trade figures released earlier showed a -0.65 billion deficit vs. -1.10 billion estimate. On Wednesday, the inventory data was bearish. That sent prices lower. The next day, we are seeing a corrective rebound. Until the supply situation shows signs of slowing, it would seem the downside for the USDCAD will be limited.

This week, I set my Bollinger bands strategy to start trading on the GBPUSD and the USDCAD. Both currency pairs showed the greatest profit for the strategy when back-tested. I also traded at the hour interval as it was also found to have provided the greatest profit in the past. This first week showed potential profit but it was brought down by losses due to an accidental coding error. I had set an additional entrance condition that would only go long if the previous 2 bars were profitable (along with the original entry condition in relation to the Bollinger bands). I had accidentally reversed one of the conditional statements so it would enter only if the previous bar wasn't profitable but the bar prior to that bar was profitable. Because the strategy was based on this pattern, it entered during a downward trend and suffered quite a loss. Despite this, the strategy showed profit both before this coding error was made and after it was fixed. In the GBPUSD, it made a $470 profit prior to the error and currently sits on an open trade at a $220 profit which will resolve next week. This profit was offset by extreme losses in the USDCAD as well as the losses cause by my coding error. Considering the current standing of the open trade, I lost $36 for the week. This might be a slight profit when the trade eventually closes, or it might send me even further in the red.

Due to poor performance in the USDCAD and other currency pairs, I feel the strategy is not designed well enough to thrive across multiple pairs. Being successful in only one pair means the strategy likely is succeeding only because of some other factors specific to that pair and could change in the future. I want to develop the strategy to be more well rounded and

specifically less risky by having a loss prevention at a specific dollar amount as opposed to a percentage based off the difference of the Bollinger bands. The way it currently is coded, a more volatile graph allows for a larger possible loss, when it should realistically cut a loss even sooner than a smooth graph. I had intended a maximum loss of maybe $100 per trade, but there were losses in the upwards of $300 to $400.

The following graphs show my strategy's trades within the USDCAD and GBPUSD:

February 9, 2015:

GBPUSD: The GBPUSD opened at 1.525 and remained in the area for most of the week. On the last two days, it rose suddenly to 1.540, where it ended for the week.

USDCAD: The USDCAD opened at 1.250 and, after a small dip to 1.243, rose to 1.265. It then fell back to 1.250 to close the week with almost no net movement.

USDCHF: The USDCHF opened at 0.925 and steadily rose throughout the week to close at 0.930 with fairly little variability.

For many investors, a stronger dollar has been a sure bet as the U.S. moves toward economic recovery and higher interest rates, while the eurozone and Japan apply stimulus efforts that weaken their currencies. However, the dollar fell 0.4% against the Yen and the Euro climbed 0.1% against the dollar towards the end of this week. Investors shift their gaze to U.S. retail-sales numbers for January, scheduled to be reported Thursday, to gauge the degree to which consumer demand is driving the broader economy. Economists forecast sales will fall 0.5% from a month earlier, which would likely weigh on the dollar.

My Bollinger Bands strategy continued unaltered this week to bring more loss. It closed the previous weeks open trade with a loss and made several more trades, accumulating a loss of 49 pips and about $500. I have been trying several different combinations of changes to the strategy to make it more consistent and stable. I believe I had succeeded, but I wanted another week's worth of data before deciding on implementing my changes.

The first issue I had with the strategy was that it's stop loss would often be too great because it was based on a percentage. Depending on how far apart the support and resistance were, the exit prices would also change. This led to the possibility of losses of over $300 and profits of less than $200. This was not my intent because the strategy depended on the possible loss being outweighed by the possible profit. With suggestion from Professor Radzicki, I learned of keywords that could set exit marks depending on the profit of an open position. With this, I set a stop loss of 120 units and a profit target of 300 units. This ensured that a profitable trade would make up for nearly 3 unprofitable trades.

The second issue was reaching a percentage of accuracy that would allow profit. With a set profit of 300 and a loss of 120, the strategy would only need to maintain a profitable trade percentage of 28.5%. Anything greater than this guarantees net profit and anything lower than it guarantees net loss. The variable I altered to aid in this respect is how close the graph needs to be to the support in order to enter long. It had been 1% of the difference between support and resistance lines, but optimization with the new stop loss and profit target system saw that 2% greatly improved profitable trade percentage.

The currency pairs that I'm going to let run the strategy live and were most promising are the GBPUSD, USDCHF, and USDCAD. They had the highest profitable trade percentage within the same interval, 60 minute, whereas other time intervals only yielded one or two profitable currency pairs.

The following charts show the strategy's performance reports for the currency pairs:

GBPUSD:

Total Net Profit	$1,343.00	Profit Factor	1.33
Gross Profit	$5,423.00	Gross Loss	($4,080.00)
Roll Over Credit	$0.00		
Open Position Profit/Loss	$0.00		
Select Total Net Profit	$4,380.00	Select Profit Factor	7.08
Select Gross Profit	$5,100.00	Select Gross Loss	($720.00)
Adjusted Total Net Profit	($634.93)	Adjusted Profit Factor	0.87
Adjusted Gross Profit	$4,144.79	Adjusted Gross Loss	($4,779.71)
Total Number of Trades	52	Percent Profitable	34.62%
Winning Trades	18	Losing Trades	34
Even Trades	0		
Avg. Trade Net Profit	$25.83	Ratio Avg. Win:Avg. Loss	2.51
Avg. Winning Trade	$301.28	Avg. Losing Trade	($120.00)
Largest Winning Trade	$323.00	Largest Losing Trade	($120.00)
Largest Winner as % of Gross Profit	5.96%	Largest Loser as % of Gross Loss	2.94%
Net Profit as % of Largest Loss	1119.17%		
Slct. Net Profit as % of Largest Loss	3650.00%	Adj. Net Profit as % of Largest Loss	(529.11%)
Max. Consecutive Winning Trades	3	Max. Consecutive Losing Trades	5
Avg. Bars in Winning Trades	3.89	Avg. Bars in Losing Trades	2.06
Avg. Bars in Total Trades	2.69		
Max. Shares/Contracts Held	100000	Account Size Required	$600.00
Total Commission	$0.00000	Total Slippage	$0.00000
Return on Initial Capital	1.34%	Annual Rate of Return	12.14%
Buy and Hold Return	1.91%	Return on Account	223.83%
Avg. Monthly Return	$671.50	Std. Deviation of Monthly Return	$239.71

USDCAD:

Total Net Profit	$2,360.97	Profit Factor	2.16
Gross Profit	$4,397.76	Gross Loss	($2,036.79)
Roll Over Credit	$0.00		
Open Position Profit/Loss	($79.67)		
Select Total Net Profit	$2,360.97	Select Profit Factor	2.16
Select Gross Profit	$4,397.76	Select Gross Loss	($2,036.79)
Adjusted Total Net Profit	$879.95	Adjusted Profit Factor	1.35
Adjusted Gross Profit	$3,361.20	Adjusted Gross Loss	($2,481.25)
Total Number of Trades	39	Percent Profitable	46.15%
Winning Trades	18	Losing Trades	21
Even Trades	0		
Avg. Trade Net Profit	$60.54	Ratio Avg. Win:Avg. Loss	2.52
Avg. Winning Trade	$244.32	Avg. Losing Trade	($96.99)
Largest Winning Trade	$253.13	Largest Losing Trade	($101.62)
Largest Winner as % of Gross Profit	5.76%	Largest Loser as % of Gross Loss	4.99%
Net Profit as % of Largest Loss	2323.24%		
Slct. Net Profit as % of Largest Loss	2323.24%	Adj. Net Profit as % of Largest Loss	865.88%
Max. Consecutive Winning Trades	4	Max. Consecutive Losing Trades	3
Avg. Bars in Winning Trades	5.78	Avg. Bars in Losing Trades	2.48
Avg. Bars in Total Trades	4.00		
Max. Shares/Contracts Held	100000	Account Size Required	$385.63
Total Commission	$0.00000	Total Slippage	$0.00000
Return on Initial Capital	2.36%	Annual Rate of Return	21.24%
Buy and Hold Return	5.15%	Return on Account	612.24%
Avg. Monthly Return	$1,140.65	Std. Deviation of Monthly Return	$1,255.58
Return Retracement Ratio	57.31	RINA Index	279.30
Sharpe Ratio	n/a	K-Ratio	n/a

USDCHF:

Total Net Profit	$1,050.87	Profit Factor	1.27
Gross Profit	$4,947.89	Gross Loss	($3,897.02)
Roll Over Credit	$0.00		
Open Position Profit/Loss	$0.00		
Select Total Net Profit	$237.92	Select Profit Factor	1.06
Select Gross Profit	$4,134.94	Select Gross Loss	($3,897.02)
Adjusted Total Net Profit	($983.01)	Adjusted Profit Factor	0.79
Adjusted Gross Profit	$3,625.51	Adjusted Gross Loss	($4,608.52)
Total Number of Trades	44	Percent Profitable	31.82%
Winning Trades	14	Losing Trades	30
Even Trades	0		
Avg. Trade Net Profit	$23.88	Ratio Avg. Win:Avg. Loss	2.72
Avg. Winning Trade	$353.42	Avg. Losing Trade	($129.90)
Largest Winning Trade	$812.95	Largest Losing Trade	($140.53)
Largest Winner as % of Gross Profit	16.43%	Largest Loser as % of Gross Loss	3.61%
Net Profit as % of Largest Loss	747.81%		
Slct. Net Profit as % of Largest Loss	169.31%	Adj. Net Profit as % of Largest Loss	(699.52%)
Max. Consecutive Winning Trades	2	Max. Consecutive Losing Trades	6
Avg. Bars in Winning Trades	4.29	Avg. Bars in Losing Trades	1.60
Avg. Bars in Total Trades	2.45		
Max. Shares/Contracts Held	100000	Account Size Required	$810.83
Total Commission	$0.00000	Total Slippage	$0.00000
Return on Initial Capital	1.05%	Annual Rate of Return	9.52%
Buy and Hold Return	(8.63%)	Return on Account	129.60%
Avg. Monthly Return	$525.53	Std. Deviation of Monthly Return	$711.29
Return Retracement Ratio	6.19	RINA Index	21.08
Sharpe Ratio	n/a	K-Ratio	n/a

I've also been wondering how another strategy would perform, so I tried a few implementations of it. I called the strategy the Triple Bar Buy. All it would do is enter the market long if there were 3 consecutive profitable bars. It would then only and always exit at the next

unprofitable bar. It traded often and performed either extremely well or extremely poorly varying from pairing to pairing . I looked at many time intervals and found the same thing; it would always be very profitable in one or two currency pairs and very unprofitable in the others. This leads me to believe specific trends are beneficial to the strategy and other trends not so much. If I could identify when it worked best by just graph shape alone, I could have it only trade under those conditions. This would retain most of the profit and cutout most of the losses.

Below are the net profit for the major currency pairs trading at a 60 minute interval:

DBPUSD: 3,580

EURUSD: - 4,472

USDCHF: - 410.53

USDCAD: 514.61

USDJPY: 348.29

NZDUSD: - 3,388

AUDUSD: - 1,997

February 16, 2015:

GBPUSD: The GBPUSD opened at 1.542 and dipped down to 1.535, where it remained for most of the week, before rising back up to 1.541.

USDCAD: The USDCAD opened at 1.244 and remained fixed at that figure while fluctuating around it, ending the week slightly higher at 1.249.

USDCHF: The USDCHF opened at 0.9315 and steadily rose albeit with volatility the whole week, closing at 0.9493

The FOMC minutes revealed that the Fed is indeed discussing measures to be taken in order to prepare for future rate hikes. There was neither a strong confirmation of a mid-year rate hike, or strong enough concern to raise significant doubt. The market did not like the minutes for the USD and we saw it slide across the board. The USDJPY looked like it wanted to revive a bullish trend this week after holding above 118.20. However, it is finding resistance around 119.40 and after the FOMC minutes, it fell back below 119. The GBPUSD was stalling around the high on the week near 1.5440 before the FOMC minutes. Afterwards, we got a pop above the intra-session consolidation range and looks poised to continue its bullish trend at least in the short-term. The EUR/USD was consolidating this week under 1.1445 as we can see in the 1H chart. After the FOMC minutes, we can see that price is again poised to test the 1.1440-1.1450 area as resistance.

I kept the updated Bollinger Bands strategy running all week and the results are within reasonable expectations. The strategy made 19 trades over the week between the GBPUSD, USDCAD, and USDCHF and brought a net profit of -$339.00. Despite being in the red for this week, I am not worried about the strategy's profitability. A loss of $339 could mean 3 losses in a row, but it would only take 1 or 2 wins to become profitable again. This is how the system was designed to work after all, approximately win for every 3 losses, so the results could be better but are within reason. There was a point in the week where the net profit was at $376.30, so the strategy can swing back up just as easily as it went down.

Below are the performance summary and trade list for the strategy:

	All Trades	Long Trades	Short Trades
Total Net Profit	($339.00)	($339.00)	$0.00
Gross Profit	$1,590.29	$1,590.29	$0.00
Gross Loss	($1,929.29)	($1,929.29)	$0.00
Profit Factor	0.82	0.82	n/a
Roll Over Credit	$0.90	$0.90	$0.00
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	($339.00)	($339.00)	$0.00
Select Gross Profit	$1,590.29	$1,590.29	$0.00
Select Gross Loss	($1,929.29)	($1,929.29)	$0.00
Select Profit Factor	0.82	0.82	n/a
Adjusted Total Net Profit	($1,497.01)	($1,497.01)	$0.00
Adjusted Gross Profit	$989.21	$989.21	$0.00
Adjusted Gross Loss	($2,486.23)	($2,486.23)	$0.00
Adjusted Profit Factor	0.40	0.40	n/a
Total Number of Trades	19	19	0
Percent Profitable	36.84%	36.84%	0.00%
Winning Trades	7	7	0
Losing Trades	12	12	0
Even Trades	0	0	0
Avg. Trade Net Profit	($17.84)	($17.84)	$0.00
Avg. Winning Trade	$227.18	$227.18	$0.00
Avg. Losing Trade	($160.77)	($160.77)	$0.00
Ratio Avg. Win:Avg. Loss	1.41	1.41	n/a
Largest Winning Trade	$288.00	$288.00	$0.00
Largest Losing Trade	($204.00)	($204.00)	$0.00
Largest Winner as % of Gross Profit	18.11%	18.11%	n/a
Largest Loser as % of Gross Loss	10.57%	10.57%	n/a
Net Profit as % of Largest Loss	(166.18%)	(166.18%)	n/a
Select Net Profit as % of Largest Loss	(166.18%)	(166.18%)	n/a
Adjusted Net Profit as % of Largest Loss	(733.83%)	(733.83%)	n/a

#	Type	Date/Time	Account	Symbol	Price	Roll Over Pips	Shares/Ctrts/Units	Net Profit	Cum Net Profit	%Profit	Run-up	Drawdown	Efficiency	Total Eff.	Comm.
1	Buy	02/16/15 04:00:00	SIM663877X	USDCHF	Fr.0.93	0.00	100000						0.00%		$0.00
	Sell	02/16/15 10:58:05	SIM663877X	USDCHF	Fr.0.93			($167.44)	($167.44)	(0.17%)	$0.00	$0.00	0.00%	(100.00%)	$0.00
2	Buy	02/16/15 08:00:00	SIM663877X	GBPUSD	$1.54	0.00	100000						0.00%		$0.00
	Sell	02/16/15 12:01:49	SIM663877X	GBPUSD	$1.54			($149.00)	($316.44)	(0.10%)	$0.00	($149.00)	0.00%	(100.00%)	$0.00
3	Buy	02/16/15 03:00:00	SIM663877X	USDCAD	$1.24	0.00	100000								$0.00
	Sell	02/17/15 02:56:33	SIM663877X	USDCAD	$1.24			$75.86	($240.58)	0.08%	$503.44	($54.55)	90.23% / 23.28%	13.51%	$0.00
4	Buy	02/16/15 15:00:00	SIM663877X	GBPUSD	$1.54	5000.00	100000								$0.00
	Sell	02/17/15 11:00:00	SIM663877X	GBPUSD	$1.53			($163.50)	($404.08)	(0.11%)	$387.50	($246.50)	61.04% / 13.09%	(25.87%)	$0.00
5	Buy	02/17/15 03:56:46	SIM663877X	USDCAD	$1.24	0.00	100000						0.00%		$0.00
	Sell	02/17/15 04:00:00	SIM663877X	USDCAD	$1.24			($116.25)	($520.33)	(0.12%)	$0.00	($116.25)	0.00%	(100.00%)	$0.00
6	Buy	02/17/15 04:13:21	SIM663877X	GBPUSD	$1.54	0.00	100000						100.00%		$0.00
	Sell	02/17/15 05:00:00	SIM663877X	GBPUSD	$1.53			$288.00	($232.33)	0.19%	$288.00	$0.00	100.00%	100.00%	$0.00
7	Buy	02/17/15 05:18:25	SIM663877X	USDCHF	Fr.0.93	0.00	100000						0.00%		$0.00
	Sell	02/17/15 08:00:00	SIM663877X	USDCHF	Fr.0.93			($172.93)	($405.26)	(0.17%)	$0.00	($172.93)	0.00%	(100.00%)	$0.00
8	Buy	02/17/15 09:13:47	SIM663877X	USDCAD	$1.24	0.00	100000						58.95%		$0.00
	Sell	02/17/15 09:00:00	SIM663877X	USDCAD	$1.24			$225.98	($179.28)	0.23%	$225.98	$0.00	58.95%	58.95%	$0.00
9	Buy	02/17/15 09:39:58	SIM663877X	GBPUSD	$1.54	4000.00	100000						45.35%		$0.00
	Sell	02/17/15 12:00:00	SIM663877X	GBPUSD	$1.53			$273.40	$94.12	0.18%	$273.40	$0.00	45.35%	45.35%	$0.00
10	Buy	02/18/15 04:25:54	SIM663877X	GBPUSD	$1.54	0.00	100000						100.00%		$0.00
	Sell	02/19/15 05:00:00	SIM663877X	GBPUSD	$1.54			$282.17	$376.30	0.28%	$282.17	$0.00	100.00%	100.00%	$0.00
11	Buy	02/19/15 05:54:55	SIM663877X	USDCHF	Fr.0.94	0.00	100000						0.00%		$0.00
	Sell	02/19/15 10:00:01	SIM663877X	USDCHF	Fr.0.95			($204.00)	$172.30	(0.13%)	$0.00	($204.00)	0.00%	(100.00%)	$0.00
12	Buy	02/19/15 14:20:40	SIM663877X	GBPUSD	$1.54	0.00	100000						0.00%		$0.00
	Sell	02/20/15 06:00:00	SIM663877X	GBPUSD	$1.54			($150.00)	$22.30	(0.10%)	$0.00	($150.00)	0.00%	(100.00%)	$0.00
13	Buy	02/20/15 06:17:43	SIM663877X	GBPUSD	$1.54	0.00	100000						0.00%		$0.00
	Sell	02/20/15 08:00:00	SIM663877X	GBPUSD	$1.54			($150.00)	($127.70)	(0.10%)	$0.00	($150.00)	0.00%	(100.00%)	$0.00
14	Buy	02/20/15 08:25:36	SIM663877X	GBPUSD	$1.54	0.00	100000						100.00%		$0.00
	Sell	02/20/15 07:00:00	SIM663877X	GBPUSD	$1.54			$220.84	$93.13	0.22%	$220.84	$0.00	100.00%	100.00%	$0.00
15	Buy	02/20/15 08:26:36	SIM663877X	USDCAD	$1.24	0.00	100000						0.00%		$0.00
	Sell	02/20/15 09:00:00	SIM663877X	USDCAD	$1.24			($150.00)	($56.87)	(0.10%)	$0.00	($150.00)	0.00%	(100.00%)	$0.00
16	Buy	02/20/15 09:13:10	SIM663877X	USDCAD	$1.25	0.00	100000						100.00%		$0.00
	Sell	02/20/15 09:00:00	SIM663877X	USDCAD	$1.25			$224.04	$167.17	0.22%	$224.04	$0.00	100.00%	100.00%	$0.00
17	Buy	02/20/15 09:53:51	SIM663877X	GBPUSD	$1.54	0.00	100000						0.00%		$0.00
	Sell	02/20/15 11:00:00	SIM663877X	GBPUSD	$1.54			($148.00)	$19.17	(0.10%)	$0.00	($148.00)	0.00%	(100.00%)	$0.00
18	Buy	02/20/15 11:08:02	SIM663877X	GBPUSD	$1.54	0.00	100000						0.00%		$0.00
	Sell	02/20/15 14:00:00	SIM663877X	GBPUSD	$1.54			($180.24)	($161.07)	(0.18%)	$0.00	($180.24)	0.00%	(100.00%)	$0.00
19	Buy	02/20/15 14:34:30	SIM663877X	USDCHF	Fr.0.94	0.00	100000						0.00%		$0.00
	Sell	02/20/15 15:00:00	SIM663877X	USDCHF	Fr.0.94			($182.37)	($343.45)	(0.18%)	$0.00	($182.37)	0.00%	(100.00%)	$0.00
	Buy	02/20/15 15:00:00	SIM663877X	USDCHF	Fr.0.94	0.00	100000								$0.00
	Sell	02/20/15 15:09:31	SIM663877X	USDCHF	Fr.0.94										$0.00

I did some more slight optimization and found a an entrance signal that helped even out the performance of the strategy across all currency pairs. By changing the entrance requirement to being within 8% of the difference between bands of the lower band, almost all currency pairs showed a positive net profit. The only one that remained in the red was EURUSD, but it did decrease from approximately -$600 to -$400. Most other currency pairs increased in net profit over the month of backtesting and although USDCAD dropped a bit, it was still profitable, and I hold that it's better to be slightly successful across multiple skews than only successful in one. The results of the change for each major currency pair can be seen in the table below:

Currency Pair	GBPUSD	EURUSD	USDCHF	USDCAD	USDJPY	NZDUSD	AUDUSD
Net profit with 20% entrance condition	$743.60	-$637.20	$695.34	$2,472.36	$19.29	$58.20	$160.00
Net profit with 8% entrance condition	$1,103.50	-$396.90	$1,290.32	$1,311.00	$12.60	$361.30	$580.30

A more well rounded strategy is good because a profitable graph could overtime become an unprofitable one if a strategy only works under certain circumstances. By making it work across multiple graphs, I ensure it can accommodate the circumstances of a graph changing while retaining similar profitability.

This week, I also attempted to add the possibility for the Bollinger Bands strategy to shortsell. Considering the point of the Bollinger Bands is to act as support and resistance lines, short entrance and exit signals could be developed by reversing the conditions of the long entrance and exit signals. I added this to the strategy so that it would short with the same conditions of the long signal but reversed. The results were underwhelming for the currency pairs I had been trading in, the GBPUSD, USDCAD, and USDCHF. Each lost over $1,000 in net profit when compared to the backtesting done over the past month with only long trades. However, the pairs that I wasn't trading due to having a poor performance with long trades, showed decent profit from the short trades.

The results to be compared can be seen below:

Currency Pair	GBPUSD	EURUSD	USDCHF	USDCAD	USDJPY	NZDUSD	AUDUSD
Net profit with only long trades	$1,103.50	-$396.90	$1,290.32	$1,311.00	$12.60	$361.30	$580.30
Net profit with only short trades	-$1,261.30	$720.80	-$1,596.90	-$1,894.46	-$1.63	$412.90	$1,258.30
Net profit with long and short trades	-$157.80	$323.90	-$306.58	-$583.45	$10.97	$774.20	$1,836.60

The reason the USDJPY showed so little net profit in all categories above is the stop loss of 120 and profit target of 300 refer to currency units of the second currency. So each trade would only gain or lose 120 to 300 JPY, which translates to very little USD. I could have this function more similarly to the other currency pairs, it would just take some customization specific to the USDJPY pairing.

From this, I can see that some graphs benefit most from only long trades, some benefit from only short trades, and some benefit from both. It's clear the GBPUSD, USDCHF, USDCAD, and USDJPY shouldn't include short trades because they perform much better without them. EURUSD is the only currency pair that benefits from short trades while being hindered by long trades. NZDUSD and AUDUSD are the only pairs that benefit from both types of trades. I've tried to examine the graphs on the daily time intervals to see some pattern or trends that could indicate which currency pairs would do best with which of the 3 options from the chart. However, the larger trend of the graph didn't seem to indicate much. The USDCAD and USDCHF both had upwards trending graphs and favored long trades, but the GBPUSD had a very downwards trending graph and also favored long trades. The EURUSD was very downwards trending and favored short trades, while the AUDUSD and NZDUSD both had downwards trending graphs and benefited from both long and short trades.

I had hoped there might be a pattern of upwards trending graphs favoring long trades, downwards trending graphs favoring short trades, and directionless graphs favoring both equally, but unfortunately that doesn't seem to be the case.

I will continue to trade the GBPUSD, USDCAD, and USDCHF with the new optimization but without the shortsell. They are all both the most profitable currency pairs for the strategy and thrive under similar conditions.

The following is Isabella's Trade Journal. Each entry is specified by the start and end dates used for trading and analysis for that week. Generally, it first mention relevant or important news, followed by a manual trade for the week, and lastly any progress on automated strategies.

11/01/14 - 11/09/14

October ended with high impact news that the Bank of Japan was taking risky measures to stimulate the Japanese economy by pumping trillions into assets[1]. Considering that the Japanese economy and the value of the Japanese yen have been notably declining throughout the past year, I will prioritize trading the Yen in the coming month.

With the release of the news at the end of last month, what the Bank of Japan has essentially done is drive down the value of the nation's currency in seek of quick economic and financial gains. This week, it was also reported that the Japanese yen had fallen to the lowest level against the dollar since 2007[2], with many investors predicting the continuation of the decline in value of the yen. For my manual trade of the week I decided to trade USDJPY after reading the news on Nov. 4 of the significant fall of the yen against the dollar, and saw that there was an indication of an uptrend (shown below). I opened a trade as soon as I heard the news, since that is when the news would seemingly have the highest impact.

After identifying this uptrend, I used Fibonacci Retracement Lines in order to use its support and resistance lines as indicators for my entry and exit positions. I monitored the USDJPY chart and waited to see the trend line strengthen and bought after it broke a resistance line at the price of 113.625. I used the highest resistance line as the price to close my trade and take my profit and placed a stop loss at the 61.8% line. The uptrend did continue upwards and I took my profit at 113.728, with a profit of 10.3 pips.

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[1] http://www.wsj.com/articles/bank-of-japan-announces-massive-stimulus-move-1414773082
[2] http://www.wsj.com/articles/yen-falls-to-near-seven-year-low-versus-dollar-1415029708?mobile=y

My manual trade this week did not produce great profit but I suspect it was due to the low 5 min time frame. Next week I will try to make a manual trade with a higher time frame and see if I can produce higher profit from my trade.

My automated strategy trades GBPJPY. This week I read on Forex Factory that the Manufacturing PMI, Construction PMI, and Services PMI were released. Both the Construction PMI and Services PMI were lower than forecasted, while only the Manufacturing PMI was higher than forecasted. These are all important factors to note, as they are leading indicators of the economy since purchasing managers have the most insight into a company's view of the economy. I was curious to see how these would affect the market, but did not make a manual and instead waited to see if my strategy would make a trade based on the conditions that it was programmed to trade under.

I also worked on improving my automated London Breakout strategy and decided that there were some features that were unnecessary. I removed these conditions from my strategy and have not seen any adverse effects from doing so. I will keep it this way for now and hope to have more ideas to implement into my strategy in the coming weeks.

11/10/14 - 11/16/14

This week I decided to also trade EURUSD in order to trade in a currency pair that did not include JPY since I have been focusing my manual trades on USDJPY and my automated strategy trades GBPJPY. I would like to have a diverse experience with several different currency pairs in addition to my efforts in closely following the news of the yen.

The value of the yen has still been down. Similar to last week's news, it was reported again that on Tuesday the yen fell against both the dollar and the euro after reports that the Japanese government could delay a tax increase[3]. I reviewed the 15 min time frame USDJPY chart after reading this news and saw a strong and steady uptrend, and expected to see this continue in accordance to the news of the yen. This proved to be a successful trade for me, with a 48 pip profit from this trade. Reflecting on my USDJPY trade from last week, I suspected that my profit was small because of the small time frame. For this reason I used a 15 min time frame this week and my profit was in fact about 30 pips higher than last week. Although obviously the markets change weekly, I was still able to see a higher profit with a higher time frame.

As I mentioned earlier, I also traded EURUSD this week after reading the US Unemployment Claims report on Forex Factory this Thursday. US unemployment claims were higher than forecasted and so I traded EURUSD, expecting the USD to decline in value. Having had a positive experience with higher time frames this past week in comparison to last week for my USDJPY trades, I decided on using a 30 min time frame for this EURUSD trade. After reading the negative news of the US unemployment claims I monitored the EURUSD chart and placed a buy stop 5 pips above what I interpreted to be a strong resistance line in order to avoid buying during a false breakout. I also placed a stop loss at the nearest support line and set my take profit to be taken at the nearest strong resistance line (shown below).

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[3] http://online.wsj.com/articles/japanese-yen-drops-against-dollar-euro-1415733277

My predictions that the USD would decline proved to be correct and I made a profit of 39 pips for this trade (shown on the left). However, after our weekly meeting with Professor Hakim, I was given feedback regarding the riskiness of placing the buy stop at 5 pips above the resistance line. I can now see how 5 pips is a bit low and in my future trades I will place my buy stop higher than that in greater efforts to avoid false breakouts.

This week I also wanted to create a ShowMe that is similar to an example that Professor Hakim showed the group last week during our weekly meeting in which an indicator drew lines at the highest and lowest price before 5PM. The ShowMe I created is based on the London Breakout Strategy which is what my automated strategy is based on. In my strategy, the high and low of the 4 hours prior to the start of the London Session are considered very strong support and resistance lines. If the close price breaks either of the lines, I expect it to continue in its direction with momentum. The strategy trades GBPJPY using 15 min chart. This ShowMe draws a rectangle around all the bars in the 4 hours prior to the start of the London Session, with the width showing the high and low of the 4 hour range. This can be seen in the picture below.

11/17/14 - 11/24/14

This past week it was reported that Japan's GDP fell 1.6% which resulted in two consecutive quarters of contraction, consequently leading the country to fall into recession[4]. This news attracted me very much to continue trading USDJPY, as I anticipated much profit.

I reviewed the USDJPY 60 min chart for the past month and saw that there has been a great uptrend. After reading the recent news of Japan's current state of recession on Monday, I predicted that the uptrend would continue and I opened the trade buying at 116.629. While reviewing the chart beforehand, I found a wedge chart pattern, which I had read about on BabyPips. The wedge that I had created for the USDJPY chart formed after an uptrend. Based on this particular chart pattern, this could indicate a bearish reversal, so I placed my take profit at the intersection price of the upward sloping support and resistance lines of the wedge. My stop loss was placed at the previous swing low. This trade was open for a few days and ended up closing at my take profit price of 118.461. I made a 183 pip profit for this trade (shown below). Although my trade was open for several days, unlike my prior USDJPY trades, I was pleased to note that I used a higher time frame than last week and the week prior to that, and have continued to gain greater profits every time I use a higher time frame.

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[4] http://online.wsj.com/articles/japan-falls-into-recession-1416182404

I took my profit at the aforementioned designated price, but continued to monitor the USDJPY chart to see if the indications from the wedge chart pattern were correct in indicating a bearish reversal and it turned out that it did prove to be true. There was a slight bearish reversal, which could have also been anticipated from the shooting star that can be seen before the downtrend begins (which can be seen below), which I also read about on BabyPips.

All in all, I was pleased with my strategy in using the wedge chart pattern for my manual trade and was glad that it resulted in quite a profitable trade.

Individually, I dedicated some time this week to reviewing and reading about different important chart patterns as well as single candlestick patterns. In doing this, I can recognize a wider variety of patterns which is a great benefit when manually trading. This can be noted in my manual trade this week.

11/25/14 - 11/30/14

I did not do any manual trades during the this Thanksgiving Break, however I did take some time to reflect on the performance of my automated strategy. I decided to check how it performed under different time frames. Beforehand, when I originally created the strategy to see its performance since 01/01/2014, I had found the 15 min time frame to be the most profitable through plenty of trial and error. However when seeing it's performance since 110/1/2014, I found that smaller time frames proved to be more profitable in comparison to the 15 minute time frame that my strategy originally used. This can be seen in the pictures below which show the performance of my automated strategy trading GBPJPY under the 15 minute time frame that I originally programmed my strategy to trade under, and the performance of my strategy under the 30 second time frame which produced double the profits in comparison to the 15 minute time frame.

Performance since 11/01/2014 under 15 minute time frame:

TradeStation Performance Summary			Collapse ⌃
	All Trades	**Long Trades**	**Short Trades**
Total Net Profit	$8,482.68	$8,482.68	$0.00
Gross Profit	$8,482.68	$8,482.68	$0.00
Gross Loss	$0.00	$0.00	$0.00
Profit Factor	n/a	n/a	n/a
Roll Over Credit	$11.14	$11.14	$0.00
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	$8,482.68	$8,482.68	$0.00
Select Gross Profit	$8,482.68	$8,482.68	$0.00
Select Gross Loss	$0.00	$0.00	$0.00
Select Profit Factor	n/a	n/a	n/a
Adjusted Total Net Profit	$5,019.64	$5,019.64	$0.00
Adjusted Gross Profit	$5,019.64	$5,019.64	$0.00
Adjusted Gross Loss	$0.00	$0.00	$0.00
Adjusted Profit Factor	n/a	n/a	n/a
Total Number of Trades	6	6	0
Percent Profitable	100.00%	100.00%	0.00%
Winning Trades	6	6	0
Losing Trades	0	0	0
Even Trades	0	0	0
Avg. Trade Net Profit	$1,413.78	$1,413.78	$0.00
Avg. Winning Trade	$1,413.78	$1,413.78	$0.00
Avg. Losing Trade	$0.00	$0.00	$0.00
Ratio Avg. Win:Avg. Loss	n/a	n/a	n/a
Largest Winning Trade	$1,770.39	$1,770.39	$0.00
Largest Losing Trade	$0.00	$0.00	$0.00
Largest Winner as % of Gross Profit	20.87%	20.87%	n/a
Largest Loser as % of Gross Loss	n/a	n/a	n/a
Net Profit as % of Largest Loss	n/a	n/a	n/a
Select Net Profit as % of Largest Loss	n/a	n/a	n/a
Adjusted Net Profit as % of Largest Loss	n/a	n/a	n/a
Max. Consecutive Winning Trades	6	6	0
Max. Consecutive Losing Trades	0	0	0
Avg. Bars in Total Trades	9.83	9.83	0.00
Avg. Bars in Winning Trades	9.83	9.83	0.00
Avg. Bars in Losing Trades	0.00	0.00	0.00
Avg. Bars in Even Trades	0.00	0.00	0.00

Performance since 11/01/2014 under 30 second time frame:

TradeStation Performance Summary			Collapse ⌃
	All Trades	**Long Trades**	**Short Trades**
Total Net Profit	$16,461.63	$16,461.63	$0.00
Gross Profit	$18,267.50	$18,267.50	$0.00
Gross Loss	($1,805.87)	($1,805.87)	$0.00
Profit Factor	10.12	10.12	n/a
Roll Over Credit	$11.15	$11.15	$0.00
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	$16,461.63	$16,461.63	$0.00
Select Gross Profit	$18,267.50	$18,267.50	$0.00
Select Gross Loss	($1,805.87)	($1,805.87)	$0.00
Select Profit Factor	10.12	10.12	n/a
Adjusted Total Net Profit	$9,939.12	$9,939.12	$0.00
Adjusted Gross Profit	$13,550.85	$13,550.85	$0.00
Adjusted Gross Loss	($3,611.73)	($3,611.73)	$0.00
Adjusted Profit Factor	3.75	3.75	n/a
Total Number of Trades	16	16	0
Percent Profitable	93.75%	93.75%	0.00%
Winning Trades	15	15	0
Losing Trades	1	1	0
Even Trades	0	0	0
Avg. Trade Net Profit	$1,028.85	$1,028.85	$0.00
Avg. Winning Trade	$1,217.83	$1,217.83	$0.00
Avg. Losing Trade	($1,805.87)	($1,805.87)	$0.00
Ratio Avg. Win:Avg. Loss	0.67	0.67	n/a
Largest Winning Trade	$1,949.27	$1,949.27	$0.00
Largest Losing Trade	($1,805.87)	($1,805.87)	$0.00
Largest Winner as % of Gross Profit	10.67%	10.67%	n/a
Largest Loser as % of Gross Loss	100.00%	100.00%	n/a
Net Profit as % of Largest Loss	911.56%	911.56%	n/a
Select Net Profit as % of Largest Loss	911.56%	911.56%	n/a
Adjusted Net Profit as % of Largest Loss	550.38%	550.38%	n/a
Max. Consecutive Winning Trades	12	12	0
Max. Consecutive Losing Trades	1	1	0
Avg. Bars in Total Trades	150.56	150.56	0.00
Avg. Bars in Winning Trades	159.47	159.47	0.00
Avg. Bars in Losing Trades	17.00	17.00	0.00
Avg. Bars in Even Trades	0.00	0.00	0.00
Max. Shares/Contracts Held	1000000	1000000	0
Total Shares/Contracts Held	16000000	16000000	0
Account Size Required	$1,805.87	$1,805.87	$0.00
Total Slippage	$0.000	$0.000	$0.000
Total Commission	$0.000	$0.000	$0.000
Return on Initial Capital	16.46%		
Annual Rate of Return	239.49%		
Buy & Hold Return	2.61%		
Return on Account	911.56%		
Avg. Monthly Return	$16,461.63		
Std. Deviation of Monthly Return	n/a		

12/01/14 - 12/08/14

Over the past two weeks, there have been several reports regarding the strength of the US economy. US banks had their largest quarterly revenue increase since 2009[5], GDP grew 3.6% resulting in the best two quarter stretch in more than a decade[6], and it seems the rise in value of the US dollar has resulted in steep declines in other currencies[7]. Conversely, the Japanese economy has continuously been declining. Two weeks ago, the Japanese economy was reported to be in recession after its GDP fell 1.6%, resulting in two contracting quarters[8]. Additionally, Moody's Investors Service recently downgraded Japan's credit rating over uncertainty regarding Prime Minister Shinzo Abe's recent actions to delay an increase in the national sales tax, and Japan's ability to cut fiscal deficit[9]. With this information I believe it would be in my best interest to continue trading USDJPY, expecting to see a declining yen as usual, and with recent news, an even higher increase in the value of the US dollar.

I began monitoring the USDJPY 30 min chart on Monday and saw that a gradual uptrend formed as the week progressed. Upon reviewing the past 30 days of this particular chart, I noticed that prices were higher than they have been throughout the entire last month. I put great effort into finding chart patterns that might indicate a reversal, but could find none. Based on the both the information from the news and my studies of the chart, the uptrend seemed as though it would continue.

I decided to use Fibonacci Retracement Lines and a trend line in order to determine when might be the best time for me to enter the market as well as when to place a stop loss and take profit. It was difficult for me to identify particularly strong support or resistance lines simply because the current prices are much higher than they have been recently and have continued moving upwards with not much volatility. For this reason, the tools I chose would be beneficial and provide me with potential support and resistance lines that would be better indicators for profit taking levels and placements of stop losses. I used the Fibonacci Retracement Lines from the swing low on Dec. 1st to the swing high on Dec. 3rd, as well as created a trend line from various previous swing highs. I decided to buy when the price broke both the trend line and the highest resistance line from the Fibonacci Retracement Lines in an effort to produce a higher likelihood of profit. I placed my take profit at the 161.80% line since I was confident that the uptrend would continue, and placed my stop loss at the 61.80% line.

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[5] http://www.wsj.com/articles/u-s-banks-showed-continued-strength-in-third-quarter-according-to-fdic-1416927638
[6] http://www.wsj.com/articles/u-s-third-quarter-gdp-revised-up-to-3-9-advance-1416922352?tesla=y&mg=reno64-wsj
[7] http://www.wsj.com/articles/dollars-rise-causes-pain-abroad-1417657867?tesla=y&mg=reno64-wsj
[8] http://www.wsj.com/articles/japan-falls-into-recession-1416182404
[9] http://www.wsj.com/articles/moodys-downgrades-japan-debt-1417425248

I bought at 119.821 on Dec. 3rd when the price broke both the 100% Fibonacci resistance line and the trend line. I monitored the trade intermittently and ended up reading the next day that the dollar had risen above 120 yen for the first time in seven years, but then went back down[10]. This was bittersweet news, considering it was great that the dollar rose so high, but also a bit discouraging that it went back down. Luckily it did not go as low as to hit my stop loss. I was hopeful that this news would not greatly affect my trade and reverse the uptrend since I saw the price start to go back up and fluctuate around the 100% Fibonacci resistance line by the time I had read the news. By the next day, the price had risen significantly and I took my profit at the 161.80% Fibonacci line at the price of 121.024, which can be seen in the screenshot below.

I made a 120 pip profit for this manual trade this week. Although my profit was not as great as other weeks, I was pleased to see the dollar rise so high above the yen and most importantly, that my predictions that the uptrend would continue were correct. I was also pleased that I was able to review so many more chart patterns in efforts to better recognize reversals on a chart. I put much effort in reviewing single, dual, and triple japanese candlestick patterns. Although I did not find any that I could apply in my manual trading this week, I am glad I am much more knowledgeable in that aspect and look forward to putting that knowledge to use.

I also ran my automated London Breakout strategy for the past two weeks, and it produced decent profit. I had previously made some changes in which I attempted to simplify my strategy and omitted some of the original conditions that it ran under, but I have recently implemented them back into the strategy because I found that they were in fact very good aids for avoiding false breakouts. In addition, I had also tested my strategy's performance under different time frames and found that smaller time frames have commonly given me more profitable results in comparison to the original 15 minute time frame that I was using. In seeing the performance during the first three weeks of November, a 30 second time frame produced double the profit compared to the 15 minute time frame. This caught my attention and although I did not want to

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[10] http://www.wsj.com/articles/dollar-rises-above-120-yen-1417706972

change the strategy to run under such an extreme, I was definitely interested in running it under a smaller time frame. I decided on a 5 minute time frame and was pleased to see that during the past two weeks, it has been profitable. The performance summary can be seen below.

TradeStation Performance Summary			Collapse ⌃
	All Trades	Long Trades	Short Trades
Total Net Profit	$726.19	$726.19	$0.00
Gross Profit	$726.19	$726.19	$0.00
Gross Loss	$0.00	$0.00	$0.00
Profit Factor	n/a	n/a	n/a
Roll Over Credit	$0.00	$0.00	$0.00
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	$726.19	$726.19	$0.00
Select Gross Profit	$726.19	$726.19	$0.00
Select Gross Loss	$0.00	$0.00	$0.00
Select Profit Factor	n/a	n/a	n/a
Adjusted Total Net Profit	$469.44	$469.44	$0.00
Adjusted Gross Profit	$469.44	$469.44	$0.00
Adjusted Gross Loss	$0.00	$0.00	$0.00
Adjusted Profit Factor	n/a	n/a	n/a
Total Number of Trades	8	8	0
Percent Profitable	100.00%	100.00%	0.00%
Winning Trades	8	8	0
Losing Trades	0	0	0
Even Trades	0	0	0

This week, I also decided to test out my strategy during different sessions. My automated strategy currently trades GBPJPY and is based around the London Session. I let the strategy continue trading GBPJPY since this currency pair has the highest pip range during all three sessions. Keeping in mind that GBPJPY is also actively traded during the Tokyo Session, I chose to test my strategy based around the Tokyo Session. I should mention that for me to be able to use my strategy and apply it based around the Tokyo Session, I need to use it on the second Tokyo Session, since my strategy uses the highs and lows of the four hours prior to the start of the session. Testing its performance over the past two weeks on the GBPJPY 5 min chart produced positive profits, but was not nearly as profitable as its performance when based around the London Session. The performance summary can be seen on the following page. The code for this is essentially the same as my London Session strategy, with only some minor modifications regarding the time and day.

TradeStation Performance Summary   Collapse ⌃

	All Trades	Long Trades	Short Trades
Total Net Profit	$335.73	$335.73	$0.00
Gross Profit	$335.73	$335.73	$0.00
Gross Loss	$0.00	$0.00	$0.00
Profit Factor	n/a	n/a	n/a
Roll Over Credit	$0.00	$0.00	$0.00
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	$335.73	$335.73	$0.00
Select Gross Profit	$335.73	$335.73	$0.00
Select Gross Loss	$0.00	$0.00	$0.00
Select Profit Factor	n/a	n/a	n/a
Adjusted Total Net Profit	$167.86	$167.86	$0.00
Adjusted Gross Profit	$167.86	$167.86	$0.00
Adjusted Gross Loss	$0.00	$0.00	$0.00
Adjusted Profit Factor	n/a	n/a	n/a
Total Number of Trades	4	4	0
Percent Profitable	100.00%	100.00%	0.00%
Winning Trades	4	4	0
Losing Trades	0	0	0
Even Trades	0	0	0

The profits produced when running the strategy around the Tokyo Session were less than half of the London Session profits. With these results, I believe I will continue to trade based around the London Session seeing as it is much more profitable. Perhaps in this upcoming week I will test my strategy's performance around the New York Session to compare the profits of all three sessions.

12/09/14 - 12/13/14

Last week, I tested how my automated strategy based around the London Session (which is what my original strategy was based on), as well as the Tokyo Session, in order to compare the performance of my strategy for the two. I found that running my strategy under a 5 minute time frame and based around the Tokyo Session produced less than half of the profits than that of the strategy running under a 5 minute time frame based around the London Session. This week, I attempted to test the performance of my strategy based around the New York Session. In doing so I traded USDJPY instead of GBPJPY as my strategy has traded when I compared the performance of it during the London and Tokyo Sessions, since it seemed more sensible to trade the US dollar during the New York Session. In the following pictures, I show the profits produced since 11/01/2014 from my strategy running under a 5 minute time frame and the specified session. You can see that the New York Session proved to be the most profitable, with the London Session being the second most profitable, and the Tokyo Session coming in last. I was pleased to see that they all produced positive profits.

Performance trading USDJPY under 5 min chart during the New York Session since 11/01/2014:

TradeStation Performance Summary			Collapse ⌃
	All Trades	**Long Trades**	**Short Trades**
Total Net Profit	$2,801.50	$2,801.50	$0.00
Gross Profit	$3,158.62	$3,158.62	$0.00
Gross Loss	($357.13)	($357.13)	$0.00
Profit Factor	8.84	8.84	n/a
Roll Over Credit	$0.43	$0.43	$0.00
Open Position P/L	($84.07)	($84.07)	$0.00
Select Total Net Profit	$2,801.50	$2,801.50	$0.00
Select Gross Profit	$3,158.62	$3,158.62	$0.00
Select Gross Loss	($357.13)	($357.13)	$0.00
Select Profit Factor	8.84	8.84	n/a
Adjusted Total Net Profit	$1,391.49	$1,391.49	$0.00
Adjusted Gross Profit	$2,105.75	$2,105.75	$0.00
Adjusted Gross Loss	($714.26)	($714.26)	$0.00
Adjusted Profit Factor	2.95	2.95	n/a
Total Number of Trades	10	10	0
Percent Profitable	90.00%	90.00%	0.00%
Winning Trades	9	9	0
Losing Trades	1	1	0
Even Trades	0	0	0
Avg. Trade Net Profit	$280.15	$280.15	$0.00
Avg. Winning Trade	$350.96	$350.96	$0.00
Avg. Losing Trade	($357.13)	($357.13)	$0.00
Ratio Avg. Win:Avg. Loss	0.98	0.98	n/a
Largest Winning Trade	$476.66	$476.66	$0.00
Largest Losing Trade	($357.13)	($357.13)	$0.00

Performance trading GBPJYP under 5 min chart during Tokyo Session since 11/01/2014:

TradeStation Performance Summary | Collapse ⌄

	All Trades	Long Trades	Short Trades
Total Net Profit	$989.74	$989.74	$0.00
Gross Profit	$989.74	$989.74	$0.00
Gross Loss	$0.00	$0.00	$0.00
Profit Factor	n/a	n/a	n/a
Roll Over Credit	$0.00	$0.00	$0.00
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	$989.74	$989.74	$0.00
Select Gross Profit	$989.74	$989.74	$0.00
Select Gross Loss	$0.00	$0.00	$0.00
Select Profit Factor	n/a	n/a	n/a
Adjusted Total Net Profit	$676.75	$676.75	$0.00
Adjusted Gross Profit	$676.75	$676.75	$0.00
Adjusted Gross Loss	$0.00	$0.00	$0.00
Adjusted Profit Factor	n/a	n/a	n/a
Total Number of Trades	10	10	0
Percent Profitable	100.00%	100.00%	0.00%
Winning Trades	10	10	0
Losing Trades	0	0	0
Even Trades	0	0	0

Performance trading GBPJPY under 5 min chart during London Session since 11/01/2014:

TradeStation Performance Summary | Collapse ⌄

	All Trades	Long Trades	Short Trades
Total Net Profit	$1,219.30	$1,219.30	$0.00
Gross Profit	$1,577.15	$1,577.15	$0.00
Gross Loss	($357.85)	($357.85)	$0.00
Profit Factor	4.41	4.41	n/a
Roll Over Credit	$1.11	$1.11	$0.00
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	$1,219.30	$1,219.30	$0.00
Select Gross Profit	$1,577.15	$1,577.15	$0.00
Select Gross Loss	($357.85)	($357.85)	$0.00
Select Profit Factor	4.41	4.41	n/a
Adjusted Total Net Profit	$424.03	$424.03	$0.00
Adjusted Gross Profit	$1,139.73	$1,139.73	$0.00
Adjusted Gross Loss	($715.70)	($715.70)	$0.00
Adjusted Profit Factor	1.59	1.59	n/a
Total Number of Trades	14	14	0
Percent Profitable	92.86%	92.86%	0.00%
Winning Trades	13	13	0
Losing Trades	1	1	0
Even Trades	0	0	0

12/14/14 - 12/17/14

I did not make any trades during this week due to the fact that I had final exams and reports due, however I did take a bit of time to implement selling into my automated strategy. I had not previously been selling at all because it was not producing very notable profits. Despite this fact, I decided that I would go ahead and implement it because I saw that it does sometimes produce profits. The following is my strategy's performance since 11/01/14. As you can see, the short trades are not producing positive profits at the moment.

Performance since 11/01/2014:

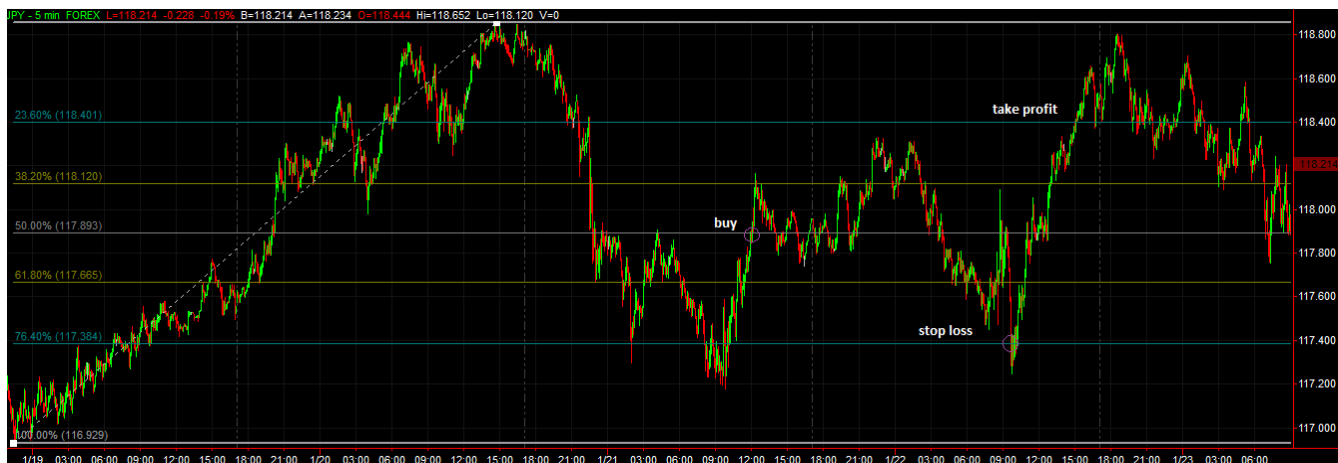| TradeStation Performance Summary			Collapse ⌃
	All Trades	**Long Trades**	**Short Trades**
Total Net Profit	$11,290.04	$12,471.84	($1,181.80)
Gross Profit	$20,870.52	$16,050.35	$4,820.16
Gross Loss	($9,580.48)	($3,578.51)	($6,001.97)
Profit Factor	2.18	4.49	0.80
Roll Over Credit	$11.14	$11.14	$0.00
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	$11,290.04	$12,471.84	($1,181.80)
Select Gross Profit	$20,870.52	$16,050.35	$4,820.16
Select Gross Loss	($9,580.48)	($3,578.51)	($6,001.97)
Select Profit Factor	2.18	4.49	0.80
Adjusted Total Net Profit	$696.91	$4,441.77	($7,835.91)
Adjusted Gross Profit	$15,808.67	$11,598.79	$2,410.08
Adjusted Gross Loss	($15,111.76)	($7,157.02)	($10,246.00)
Adjusted Profit Factor	1.05	1.62	0.24
Total Number of Trades	20	14	6
Percent Profitable	85.00%	92.86%	66.67%
Winning Trades	17	13	4
Losing Trades	3	1	2
Even Trades	0	0	0

01/19/15 - 01/26/15

I have still been following and trading USDJPY, as I have been dedicated to following this currency pair for quite some time now. Last week, it was reported in a Wall Street Journal article that Japan expects tax revenue to reach its highest level in 24 years in the fiscal year starting in April, aiding Prime Minister Shinzo Abe's pledge to reduce the country's budget deficit[11]. However, just last month, Moody's Investors Service had downgraded Japan's credit rating over Prime Minister Shinzo Abe's decision to delay an increase in sales tax and Japan's ability to cut fiscal deficit[12]. In the aforementioned Wall Street Journal article, it was also stated that cheap oil was expected to help increase national income and that officials hoped for consumers to spend to spur growth. It seems as though Japan is still expecting to have a weak yen, as it has been for the past year or so. With all these things in mind, I feel confident sticking to trading USDJPY and continue to see profit trading this currency pair.

When monitoring the USDJPY chart throughout the past week, I noticed that the dollar has been declining after it had risen to above 120 yen for the first time in seven years last month[13]. I decided on monitoring the 5 minute USDJPY chart this past week, which is not the usual time frame that I chose to follow when I make manual trades. I normally chose to follow bigger time frames (15, 30, or 60 minutes), however, I wanted to have more experience manually trading under more volatile time frames. At the beginning of the week, there was already a steady uptrend and so I used the Fibonacci Retracement Lines for the swing low and swing high of the week thus far, and used the retracement lines to guide me. After using the Fibonacci Retracement Lines on the 5 minute USDJPY chart, there was an unfortunate reversal and a downtrend began. This was a bit discouraging but I monitored intermittently over the following days until I finally saw a notable resistance line with the help of the Fibonacci Retracement Lines. I bought the next time the price hit this resistance line, which happened to be at the 50.00% Fibonacci line. I then placed a stop loss at the 76.40% Fibonacci Line and my take profit at the 23.60% line. A screenshot can be seen on the following page.

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[11] http://www.wsj.com/articles/japan-expects-higher-tax-revenue-1421151673
[12] http://www.wsj.com/articles/moodys-downgrades-japan-debt-1417425248
[13] http://www.wsj.com/articles/dollar-rises-above-120-yen-1417706972

I was originally feeling a bit reserved and did not want to risk too much with this trade because of the large downtrend that followed the strong uptrend. I hoped for a reversal, and although Fibonacci lines suggest strong support and resistance lines, the price hit my stop loss before my take profit and I suffered a 50 pip loss with this trade. I have consistently had great experiences using the Fibonacci Retracement Lines, with many profitable trades while using them, so I was disappointed that despite the fact that I was reserved and felt I did not take a large risk with setting my take profit where I did, my trade was still not profitable.

This week, I also worked on combining a simple moving average with my automated trading system. With this implementation, I will have an additional condition that my strategy takes into consideration when trading. I hoped this would give me some security by reducing the risk of false breakouts in addition to the precautions my strategy already took into account to avoid false breakouts. I tested out my new strategy over the last two months on a 5 minute time frame trading GBPJPY, and although it produced profits, the drawdown was far too much and I would prefer to pursue modifying the strategy further or abandoning the concept altogether. The strategy performance can be seen on the following page.

Performance Summary 11/4/2014 - 01/26/2015:

TradeStation Performance Summary			Collapse ⌄
	All Trades	**Long Trades**	**Short Trades**
Total Net Profit	$10,574.25	$6,223.78	$4,350.47
Gross Profit	$53,466.19	$23,345.94	$30,120.24
Gross Loss	($42,891.94)	($17,122.16)	($25,769.77)
Profit Factor	1.25	1.36	1.17
Roll Over Credit	($61.66)	$21.27	($82.93)
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	($6,478.05)	$6,223.78	($12,701.83)
Select Gross Profit	$36,413.88	$23,345.94	$13,067.94
Select Gross Loss	($42,891.94)	($17,122.16)	($25,769.77)
Select Profit Factor	0.85	1.36	0.51
Adjusted Total Net Profit	($9,757.00)	($5,145.83)	($13,455.49)
Adjusted Gross Profit	$43,537.76	$17,683.72	$21,425.28
Adjusted Gross Loss	($53,294.76)	($22,829.55)	($34,880.77)
Adjusted Profit Factor	0.82	0.77	0.61
Total Number of Trades	46	26	20
Percent Profitable	63.04%	65.38%	60.00%
Winning Trades	29	17	12
Losing Trades	17	9	8
Even Trades	0	0	0

Drawdown:

Max. Drawdown (Intra-day Peak to Valley)			
Value	($26,903.02)	($12,216.61)	($19,179.07)
Date	01/21/15 10:15		
as % of Initial Capital	26.90%	12.22%	19.18%
Net Profit as % of Drawdown	39.31%	50.95%	22.68%
Select Net Profit as % of Drawdown	(24.08%)	50.95%	(66.23%)
Adjusted Net Profit as % of Drawdown	(36.27%)	(42.12%)	(70.16%)
Max. Drawdown (Trade Close to Trade Close)			
Value	($19,119.56)	($8,870.72)	($11,710.97)
Date	01/21/15 08:10		
as % of Initial Capital	19.12%	8.87%	11.71%
Net Profit as % of Drawdown	55.31%	70.16%	37.15%
Select Net Profit as % of Drawdown	(33.88%)	70.16%	(108.46%)
Adjusted Net Profit as % of Drawdown	(51.03%)	(58.01%)	(114.90%)
Max. Trade Drawdown	($4,254.49)	($3,324.47)	($4,254.49)

01/25/15 - 02/01/15

First off this week, I read about the recent strength of the US dollar. Although the dollar is strong, it has been hurting sales and profits of big US companies. Many large US companies have largely expanded overseas and their growth looks smaller once converted back to the US dollar. For reasons like this, the strong dollar is causing big US companies to cut costs and is adding pressure on the US economy.[14] In another article this week, I read that the volume in currency-trading has soared as a result of opportunities created by various global monetary-policy shifts. It also noted that "trend-chasing investors" have wagered on the US dollar to rise against the euro and yen, as central banks in Europe and Japan have taken the most aggressive steps to stimulate growth and raise inflation.[15] The same article also mentioned the fact that the euro had fallen to an 11-year low against the dollar this year after the European Central Bank introduced a "bigger-than-expected bond-purchase plan." After reading these articles, I decided to manually trade USDJPY as I usually do, as well as EURUSD, expecting to see a strong US dollar.

Analyzing the 60 min EURUSD chart, I saw that it has been a consistent downtrend over the past month. I monitored the chart and saw a bit of an uptrend from Monday to Tuesday. I expected and hoped for a downtrend, seeing as the US dollar has been so strong. I continued to monitor the chart and sold when the price hit 1.14040. I placed my stop loss 20 pips above my selling price and my take profit price at what I interpreted could be a resistance line. This can be seen in the screenshot below. I profited 120 pips from this trade!

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[14] http://www.wsj.com/articles/strong-dollar-hangs-over-more-companies-rattling-investors-1422386620

[15] http://www.wsj.com/articles/currency-trading-volumes-jump-1422390726

Upon analyzing the 30 minute USDJPY chart, I noted that it has been relatively volatile lately. I decided that I would use the Fibonacci Retracement Lines as an aid for me to enter and exit the market seeing as in my experience they have been relatively reliable support and resistance lines. I used the Fibonacci Retracement Lines tool from the swing low to the swing high since the start of the session. I monitored the chart over the week until I found what I thought was a good resistance line and good place to buy. I bought at the 61.80% fibonacci line at the price of 118.862, and placed my stop loss at the 100% line (the swing low) and my take profit price at the 23.60% line. I ended up profiting 50 pips as a result of this trade. A screenshot can be seen below.
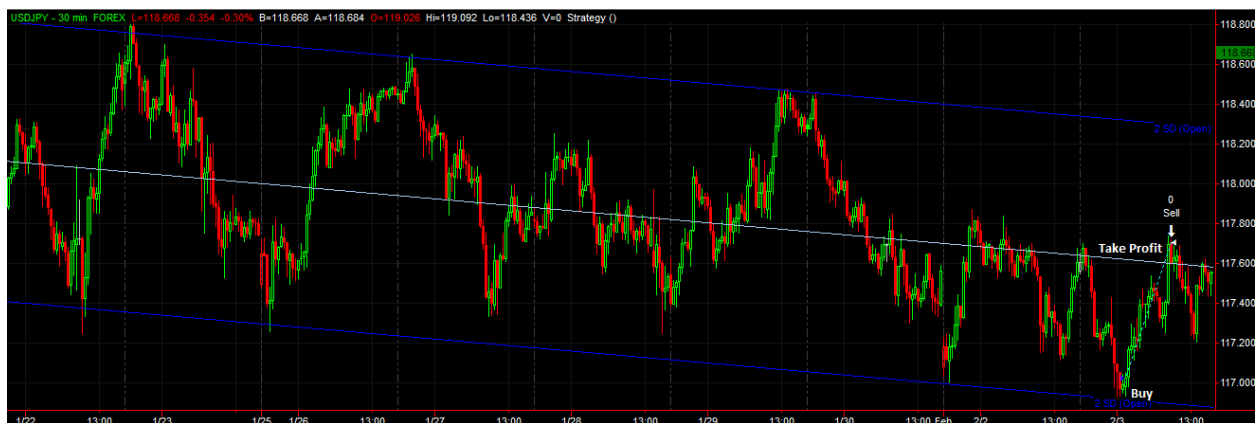

My breakout strategy continues to make profit, however, it makes very few trades a month, some of which are losing, so I decided to work on a strategy that can trade more often during trending markets. I used some ideas from Thursday's class and created a strategy that trades based on swing low and swing high.

02/01/15 - 02/08/15

This week I read about some Japanese companies returning production from overseas, back to Japan as a result of a weak yen. The yen has continued to weaken over the past year, and companies are looking to take advantage of the weak yen to reduce manufacturing costs in Japan[16]. A separate article also reported that the weak yen is "finally offering some of its long-expected boosts, by making Japan-made goods and services cheaper for the rest of the world," and by doing so the weak yen will begin to lift Japanese exports[17]. With so many opportunities resulting from the weak yen, I expect to continue seeing a weak yen present. Additionally, a weak US GDP was reported at the end of January[18], which hurt the strength of the US dollar.

Upon analyzing the USDJPY 30 minute chart, I recognized that it has been relatively volatile recently and saw the opportunity to use a regression channel to guide my entry and exit points in the market. I entered the market once the price hit the lower trend line of the channel. Deciding on a place to take my profit was a bit difficult for me because of the charts volatility. There was a noticeable downtrend last Friday and once the news of the weak US GDP was reported, the downtrend continued into the start of the new week. I was unsure if my regression channel would still be applicable or if the news would change the trend, so I decided to minimize my risk because I considered this a risky trade. I placed my stop loss 20 pips below my buy price and my take profit level to be halfway between the upper and lower trend lines of the regression channel. A screenshot of this can be seen below.

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[16] http://www.wsj.com/articles/weak-yen-rekindles-hope-for-made-in-japan-1421618401

[17] http://www.wsj.com/articles/abenomics-gets-boost-from-rebound-signs-1422912782

[18] http://www.bea.gov/newsreleases/national/gdp/2015/gdp4q14_adv.htm

I was pleased to have made a 68 pip profit from this trade! Reflecting on my trade and analyzing the chart after I had closed my trade, I saw that the price never reached either the upper or lower trend line of the regression channel after my trade. I was pleased to have entered and exited the market when I did because after closing my trade, I saw that the midway line continued to act as a resistance line and the price went down after I closed my trade.

I also checked to see how my London Breakout strategy has been performing. The screenshot below shows the performance of my strategy over the past 10 days. I spent a lot of time optimizing this strategy in the past so I am very pleased that it is producing positive profits.

Strategy Performance for GBPJPY 5 minute chart from 1/26/2015 - 2/8/2015:

TradeStation Performance Summary			Collapse ⌃
	All Trades	**Long Trades**	**Short Trades**
Total Net Profit	$9,081.50	$3,719.57	$5,361.93
Gross Profit	$9,081.50	$3,719.57	$5,361.93
Gross Loss	$0.00	$0.00	$0.00
Profit Factor	n/a	n/a	n/a
Roll Over Credit	$0.00	$0.00	$0.00
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	$9,081.50	$3,719.57	$5,361.93
Select Gross Profit	$9,081.50	$3,719.57	$5,361.93
Select Gross Loss	$0.00	$0.00	$0.00
Select Profit Factor	n/a	n/a	n/a
Adjusted Total Net Profit	$5,020.13	$1,089.44	$2,266.22
Adjusted Gross Profit	$5,020.13	$1,089.44	$2,266.22
Adjusted Gross Loss	$0.00	$0.00	$0.00
Adjusted Profit Factor	n/a	n/a	n/a
Total Number of Trades	5	2	3
Percent Profitable	100.00%	100.00%	100.00%
Winning Trades	5	2	3
Losing Trades	0	0	0
Even Trades	0	0	0

I also checked to see how my simple strategy based on swing lows and swing highs has been performing lately. I made a few minor modifications to the code. The following screenshot below shows the performance of the strategy over the past 10 days. It did not make as many trades over the past 10 days as my London Breakout strategy, but it does currently have a profiting open position. I was also pleased to see only one small losing trade during this time.

Strategy Performance for GBPJPY 15 minute chart from 1/26/2015 - 2/8/2105:

TradeStation Performance Summary			Collapse ⌃
	All Trades	Long Trades	Short Trades
Total Net Profit	$2,957.11	$2,974.16	($17.05)
Gross Profit	$2,974.16	$2,974.16	$0.00
Gross Loss	($17.05)	$0.00	($17.05)
Profit Factor	174.48	n/a	0.00
Roll Over Credit	$8.18	$8.18	$0.00
Open Position P/L	$515.84	$515.84	$0.00
Select Total Net Profit	$2,957.11	$2,974.16	($17.05)
Select Gross Profit	$2,974.16	$2,974.16	$0.00
Select Gross Loss	($17.05)	$0.00	($17.05)
Select Profit Factor	174.48	n/a	0.00
Adjusted Total Net Profit	($34.09)	$0.00	($34.09)
Adjusted Gross Profit	$0.00	$0.00	$0.00
Adjusted Gross Loss	($34.09)	$0.00	($34.09)
Adjusted Profit Factor	0.00	n/a	0.00
Total Number of Trades	2	1	1
Percent Profitable	50.00%	100.00%	0.00%
Winning Trades	1	1	0
Losing Trades	1	0	1
Even Trades	0	0	0

For this strategy, I use the most recent swing highs and swing lows in the last 50 bars, where the swing high (SH) is defined as a bar that has highs higher than the neighboring 5 bars on the left and right and the swing low (SL) is defined as a bar that has lows lower than the neighboring 5 bars on the left and right. This strategy trades one standard lot.

This week I tried to create a new strategy that trades consistently. I had a similar goal last week with my swing high/swing low strategy. I wanted that strategy to trade often, but unfortunately it only made profit with strict conditions that prevented most trades, and ended up only trading twice during the last 10 days. I kept the idea of swing highs and swing lows and tried to create a trend channel using two moving averages that use highs and lows instead of bar closing price. Although it was not as profitable as my two previous strategies shown, it made 125 trades within the last 10 days, which is much more than both of the other two strategies. In the coming weeks, I will try to improve how profitable the strategy is, without affecting the consistent trading it's doing. The performance summary of this strategy can be seen on the following page.

Strategy Performance for GBPJPY 5 minute chart from 01/26/2015 - 02/08/2015:

TradeStation Performance Summary | Collapse ⌃

	All Trades	Long Trades	Short Trades
Total Net Profit	$532.73	$62.65	$470.09
Gross Profit	$12,774.87	$5,924.53	$6,850.34
Gross Loss	($12,242.13)	($5,861.88)	($6,380.25)
Profit Factor	1.04	1.01	1.07
Roll Over Credit	$2.67	$14.73	($12.06)
Open Position P/L	$8.43	$8.43	$0.00
Select Total Net Profit	$532.73	$62.65	$470.09
Select Gross Profit	$12,774.87	$5,924.53	$6,850.34
Select Gross Loss	($12,242.13)	($5,861.88)	($6,380.25)
Select Profit Factor	1.04	1.01	1.07
Adjusted Total Net Profit	($2,681.52)	($2,120.73)	($1,892.46)
Adjusted Gross Profit	$11,309.49	$4,963.44	$5,739.07
Adjusted Gross Loss	($13,991.01)	($7,084.17)	($7,631.52)
Adjusted Profit Factor	0.81	0.70	0.75
Total Number of Trades	125	61	64
Percent Profitable	60.80%	62.30%	59.38%

02/09/15 - 02/16/15

Many investors have been wary to bet against the yen in recent weeks. The Wall Street Journal reported last week that the dollar fell 0.4% against the yen causing investors to cut back on some of their largest bets that include those for a stronger U.S. dollar, with tensions in Greece and Ukraine amidst.[19] Furthermore, the article reported that investors were keeping an eye on the U.S. retail sales for January to assess to what degree the consumer demand is driving the broader economy. The U.S. Retail Sales was released on Thursday, and actual sales (-0.8%) where less than the forecasted sales (-0.4%)[20], which weighed on the dollar. Lastly, it was also reported that on Thursday, the yen rose 1.1%, "its biggest one-day percentage gain against the U.S. dollar since December."[21]

For my manual trade this week, I traded USDJPY. I analyzed the 30 min USDJPY chart and noticed that there was a steady uptrend for the first two days of the week. However, having read the aforementioned articles, I predicted that the dollar would not continue to be strong and decided to monitor the chart until the U.S. Retail Sales were released on Thursday. I shorted when the news was released at the price of 119.694. I chose the previous swing high as my stop loss and what I interpreted to be a strong resistance line as my take profit level. This was a successful trade for me, with approximately a 100 pip profit. A screenshot of the trade can be seen below.

This week, I continued to work on the new strategy that I created last week. This strategy uses a trend channel using two moving averages that use highs and lows instead of bar closing price. My main goal with this was to create a strategy that traded consistently, or at least more than the previous strategies that I have made. I tested the strategy under different time frames and for different currency pairs, as well as tried to change some of the parameters in order to optimize the strategy. Through much trial and error, I still found the original parameters of the strategy to

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[19] http://www.wsj.com/articles/dollar-weakens-against-yen-euro-1423515434

[20] http://www.census.gov/retail/marts/www/marts_current.pdf

[21] http://www.wsj.com/articles/scoring-on-bets-the-yen-will-fall-gets-harder-1423787740

work best. However, I did change the time frame from 5 minutes to 10 minutes, and applied the strategy for both USDJPY and GBPJPY. I am pleased with the amount of trading my system is doing, and that it still continues to be profitable.

The screenshots that can be seen on the following page show the performance summaries for the past 10 days, for both currency pairs during a 10 minute time frame.

Strategy Performance for GBPJPY 10 minute chart from 02/02/2015 - 02/15/2015:

TradeStation Performance Summary			Collapse ⌃
	All Trades	**Long Trades**	**Short Trades**
Total Net Profit	$4,774.44	$3,727.24	$1,047.20
Gross Profit	$8,848.09	$4,227.97	$4,620.12
Gross Loss	($4,073.65)	($500.73)	($3,572.92)
Profit Factor	2.17	8.44	1.29
Roll Over Credit	($19.52)	$10.59	($30.11)
Open Position P/L	($727.32)	($727.32)	$0.00
Select Total Net Profit	$3,561.35	$3,727.24	($165.89)
Select Gross Profit	$7,635.00	$4,227.97	$3,407.03
Select Gross Loss	($4,073.65)	($500.73)	($3,572.92)
Select Profit Factor	1.87	8.44	0.95
Adjusted Total Net Profit	$1,957.03	$2,419.89	($1,496.15)
Adjusted Gross Profit	$7,258.93	$3,170.98	$3,427.21
Adjusted Gross Loss	($5,301.90)	($751.09)	($4,923.36)
Adjusted Profit Factor	1.37	4.22	0.70
Total Number of Trades	42	20	22
Percent Profitable	73.81%	80.00%	68.18%
Winning Trades	31	16	15
Losing Trades	11	4	7
Even Trades	0	0	0

Strategy Performance for USDJPY 10 minute chart from 02/02/2015 - 02/15/2015:

TradeStation Performance Summary			Collapse ⌃
	All Trades	**Long Trades**	**Short Trades**
Total Net Profit	$2,609.98	$1,542.67	$1,067.31
Gross Profit	$4,868.86	$2,342.05	$2,526.81
Gross Loss	($2,258.88)	($799.38)	($1,459.50)
Profit Factor	2.16	2.93	1.73
Roll Over Credit	($5.83)	$3.56	($9.39)
Open Position P/L	($114.89)	($114.89)	$0.00
Select Total Net Profit	$1,679.02	$1,542.67	$136.35
Select Gross Profit	$3,937.91	$2,342.05	$1,595.85
Select Gross Loss	($2,258.88)	($799.38)	($1,459.50)
Select Profit Factor	1.74	2.93	1.09
Adjusted Total Net Profit	$1,008.77	$559.24	($203.85)
Adjusted Gross Profit	$3,948.73	$1,716.11	$1,851.49
Adjusted Gross Loss	($2,939.96)	($1,156.87)	($2,055.34)
Adjusted Profit Factor	1.34	1.48	0.90
Total Number of Trades	39	19	20
Percent Profitable	71.79%	73.68%	70.00%
Winning Trades	28	14	14
Losing Trades	11	5	6
Even Trades	0	0	0

02/17/15 - 02/ 22/15

This week a Wall Street Journal article reported that Japan has pulled out of recession slower than expected in the last quarter, with growth driven by exports, yet with low consumer spending also being reported. However, some investors question whether the growth of exports will be sustained.[22] The Preliminary GDP released on Sunday revealed that Japan's GDP rose at an annualized rate of 2.2% in the fourth quarter, well below a forecasted 3.6% increase.[23] A separate Wall Street Journal article reported that the annual wage negotiations that are under way will set the tone for consumer spending, and if results meet expectation, "the outlook for the Japanese economy will brighten."[24]

This week I analyzed the USDJPY chart with a 15 minute time frame, which showed a continuous downtrend from last week into this week. I created a wedge chart, and predicted a reversal after noticing lower lows and lower highs. After some indication of an uptrend beginning, I bought a standard lot at 118.619 and closed my trade at what I interpreted could be a reliable resistance line. I made approximately a 40 pip profit. A screenshot of this trade can be seen below.

Although my trade this week is not quite as profitable as my manual trades from past weeks, I am still pleased with the fact that I am still continuing to make profitable trades considering that the USDJPY pair has been relatively volatile for the past couple of months or so. Despite the volatility of the USDJPY pair, I am still able to recognize chart patterns and use the news to make successful trades.

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[22] http://www.wsj.com/articles/japan-q4-gdp-worse-than-expected-at-22-1424044641

[23] http://www.esri.cao.go.jp/en/sna/data/sokuhou/files/2014/qe144/pdf/main_1e.pdf

[24] http://www.wsj.com/articles/japans-economy-needs-a-pay-rise-1424084315

This week, I made some major changes towards my Channel Trading strategy. This strategy uses a trend channel using two moving averages that use highs and lows instead of bar closing prices. I have now changed how the moving average is calculated, from simple moving average, to exponential moving average. I also used TradeStation to further optimize the strategy and found that using the last 10 bars instead of the last 20 bars to calculate the exponential moving average, proved to be the most profitable. Finally, I shifted the upper moving average up by a factor of 1.6 average true damage (ex. If average true range is 10 pips, the upper moving average is 16 pips higher), and shifted the lower moving average by a factor of 1.6 average true range as well.

Performance Summary for GBPJPY 10 minute time frame for the last 10 days:

TradeStation Performance Summary   Collapse ⌃

	All Trades	Long Trades	Short Trades
Total Net Profit	$2,777.59	$2,562.07	$215.52
Gross Profit	$4,914.33	$3,408.08	$1,506.25
Gross Loss	($2,136.75)	($846.01)	($1,290.74)
Profit Factor	2.30	4.03	1.17
Roll Over Credit	($5.96)	$2.10	($8.06)
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	$2,777.59	$2,562.07	$215.52
Select Gross Profit	$4,914.33	$3,408.08	$1,506.25
Select Gross Loss	($2,136.75)	($846.01)	($1,290.74)
Select Profit Factor	2.30	4.03	1.17
Adjusted Total Net Profit	$880.41	$895.59	($788.58)
Adjusted Gross Profit	$3,551.34	$2,119.95	$891.33
Adjusted Gross Loss	($2,670.94)	($1,224.36)	($1,679.91)
Adjusted Profit Factor	1.33	1.73	0.53
Total Number of Trades	29	12	17
Percent Profitable	44.83%	58.33%	35.29%
Winning Trades	13	7	6
Losing Trades	16	5	11
Even Trades	0	0	0

The following is Essam's Trading Journal. It details his manual and automated trading progress throughout the academic year.

11/10/14 - 11/16/14

This week my main focus was programming. Prof. Hakim asked us to create a strategy that uses two different timeframes instead of using only the selected timeframe, and thus, I modified my strategy to do that. Instead of buying at green and selling at red, it now also considers previous bar on the weekly chart. This helped me learn more about what I need to create a system that can combine different strategies that can potentially use different timeframes. However, it also showed me that MT4 is much better at allowing scripts to use different timeframes easily and perhaps it would be better to use MT4 for our system that combines different strategies instead of continue using TradeStation.

My individual goal was to create a neural network that can detect market conditions appropriate for a strategy. The goal was to create a neural network that can look at all outcomes of all the trades a strategy made and how the price graph looked at that time of entry, and then learn to see patterns of when a strategy is most likely to make a profitable trade if it initiated a trade at that current time. However, my neural network was only marginally more accurate than flipping a coin, only causing the system to make less trades. It is a work in progress but I believe with consistent incremental improvements this idea can still work.

My main goal for this week was to have some progress in creating a system that combines all strategies. However, as of now, I don't have any concrete code to show. It is much more difficult than I anticipated to have a system that can detect vague market conditions and then select appropriate strategies for the current market conditions. I suspect I will try to incorporate neural networks or program specific market condition and their rules (for example, if price did not move more than X amount of pips up or down in the last week, the market is trending). It is a work in progress but I read a lot of papers on using neural networks for trading and I believe there is a lot of potential and neural networks can provide a very real advantage over many automated trading strategies.

The news that I thought is most important this week for me was the speech by BOE Governor Carney, and BOE Inflation report. I trade mostly GBPJPY and news of lower growth and

inflation definitely affected the price of GBPJPY very heavily. The price went down over 200 pips in almost no time, and fell another 100 pips as of Sunday. I was prepared for this news, however, I opened only after the price fell below recent swing lows and I closed once it reached a suspected line of resistance at 130 pips profit.

11/17/14 - 11/24/14

This week my main focus was programming for the team goal instead of individual goal. In the process of trying to create a system that can detect market conditions suitable for a strategy, I realized neural networks can be very useful. Since then, I have done a lot of programming to use neural networks on TradeStation. The code is currently not functioning properly, it is a work in progress. To iterate what I explained last week, I'm trying to create a system that combines strategies and can select appropriate strategies for current market conditions, and initially, the goal was to allow each strategy to function on different timeframes, but it currently seems unrealistic.

Last week I had reconsidered using MT4 because utilizing different timeframes in an Expert Advisor was easier than utilizing different timeframes in Easy Language, however, because other team members would be unfamiliar with the system, and be unable to contribute their own programmed strategies, I decided to create a system that only utilizes strategies in a single timeframe, and then in the future we can potentially clone it for different timeframes and run multiple cloned systems that each utilize their own set of strategies and timeframe. This allows me to use other team member's code instead of reprogramming for MT4 and it would also cut time spent on programming. If the performance of the neural network is terrible, we will be forced to try and combine ideas of each strategy to create a single one.

The most important news that affected my trades and the asset classes I'm trading is news of recession in Japan. Japan's economy shrank two quarters in a row, despite nearly every forecast expecting a positive quarter instead. It came as a surprise to many to see that instead of the forecasted growth of 2.3%, GDP shrank 1.6%. Obviously, this news and Japan already lowering the value of it's own currency, it is easy to predict how JPY pairs will move.

During the last week, I traded GBPJPY because it seemed relatively safe guess to assume the value of JPY is going down for the time being. I opened trades on Monday and closed them on Thursday for 350 pips profit in one trade, and 195 pips in the other! I opened the two trades after reading news of Japan's unexpected recession on Monday[25].

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[25] http://online.wsj.com/articles/japan-falls-into-recession-1416182404

+195 pips
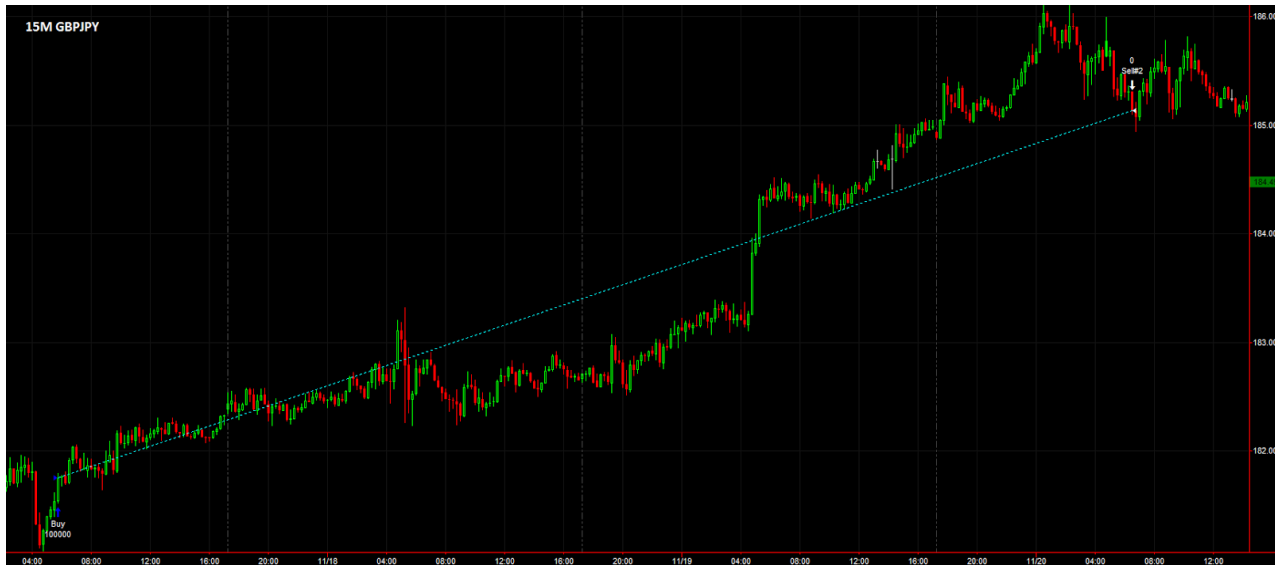
+350 pips

I also spent time on creating a strategy that utilizes different timeframes at the same time and to take that even a step further, I try to utilize different currencies as well. The performance of the strategy is disappointing, but it is only a "rough draft" and I believe there is some potential for profit there with some changes.

12/01/14 - 12/08/14

During this week I worked a lot on neural networks. I found good research papers on using neural network for pattern prediction that I feel can apply very well to price forecasting. I am not yet able to test on TradeStation but I am getting very close. I am able to get basic statistical information about the accuracy of my prediction. At this current moment it is actually 56% accurate. 56% may not seem like a big amount, especially considering a coin toss is 50% accurate, but it is a very promising start. Keep in mind that improvements can still be made to the neural network architecture. I used a Python machine learning library that I found for my neural network[26]. I have also been researching how to run Python code with TradeStation but I am struggling to find a working implementation. I think I will be forced to create my own library in C++ similar to the one I created for MT4 to run Matlab code.

I would go into detail about the neural network I created but it requires some knowledge in machine learning and neural networks in general. However, I want to point out that training a neural network is very time consuming and requires a strong performing computer to properly learn patterns effectively. Sadly, I only have my laptop, and the Python library I am using is slower than other implementations which is affecting my progress.

This week I also created the MT4 Expert Advisor that you requested. I used Dukascopy historical GBPUSD ticks to be able to backtest. I tested it on a one hour chart for approximately 6 months. The results were not good at first, however, after optimizing the inputs it has performed very nicely.

Initial deposit	10000.00		Spread	25
Total net profit	3429.00	Gross profit	5529.00 Gross loss	-2100.00
Profit factor	2.63	Expected payoff	100.85	
Absolute drawdown	653.00	Maximal drawdown	809.00 (7.95%) Relative drawdown	7.95% (809.00)
Total trades	34	Short positions (won %)	18 (77.78%) Long positions (won %)	16 (87.50%)
		Profit trades (% of total)	28 (82.35%) Loss trades (% of total)	6 (17.65%)
	Largest	profit trade	600.00 loss trade	-350.00
	Average	profit trade	197.46 loss trade	-350.00
	Maximum	consecutive wins (profit in money)	10 (1540.00) consecutive losses (loss in money)	1 (-350.00)
	Maximal	consecutive profit (count of wins)	1582.00 (8) consecutive loss (count of losses)	-350.00 (1)
	Average	consecutive wins	6 consecutive losses	1

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[26] https://github.com/cazala/synaptic
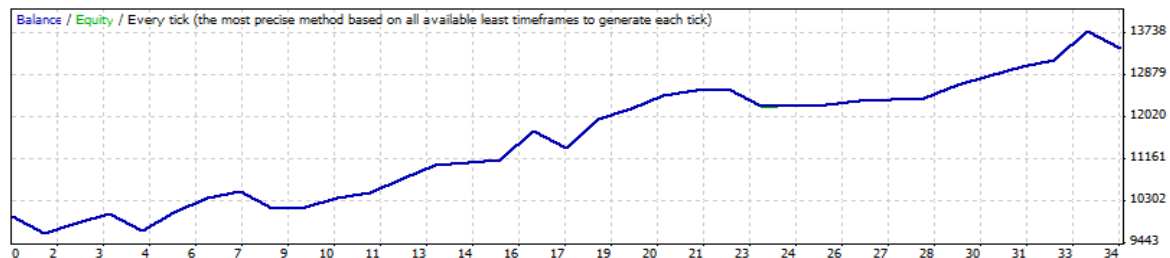
As you can see in the screenshot, in only 6 months it made a 35% return on it's initial capital and a drawdown of less than 8%, with a winning trade percentage well above 75%.

In addition to the MT4 EA, I wanted to create an indicator of currency strength. One of the ideas we considered for evaluating a currency's strength is it's trending direction in multiple pairs. For example, if GBPJPY, EURJPY, USDJPY and AUDJPY prices are all trending upwards, then we can safely assume that JPY is the weakest currency. The assumption is that a strong currency would be a currency that is rising relative to other currencies in all or most major pairs. However, I didn't get the chance to do that this week because of time limits.

Unfortunately I didn't manually trade this week, however, my automated strategy has continued it's great performance during the last few weeks. I made a small edit to the strategy to incorporate the average of the High, Low and Close of the previous bars to select trailing stop and take profit levels that is more appropriate than using only the Closing price or over complicating the strategy with Bollinger Bands or Average True Range calculations.

TradeStation Performance Summary

	All Trades	Long Trades
Total Net Profit	$3,187.87	$3,187.87
Gross Profit	$3,187.87	$3,187.87
Gross Loss	$0.00	$0.00
Profit Factor	n/a	n/a
Roll Over Credit	$19.77	$19.77
Open Position P/L	($41.41)	$0.00
Select Total Net Profit	$3,187.87	$3,187.87
Select Gross Profit	$3,187.87	$3,187.87
Select Gross Loss	$0.00	$0.00
Select Profit Factor	n/a	n/a
Adjusted Total Net Profit	$1,347.35	$1,347.35
Adjusted Gross Profit	$1,347.35	$1,347.35
Adjusted Gross Loss	$0.00	$0.00
Adjusted Profit Factor	n/a	n/a
Total Number of Trades	3	3
Percent Profitable	100.00%	100.00%
Winning Trades	3	3
Losing Trades	0	0
Even Trades	0	0
Avg. Trade Net Profit	$1,062.62	$1,062.62
Avg. Winning Trade	$1,062.62	$1,062.62
Avg. Losing Trade	$0.00	$0.00
Ratio Avg. Win:Avg. Loss	n/a	n/a
Largest Winning Trade	$3,047.13	$3,047.13
Largest Losing Trade	$0.00	$0.00
Largest Winner as % of Gross Profit	95.58%	95.58%
Largest Loser as % of Gross Loss	n/a	n/a
Net Profit as % of Largest Loss	n/a	n/a
Select Net Profit as % of Largest Loss	n/a	n/a
Adjusted Net Profit as % of Largest Loss	n/a	n/a
Max. Consecutive Winning Trades	3	3
Max. Consecutive Losing Trades	0	0
Avg. Bars in Total Trades	432.67	432.67
Avg. Bars in Winning Trades	432.67	432.67
Avg. Bars in Losing Trades	0.00	0.00
Avg. Bars in Even Trades	0.00	0.00

I feel this strategy definitely has potential and with some improvements can be traded on a live account. A performance test on the last 10 months of data shows that it can perform on more than one currency with great profit to drawdown ratio. If I optimize the parameters for each currency I am confident it would perform much better.

CADJPY (0.2% drawdown)

	All Trades	Long Trades	Short Trades
Total Net Profit	$12,041.69	$8,473.02	$3,568.67
Gross Profit	$12,244.01	$8,473.02	$3,771.00
Gross Loss	($202.33)	$0.00	($202.33)
Profit Factor	60.52	n/a	18.64

GBPJPY (7% drawdown)

	All Trades	Long Trades	Short Trades
Total Net Profit	$32,058.03	$22,492.40	$9,565.63
Gross Profit	$83,234.47	$49,694.11	$33,540.36
Gross Loss	($51,176.44)	($27,201.70)	($23,974.74)
Profit Factor	1.63	1.83	1.40

EURUSD (3% drawdown)

	All Trades	Long Trades	Short Trades
Total Net Profit	$6,233.00	($2,582.10)	$8,815.10
Gross Profit	$21,580.50	$5,597.00	$15,983.50
Gross Loss	($15,347.50)	($8,179.10)	($7,168.40)
Profit Factor	1.41	0.68	2.23

USDJPY (5% drawdown)

	All Trades	Long Trades	Short Trades
Total Net Profit	$8,632.73	$11,154.55	($2,521.82)
Gross Profit	$61,445.11	$34,827.04	$26,618.07
Gross Loss	($52,812.38)	($23,672.49)	($29,139.89)
Profit Factor	1.16	1.47	0.91

AUDJPY (5.3% drawdown)

	All Trades	Long Trades	Short Trades
Total Net Profit	$8,147.78	$7,105.22	$1,042.56
Gross Profit	$54,007.51	$31,379.27	$22,628.24
Gross Loss	($45,859.72)	($24,274.05)	($21,585.67)
Profit Factor	1.18	1.29	1.05

EURJPY (7% drawdown)

	All Trades	Long Trades	Short Trades
Total Net Profit	$7,215.78	$5,252.56	$1,963.22
Gross Profit	$35,817.27	$20,892.85	$14,924.42
Gross Loss	($28,601.49)	($15,640.30)	($12,961.20)
Profit Factor	1.25	1.34	1.15

01/19/15 - 01/26/15

During this week I worked on combining my system with a different trading system that I hope would improve the strategy entry setup. As of right now, it basically just buys at green and sells at red, and keeps the trade as long as it didn't hit it's trailing stop. There's a little bit more than that but the entry is still largely simple. The entire strategy is simple and somehow usually profitable. Unfortunately, it wasn't profitable this month, although with only modest losses. I revised the entry point for the strategy looking to improve it by combining it with a different strategy for a hopefully better return. My strategy was in the market nearly 100% of the time, as suggested by Charlie Wright, and it was a key reason for it's success. The strategy would be in the market during any movement, and would never miss any big moves. Multiple students in our class are having positive returns with simply trading moving averages, however, I couldn't adapt it to a system that is required to be in the market 100% of the time. I always was fascinated in trading with systems that can learn and adapt, and realized that I can use a very simple version of a "neuron" to create an improvement to moving averages with fixed days.

My idea was to create a "formula" that takes moving averages as inputs, and tells you if it's a good time to buy. If it isn't a good time to buy, then it sells instead. I programmed a system in TradeStation that uses a simple sigmoid Perceptron, basically it's a function that predicts a number between 0 and 1, and whenever it's wrong, it adjusts itself a little bit to be more likely to be right next time around. The system would still have a trailing stop, and the system would still be in the market 100% of the time, and it wouldn't require any optimization on any time period because it learns after every trade. In addition to combining my previous strategy with a different strategy, this would also be a good start into trading with machine learning techniques, and a great trading strategy that is much less vulnerable to changing markets.

The results were impressive. I traded different months, different years, different currencies, and different timeframes and every single time the results were still impressive. In some cases the system made 70% of the initial capital with a maximum of 10% drawdown. And there is still definitely room for improvement.

01/25/15 - 02/01/15

Throughout this week I worked on my automated trading strategy that learns while trading. Although last week performance was good, there is always room for improvement. I am currently improving my neuron and hoping to combine these neurons into a big neural net that can perform more complex computations than it is currently capable of. Right now, it is considerably simpler than any neural network that is commonly used in any system today, but it still remains profitable.

I made small improvements to my neuron inputs, and slightly improved how fast the strategy executes, simply because it would take up to 30 minutes for my computer to test the strategy with every small edit. It still remains considerably slow. I also did a lot of reading into different types of neural networks and I am confident the neural network that I started programming late into B term would significantly improve my system's performance. Unfortunately I have a long way to go before it is working.

I also had some progress programming my neural network, however, there is some errors that I am unable to correct. I have posted on programming forums asking for help, and even contacted the author of a neural network library that I am using and we actually fixed a problem that he had for months.

TradeStation Performance Summary			Collapse ⌃
	All Trades	**Long Trades**	**Short Trades**
Total Net Profit	$52,305.89	$53,006.65	($700.77)
Gross Profit	$252,463.46	$141,636.11	$110,827.35
Gross Loss	($200,157.57)	($88,629.45)	($111,528.12)
Profit Factor	1.26	1.60	0.99

Although I don't have a functional neural network yet, as you can see, the simple neuron is performing nicely, with only ten percent drawdown.

02/01/15 - 02/08/15

Although it is still a work in progress, I was able to backtest on 11 months of historical data and the results were truly incredible. After some tweaking and editing my scripts on Matlab I created a neural network that tells me when to buy or sell with a little below 70% accuracy based on my training data. However, when I look at the results on TradeStation with 50 pips take profit and 50 pips stop loss, the system's results are the best I've seen.

The system performed so well, it actually had over 260 trades, 85% of which were profitable trades, 24 consecutive winning trades and a maximum of 2 consecutive losses. I know of systems that have 99% profitable trades, but each loss is so big that the system is actually losing. However, my system's average winning trade is 450$, and the average losing trade is 260$. The max drawdown experienced was less than 1 percent, while the return was approximately 95 during the testing period.

Max. Drawdown (Intra-day Peak to Valley)			
Value	($771.18)	($732.06)	($793.78)
Date	02/19/14 19:30		
as % of Initial Capital	0.77%	0.73%	0.79%
Net Profit as % of Drawdown	12298.36%	6585.03%	5875.19%
Select Net Profit as % of Drawdown	12109.80%	6475.04%	5793.44%
Adjusted Net Profit as % of Drawdown	11196.62%	5745.42%	5136.65%
Max. Drawdown (Trade Close to Trade Close)			
Value	($598.51)	($598.51)	($294.54)
Date	12/17/14 14:30		
as % of Initial Capital	0.60%	0.60%	0.29%
Net Profit as % of Drawdown	15846.40%	8054.40%	15833.57%
Select Net Profit as % of Drawdown	15603.44%	7919.86%	15613.26%
Adjusted Net Profit as % of Drawdown	14426.82%	7027.43%	13843.21%
Max. Trade Drawdown	($294.54)	($294.18)	($294.54)

It is difficult to replicate this on different data, currencies, timeframes, etc. without first completely programming big parts of the program. Sadly I can't yet see if these results were an error or if the neural network has potential for profit during live trading. At this current moment, the neural network is probably very biased towards trading during this period because that is the period in which it was trained. I suspect if the network was tested on different data it would not perform so admirably, or even at an acceptable level. This will obviously take some time to finish, and I sincerely hope that by the end of C term I will have a fully functional system that can effectively replace manual human input in trading.

TradeStation Performance Summary			Collapse ⌃
	All Trades	**Long Trades**	**Short Trades**
Total Net Profit	$94,842.39	$48,206.44	$46,635.95
Gross Profit	$104,354.24	$53,713.68	$50,640.56
Gross Loss	($9,511.85)	($5,507.24)	($4,004.61)
Profit Factor	10.97	9.75	12.65
Roll Over Credit	($26.92)	$5.30	($32.22)
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	$93,388.29	$47,401.23	$45,987.06
Select Gross Profit	$102,900.13	$52,908.47	$49,991.67
Select Gross Loss	($9,511.85)	($5,507.24)	($4,004.61)
Select Profit Factor	10.82	9.61	12.48
Adjusted Total Net Profit	$86,346.06	$42,059.92	$40,773.58
Adjusted Gross Profit	$97,443.21	$48,768.93	$45,812.17
Adjusted Gross Loss	($11,097.15)	($6,709.01)	($5,038.59)
Adjusted Profit Factor	8.78	7.27	9.09
Total Number of Trades	264	139	125
Percent Profitable	86.36%	84.89%	88.00%
Winning Trades	228	118	110
Losing Trades	36	21	15
Even Trades	0	0	0
Avg. Trade Net Profit	$359.25	$346.81	$373.09
Avg. Winning Trade	$457.69	$455.20	$460.37
Avg. Losing Trade	($264.22)	($262.25)	($266.97)
Ratio Avg. Win:Avg. Loss	1.73	1.74	1.72
Largest Winning Trade	$805.21	$805.21	$648.89
Largest Losing Trade	($294.54)	($294.18)	($294.54)
Largest Winner as % of Gross Profit	0.77%	1.50%	1.28%
Largest Loser as % of Gross Loss	3.10%	5.34%	7.35%
Net Profit as % of Largest Loss	32200.35%	16386.50%	15833.57%
Select Net Profit as % of Largest Loss	31706.66%	16112.79%	15613.26%
Adjusted Net Profit as % of Largest Loss	29315.72%	14297.15%	13843.21%
Max. Consecutive Winning Trades	24	18	23
Max. Consecutive Losing Trades	2	2	1
Avg. Bars in Total Trades	16.86	18.22	15.34
Avg. Bars in Winning Trades	17.02	19.18	14.71
Avg. Bars in Losing Trades	15.83	12.86	20.00
Avg. Bars in Even Trades	0.00	0.00	0.00

02/09/15 - 02/16/15

This week my trading system's results suffered greatly. I found errors in my testing and apparently my system's results were actually very exaggerated compared to how it would perform live because of that error.

My accurate predictions have actually went down drastically and the system is no longer profitable. Unfortunately I am not entirely sure how to fix this. I tried different timeframes, currencies and it is almost always losing money.

TradeStation Performance Summary			Collapse ⌃
	All Trades	**Long Trades**	**Short Trades**
Total Net Profit	($2,170.62)	$4,408.78	($6,579.40)
Gross Profit	$95,349.11	$53,495.92	$41,853.19
Gross Loss	($97,519.72)	($49,087.14)	($48,432.59)
Profit Factor	0.98	1.09	0.86
Roll Over Credit	($241.07)	$49.06	($290.13)
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	($2,170.62)	$4,408.78	($6,579.40)
Select Gross Profit	$95,349.11	$53,495.92	$41,853.19
Select Gross Loss	($97,519.72)	($49,087.14)	($48,432.59)
Select Profit Factor	0.98	1.09	0.86
Adjusted Total Net Profit	($15,715.17)	($5,698.89)	($15,605.14)
Adjusted Gross Profit	$87,739.42	$47,693.47	$36,920.74
Adjusted Gross Loss	($103,454.58)	($53,392.36)	($52,525.89)
Adjusted Profit Factor	0.85	0.89	0.70
Total Number of Trades	427	215	212
Percent Profitable	36.77%	39.53%	33.96%
Winning Trades	157	85	72
Losing Trades	270	130	140
Even Trades	0	0	0
Avg. Trade Net Profit	($5.08)	$20.51	($31.03)
Avg. Winning Trade	$607.32	$629.36	$581.29
Avg. Losing Trade	($361.18)	($377.59)	($345.95)
Ratio Avg. Win:Avg. Loss	1.68	1.67	1.68
Largest Winning Trade	$654.67	$654.67	$651.90
Largest Losing Trade	($394.23)	($394.23)	($394.13)
Largest Winner as % of Gross Profit	0.69%	1.22%	1.56%
Largest Loser as % of Gross Loss	0.40%	0.80%	0.81%
Net Profit as % of Largest Loss	(550.60%)	1118.33%	(1669.35%)
Select Net Profit as % of Largest Loss	(550.60%)	1118.33%	(1669.35%)
Adjusted Net Profit as % of Largest Loss	(3986.31%)	(1445.58%)	(3959.39%)

After a little bit of tweaking, I found that with small changes in the training method, the system can start being profitable again. However, the profit is small and not worth the the risk. With 13% drawdown, the system only made 10% profit.

TradeStation Performance Summary			Collapse ⌃
	All Trades	**Long Trades**	**Short Trades**
Total Net Profit	$11,782.33	$25,143.80	($13,361.48)
Gross Profit	$217,438.19	$125,466.61	$91,971.59
Gross Loss	($205,655.86)	($100,322.80)	($105,333.06)
Profit Factor	1.06	1.25	0.87
Roll Over Credit	($467.11)	$26.08	($493.18)
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	$12,936.71	$24,039.10	($11,102.39)
Select Gross Profit	$215,610.75	$123,639.16	$91,971.59
Select Gross Loss	($202,674.04)	($99,600.06)	($103,073.98)
Select Profit Factor	1.06	1.24	0.89
Adjusted Total Net Profit	($7,876.46)	$10,765.11	($26,739.58)
Adjusted Gross Profit	$206,224.67	$116,968.93	$84,654.72
Adjusted Gross Loss	($214,101.14)	($106,203.83)	($111,394.30)
Adjusted Profit Factor	0.96	1.10	0.76
Total Number of Trades	969	509	460
Percent Profitable	38.80%	42.83%	34.35%
Winning Trades	376	218	158
Losing Trades	593	291	302
Even Trades	0	0	0

After a few additional changes, I made another small improvement, increasing the profit and reducing the drawdown. However, it still only makes 14% with a drawdown of 10%.

TradeStation Performance Summary   (Collapse ⌃)

	All Trades	Long Trades	Short Trades
Total Net Profit	$14,398.54	$18,474.04	($4,075.50)
Gross Profit	$220,321.78	$125,499.51	$94,822.27
Gross Loss	($205,923.25)	($107,025.47)	($98,897.78)
Profit Factor	1.07	1.17	0.96
Roll Over Credit	($462.95)	$44.19	($507.14)
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	$16,510.77	$18,327.18	($1,816.42)
Select Gross Profit	$219,452.19	$124,629.92	$94,822.27
Select Gross Loss	($202,941.42)	($106,302.73)	($96,638.69)
Select Profit Factor	1.08	1.17	0.98
Adjusted Total Net Profit	($5,308.51)	$3,905.10	($17,338.08)
Adjusted Gross Profit	$209,063.86	$117,019.04	$87,417.90
Adjusted Gross Loss	($214,372.38)	($113,113.94)	($104,755.97)
Adjusted Profit Factor	0.98	1.03	0.83
Total Number of Trades	977	528	449
Percent Profitable	39.20%	41.48%	36.53%
Winning Trades	383	219	164
Losing Trades	594	309	285
Even Trades	0	0	0
Avg. Trade Net Profit	$14.74	$34.99	($9.08)
Avg. Winning Trade	$575.25	$573.06	$578.18
Avg. Losing Trade	($346.67)	($346.36)	($347.01)
Ratio Avg. Win:Avg. Loss	1.66	1.65	1.67
Largest Winning Trade	$869.59	$869.59	$650.98
Largest Losing Trade	($1,571.21)	($722.74)	($1,571.21)
Largest Winner as % of Gross Profit	0.39%	0.69%	0.69%
Largest Loser as % of Gross Loss	0.76%	0.68%	1.59%
Net Profit as % of Largest Loss	916.40%	2556.12%	(259.39%)
Select Net Profit as % of Largest Loss	1050.83%	2535.80%	(115.61%)
Adjusted Net Profit as % of Largest Loss	(337.86%)	540.32%	(1103.48%)

These are really disappointing results, especially because I was under the impression I hit a gold mine. I will still continue working on my implementation of a special kind of neural network in hopes that it has more potential, but I will most probably focus more on programming a strategy that doesn't necessarily use neural networks, or only uses neural networks as an extra, instead of being the main thing.

02/17/15 - 02/ 22/15

After last week's paper I had decided to work on programming a strategy that does not depend entirely on neural network. And so, I created a new strategy that combined some advantages of machine learning and also some advantages of technical trading and known chart patterns that are considered important when trading.

I created a machine learning "neuron" that instead of simply taking closing price or moving averages and deciding if it should buy, it uses patterns as inputs instead. For example, if two moving averages just crossed over, then input is set to 1. If not, then input is zero.

As of right now, there are still some things I have to work out before I can really train it correctly. The results I have experienced so far are significantly negative.

TradeStation Performance Summary			Collapse ⌃
	All Trades	**Long Trades**	**Short Trades**
Total Net Profit	($3,729.63)	($1,352.45)	($2,377.19)
Gross Profit	$8,388.79	$5,710.63	$2,678.16
Gross Loss	($12,118.43)	($7,063.08)	($5,055.35)
Profit Factor	0.69	0.81	0.53
Roll Over Credit	($24.24)	$4.71	($28.95)
Open Position P/L	$807.03	$807.03	$0.00
Select Total Net Profit	($3,386.13)	($1,352.45)	($2,033.69)
Select Gross Profit	$8,388.79	$5,710.63	$2,678.16
Select Gross Loss	($11,774.93)	($7,063.08)	($4,711.85)
Select Profit Factor	0.71	0.81	0.57
Adjusted Total Net Profit	($7,991.37)	($4,797.28)	($4,880.18)
Adjusted Gross Profit	$6,146.79	$3,807.09	$1,480.45
Adjusted Gross Loss	($14,138.17)	($8,604.37)	($6,360.63)
Adjusted Profit Factor	0.43	0.44	0.23
Total Number of Trades	67	39	28
Percent Profitable	20.90%	23.08%	17.86%

I tested the strategy on USD JPY only, for technical reasons. As you can see, in only approximately 10 days the machine learning neuron only made profit on one of every 5 trades, which was not enough to compensate for the losses.

The neuron can accept multiple inputs and then gives each input a weight to finally decide if it is a good idea to trade. This can be used for us to combine our strategies during our IQP, by simply inputting 1 if a strategy wants to buy, -1 if a strategy wants to sell, and 0 otherwise. The neuron can accept multiple strategies and if enough strategies agree on a decision, it trades.

IQP Report from Oct.31st to Nov 6th, 2014

Details about this week's trading:

My goal for last week is to increase one percent of the total asset.

For the last week, I spent 3~4 hours on reading the news, 1 hour on trading, almost 2 hours on analysis and 2 hours for writing the report.

Since I got news on Oct 31th, based on my analysis mention in the previous, I kept my trending strategy running this week. (The code can be seen in Appendix A.) Although we are asked to use the manual based trading, I still prefer the auto strategy trading. From my conclusion of analysis, this week must be a trending situation. I don't want to miss any chances to earn money since I was too busy concentrating on other stuffs. Based on the trending graph, everything goes perfectly at first. But one thing I forgot take me a lesson. In the Nov 5th 2011, a hacker attacked Facebook page and let the main page shut down for several hours. This accident made a great impact on Facebook stock price. So when every Nov 5th comes out, investors are all afraid of that kind of thing happens once again. So at the beginning of Nov 5th, the stock price crashed deeply. During that time, I was just enter the market at 75.773 with 1000 shares. Although I quitted quickly based on my strategy at 75.254, I still lost all my profit and lost a lot of money. This teach me a lesson. News is not just for today, maybe it will also influence the future directly. Don't just focus on the news for today, read it as a history. Someday, the history might copy itself. Since the change of the stock price is not that evident, it's not that convenient using the 10 minutes bar. But on a larger scale, an upward trending graph is beneficial for my strategy seeing as it goes long.

Tradestation Chart Analysis and Performance Summary for this week:

TradeStation Performance Summary Collapse ⌃

	All Trades	Long Trades	Short Trades
Total Net Profit	($5,430.50)	($5,430.50)	$0.00
Gross Profit	$842.00	$842.00	$0.00
Gross Loss	($6,272.50)	($6,272.50)	$0.00
Profit Factor	0.13	0.13	n/a
Roll Over Credit	$0.00	$0.00	$0.00
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	($5,430.50)	($5,430.50)	$0.00
Select Gross Profit	$842.00	$842.00	$0.00
Select Gross Loss	($6,272.50)	($6,272.50)	$0.00
Select Profit Factor	0.13	0.13	n/a
Adjusted Total Net Profit	($10,461.21)	($10,461.21)	$0.00
Adjusted Gross Profit	$246.62	$246.62	$0.00
Adjusted Gross Loss	($10,707.83)	($10,707.83)	$0.00
Adjusted Profit Factor	0.02	0.02	n/a
Total Number of Trades	4	4	0
Percent Profitable	50.00%	50.00%	0.00%
Winning Trades	2	2	0
Losing Trades	2	2	0
Even Trades	0	0	0
Avg. Trade Net Profit	($1,357.63)	($1,357.63)	$0.00
Avg. Winning Trade	$421.00	$421.00	$0.00

IQP News on Nov 16[th], 2014

News for this week:
1. Abe likely to Postpone Sales-Tax Increase[27]
Japanese Prime Minister Shinzo Abe will likely decide next week to postpone an unpopular sales-tax increase, judging that the country's economy is too weak to withstand the burden, and call a general election to seek public support for his economic program, a top Abe administration official said on Wednesday.
2. Krugman Says Weak Yen Can Still Help Exports[28]
He said it takes time for manufacturers to adjust their production after currency changes and cited the experience of the U.S. after the 1985 Plaza Accord, an agreement between five major economies to allow the U.S. dollar to weaken. The deal led to a rebound in U.S. export growth but it took several years to emerge, Mr. Krugman said.

Relation between the news and my trading:
1. This action shows that Abe is willing to keep the sales up in the short time. Since the last increasing of sales-tax in April slow the increment of Japanese economics, Abe is becoming more and more careful to make the decision about policies that will influence the increment of economics. We can explain it in another way, Japanese economics cannot hold another increment of sales tax. So it shows that Japan has a really weak economics so far. Japan is more willing to have higher exchange

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[27] NISHIYAMA, G. (2014, November 12). Abe Likely to Postpone Sales-Tax Increase. Retrieved November 25, 2014, from http://online.wsj.com/articles/japan-abe-aides-preparing-for-snap-poll-1415772770

[28] WARNOCK, E. (2014, November 6). Krugman Says Weak Yen Can Still Help Exports. Retrieved November 25, 2014, from http://blogs.wsj.com/japanrealtime/2014/11/06/krugman-says-weak-yen-can-still-help-exports/

rate to insure that export is still a strong helper for the economics. Based on these, the exchange rate for JPY will still be kept in a high position.

2.   Based on Krugman's analysis, we have to wait for the Japanese companies' reaction for the weak yen. So far, in the short time, the exchange rate won't be able to reach 110 anymore. After seeing the outcome of weak yen, the Japanese Government will decide what next. So JPY will goes weak for a quite long time.

<center>IQP Report from Nov 9th to Nov 16th, 2014</center>

Details about this week's trading:

My goal for last week is to upgrade the Easylanguage code for Facebook. It didn't do a good job last week. I started a new indicator for moving average to indicate the fluctuation. But there's something wrong to use the indicator in the strategy. (The indicator can be seen in Appendix B)

For the last week, I spent 3~4 hours on reading the news, 1 hour on trading, one hours on analysis, 3 hours on Easylanguage and 2 hours for writing the report.

Since my teammates are all concentrate on USDJPY trading. I decided to be back to it too. For this week, based on the news, I think the graph of the USDJPY will be kept in a high position at least.

And it will probably go up. So, based on my analysis, I started my trading at a low position. I bought $100,000 at 115.761. Based on the previous week's graph, this is a relatively low point on the graph. Based on a survey in Japan, weak yen has a direct impact on the import for some Japanese factories. Weak yen makes them pay a lot more for the same amount of raw materials. Japan is a poor country that almost have nothing for the raw material. Japanese factories mostly keep producing based on importing. Over 117 yen per dollar will be a disaster for the import.[29] 80 percent of the local factories will be influenced. 45 percent of the local factories will decrease 60% of their productions. So I think in short time, the exchange rate will not be over 117. After these analysis, I quit the market at 116.722. I earned 96.1 pips.

For the Alibaba trading, as I mentioned last week. I bought 1000 shares at 104.87 on Nov 4th. Before the holiday on Nov 11th, the stock price raised like a rocket. Since the holiday is over, the effect from the holiday is weaker and weaker. So I exit the market right after the holiday at 118.69. Actually, I invest the real money at the same time too. And I earned more than 2000 dollars for this time.

TradeStation Chart Analysis and Performance Summary for this week:

IQP News on Nov 24[th], 2014

News for this week:

1. Japan's Finance Minister Rings Alarm Over Yen Weakness[30]

TOKYO—Japan's finance minister moved Friday for the first time to get the yen's rapid fall under control, the clearest sign yet that a weak currency is beginning to complicate the country's aggressive experiment to restore growth.

2. Alibaba Group Announces Pricing of Offering of US$8.0 Billion of Senior Unsecured Notes31

Alibaba Group Holding Limited ("Alibaba Group") (NYSE:BABA) today announced the pricing of an offering of US$8.0 billion aggregate principal amount of senior unsecured notes.

IQP Report from Nov 18[th] to Nov 24[th], 2014

Relation between the news and my trading:

1. From on this passage, "Maybe levels around ¥120 are acceptable, but if it weakens as much as to ¥125, that would make me a bit nervous, make me stop and think, 'Is this OK?'" said Etsuro Honda, an adviser to Mr. Abe, in a recent interview. We can see in short time, ¥120 to ¥125 is possible for the exchange rate. But since up to now, even the strongest supporters of Abenomics say they don't want the yen to get much weaker than ¥120 to the dollar. So we need to pay attention to the recent policy and prepare to exit the market.

2. Since I'm focusing on the Alibaba, this is a great news for the rest of the week for Alibaba. Because of this promotion, Alibaba stock price will increase shortly. And I went in right after reading the news.

Details about this week's trading:

My goal for this week is to write a new moving average code for the short time trading. The last code for trending following strategy didn't work well in short time. Also, I keep trading with USDJPY and Alibaba. And I'm keep trying to add the new indicator to the trading, but no progress so far.

This week, I spent 5 hours on the codes, 3 hours on news, 3 hours on meeting, 2 hours on trading and 3 hours on writing reports. Total is 15 hours.

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[30] NAKAMICHI, T., & OBE, M. (2014, November 21). Japan's Finance Minister Rings Alarm over Yen Weakness. Retrieved November 24, 2014, from http://online.wsj.com/articles/japans-finance-minister-rings-alarm-over-yen-weakness-1416537501

[31] Christie, R. (2014, November 20). Alibaba Group Announces Pricing of Offering of US$8.0 Billion of Senior Unsecured Notes. Retrieved November 24, 2014, from http://online.wsj.com/article/PR-CO-20141120-916994.html

For USDJPY, I started at Thursday. Since usually, Friday is not a good time for trading currency. And on Thursday, the exchange rate is remaining in a high position. So I bought 11,871,100 yen at the price 118.711. After that, yen goes strong since the news mentioned previously. Based on the fluctuation recently, the difference between the maximum and the minimum is around 100 pips in the view of 10 minutes bar. So, after earning almost 100 pips I quite the market. And like I said, dollar goes strong immediately after that.

The Flowchart for the new moving average code (Appendix C):

TradeStation Chart Analysis and Performance Summary for this week:

IQP News from Dec 1st to Dec 8th, 2014

News for this week:

Falling Yen Stirs Debate in Japan[32]

With only a week to go before the general election on Dec.14, one topic that has constantly come up for debate in japan has been the falling yen.

The Japanese currency hit a fresh seven-year low versus the dollar at ¥121 on Friday, after a strong U.S. jobs report highlighted a contrast between robust growth in the U.S. and Japan's recessionary economy.

Relation between the news and my trading:

Although the weak economy is the biggest problem for Japan, I don't think it won't change for quite a long time. First of all, Liberal Democratic Party is the biggest party in Japan. Even though Abe didn't a good job on the economy, the general election won't affect Abe's re-election. So Abeconomics won't have any big changes. In general, the economy won't change a lot. So far, the buy short is still good next week.

I think after the general election, JPY may go strong for a short time. According to credit research firm Tokyo Shoko Research[33], out of 8,309 bankruptcies filed from January to October, 238 were mainly because of the weak yen. However, the total number of bankruptcies filed in October—800— was the month's lowest in 24 years. Japan economy is facing a huge impact. I think it's the time now to give people confidence that the government has ability to stop those things. So I will keep eye on the new policies come up from the Japanese Government.

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[32] "Falling Yen Stirs Debate in Japan." WSJ. N.p., n.d. Web. 30 Apr. 2015.

[33] "Bloomberg the Company & Products." Businessweek.com. N.p., n.d. Web. 30 Apr. 2015.

Details about this week's trading:

My goal this week is to improve my manual trading skills. Isabell's strategy of trading inspires me a lot. So I focused on reading babypips to learn more about trading skills this week.

At the beginning, I found that there is a constant uptrend on USDJPY. So I bought short at 120.125. Based on what I have read in babypips, the swift move higher after the break was a product of strong US economy and weak Japanese data, including the dip lower today in Japanese leading indicator data. Since the pair was not too far away from a major psychological level (119.88), I thought I'd take the fast move as a gift and lock in profits right after weekend risk. Luckily, there's no such a weekend risk this week. In another reason, I faced the wedge chart pattern after the uptrend and saw a higher high bar. This might indicate that a bearish reversal. So I sold cover immediately at 121.602. Luckily, I earned 147.7 pips in 8 hours. During the uptrend, there was a shooting star pattern in the graph around 9 o'clock. The shooting star might indicate the top of the uptrend. And it might be the time I exit the market. While I was thinking whether exit or not, the next bar comes up with another shooting star in lower fluctuation. So I decided to keep staying in the market since the uptrend is still on the move. Because of my right decision, I made 20 pips more.

This week, I spent 3~4 hours on reading the news, 6 hours reading babypips, 1 hour on trading, 3 hours on analysis, 1 hour on meeting and 2 hours for writing the report. So there's a total of 17 hours for the week.

TradeStation Chart Analysis and Performance Summary for this week:

Also, using the knowledge learnt from babypips, I started to update my strategy. After reading babypips, I found that the weight average is much better than the moving average. The weight average shows the average based on the importance of each factor. During the trading of USDJPY, the fluctuation is the most important. The bars in USDJPY&GBPJPY. are short and steady since U.S. economy is growing fast. So the variances for the USDJPY&GBPJPY are a lot lower than other currency trading. Based on this feature, I upgrade my trading strategy. And I make a comparison test the previous code (Appendix A) and the new code (Appendix D) using USDJPY&GBPJPY. And the performance summary shows the big difference between those two trading in the same currency, same standard lot of money and same time frame. But the thing is that in the next year, after the general election, even USDJPY won't go so well as this year. So I need to keep updating for the next year.

I tried to separate Appendix D and let it trade in different condition. The Appendix E is the buy part. And the Appendix F is the sell part. But in some reason, two codes cannot work together properly. I will figure it out during the winter vacation.

USDJPY using Appendix D

TradeStation Performance Summary
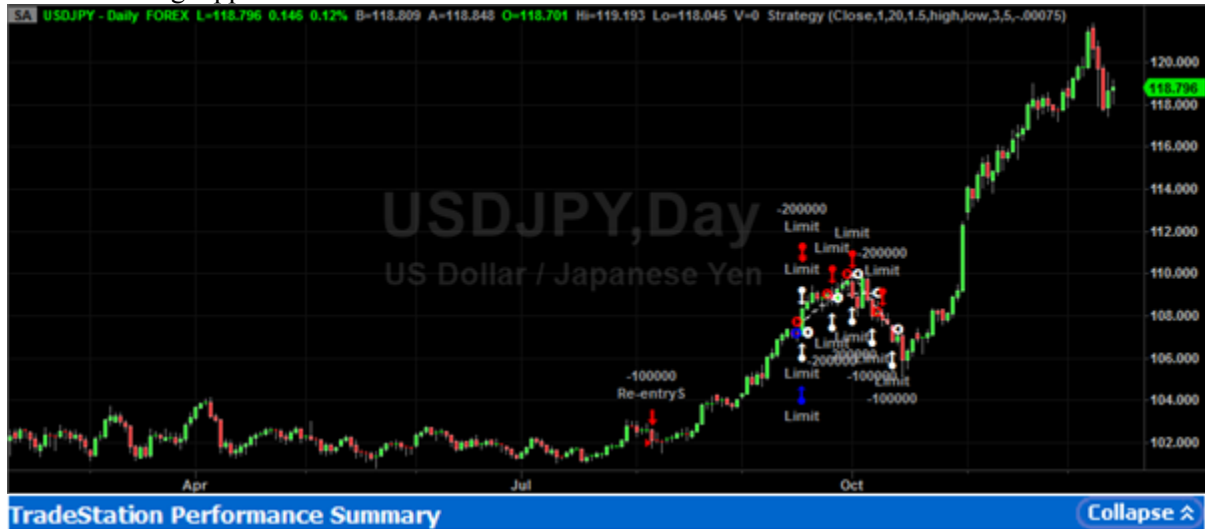
	All Trades	Long Trades	Short Trades
Total Net Profit	$6,498.00	($11,802.00)	$18,300.00
Gross Profit	$169,300.00	$0.00	$169,300.00
Gross Loss	($162,802.00)	($11,802.00)	($151,000.00)
Profit Factor	1.04	0.00	1.12
Roll Over Credit	$0.00	$0.00	$0.00
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	$6,498.00	($11,802.00)	$18,300.00
Select Gross Profit	$169,300.00	$0.00	$169,300.00
Select Gross Loss	($162,802.00)	($11,802.00)	($151,000.00)
Select Profit Factor	1.04	0.00	1.12
Adjusted Total Net Profit	($186,022.45)	($18,615.89)	($208,186.30)
Adjusted Gross Profit	$49,586.82	$0.00	$49,586.82
Adjusted Gross Loss	($235,609.27)	($18,615.89)	($257,773.12)
Adjusted Profit Factor	0.21	0.00	0.19
Total Number of Trades	7	3	4
Percent Profitable	28.57%	0.00%	50.00%
Winning Trades	2	0	2
Losing Trades	5	3	2
Even Trades	0	0	0
Avg. Trade Net Profit	$928.29	($3,934.00)	$4,575.00
Avg. Winning Trade	$84,650.00	$0.00	$84,650.00

GBPJPY using Appendix D

TradeStation Performance Summary Collapse ⌃

	All Trades	Long Trades	Short Trades
Total Net Profit	($11,908.70)	($18.48)	($11,890.22)
Gross Profit	$2,447.22	$0.00	$2,447.22
Gross Loss	($14,355.92)	($18.48)	($14,337.44)
Profit Factor	0.17	0.00	0.17
Roll Over Credit	($403.93)	$0.00	($403.93)
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	($11,908.70)	($18.48)	($11,890.22)
Select Gross Profit	$2,447.22	$0.00	$2,447.22
Select Gross Loss	($14,355.92)	($18.48)	($14,337.44)
Select Profit Factor	0.17	0.00	0.17
Adjusted Total Net Profit	($20,216.70)	($36.96)	($20,749.34)
Adjusted Gross Profit	$0.00	$0.00	$0.00
Adjusted Gross Loss	($20,216.70)	($36.96)	($20,749.34)
Adjusted Profit Factor	0.00	0.00	0.00
Total Number of Trades	7	1	6
Percent Profitable	14.29%	0.00%	16.67%
Winning Trades	1	0	1
Losing Trades	6	1	5
Even Trades	0	0	0
Avg. Trade Net Profit	($1,701.24)	($18.48)	($1,981.70)
Avg. Winning Trade	$2,447.22	$0.00	$2,447.22

USDJPY using Appendix A

TradeStation Performance Summary
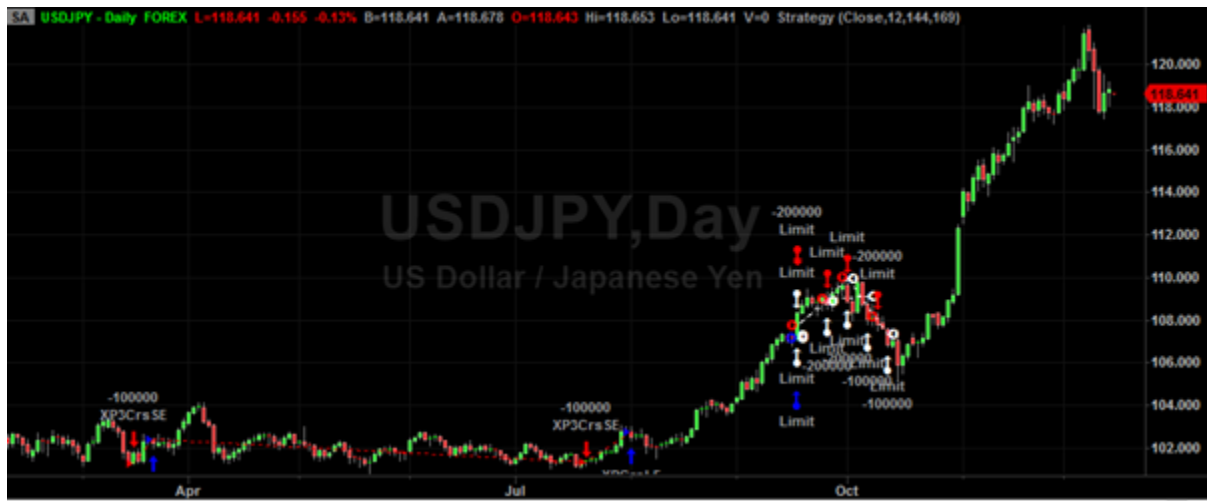
	All Trades	Long Trades	Short Trades
Total Net Profit	($22,883.32)	($17,514.54)	($5,368.78)
Gross Profit	$939.00	$939.00	$0.00
Gross Loss	($23,822.32)	($18,453.54)	($5,368.78)
Profit Factor	0.04	0.05	0.00
Roll Over Credit	($32.75)	$0.00	($32.75)
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	($22,883.32)	($17,514.54)	($5,368.78)
Select Gross Profit	$939.00	$939.00	$0.00
Select Gross Loss	($23,822.32)	($18,453.54)	($5,368.78)
Select Profit Factor	0.04	0.05	0.00
Adjusted Total Net Profit	($35,336.62)	($28,710.83)	($10,737.57)
Adjusted Gross Profit	$396.87	$396.87	$0.00
Adjusted Gross Loss	($35,733.49)	($29,107.70)	($10,737.57)
Adjusted Profit Factor	0.01	0.01	0.00
Total Number of Trades	7	6	1
Percent Profitable	42.86%	50.00%	0.00%
Winning Trades	3	3	0
Losing Trades	4	3	1
Even Trades	0	0	0
Avg. Trade Net Profit	($3,269.05)	($2,919.09)	($5,368.78)
Avg. Winning Trade	$313.00	$313.00	$0.00

GBPJPY using Appendix A

TradeStation Performance Summary   Collapse ⌃

	All Trades	Long Trades	Short Trades
Total Net Profit	($14,738.15)	($14,738.15)	$0.00
Gross Profit	$2,513.00	$2,513.00	$0.00
Gross Loss	($17,251.15)	($17,251.15)	$0.00
Profit Factor	0.15	0.15	n/a
Roll Over Credit	$0.00	$0.00	$0.00
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	($14,738.15)	($14,738.15)	$0.00
Select Gross Profit	$2,513.00	$2,513.00	$0.00
Select Gross Loss	($17,251.15)	($17,251.15)	$0.00
Select Profit Factor	0.15	0.15	n/a
Adjusted Total Net Profit	($26,148.99)	($26,148.99)	$0.00
Adjusted Gross Profit	$1,062.12	$1,062.12	$0.00
Adjusted Gross Loss	($27,211.11)	($27,211.11)	$0.00
Adjusted Profit Factor	0.04	0.04	n/a
Total Number of Trades	6	6	0
Percent Profitable	50.00%	50.00%	0.00%
Winning Trades	3	3	0
Losing Trades	3	3	0

IQP Report from Jan 25[th] to Feb 1[st]

Time:

For this week, I spent 3 hours reading news (about 0.5h per day). Modification for the code is around 5 hours. And 2 hours for testing and making decision using code. At last 3 hours to finish the report.

News:

U.S. Oil Jumps as Number of Drilling Rigs Drops[34]

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[34] "U.S. Oil Jumps as Number of Drilling Rigs Drops." WSJ. N.p., n.d. Web. 30 Apr. 2015.
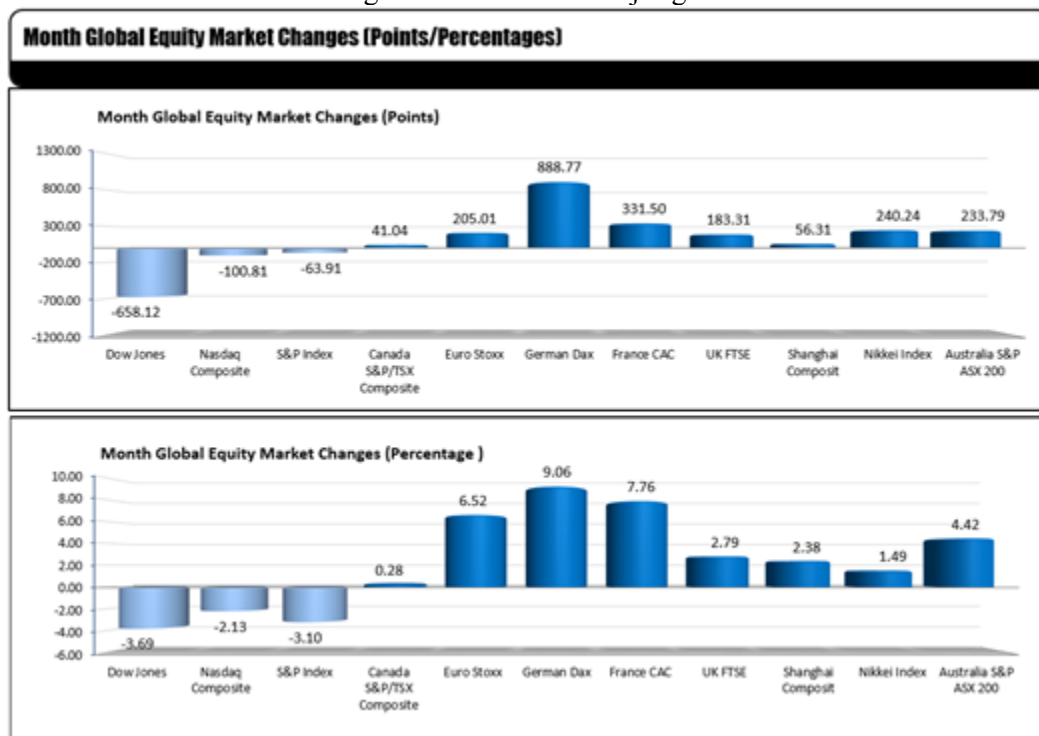
U.S. oil prices surged 8.3% as traders jettisoned bearish bets against the market after data showed a steep drop in the number of rigs drilling for oil in the country—a sign that crude production may be starting to ebb. The benchmark U.S. oil contract rose $3.71 to settle at $48.24 a barrel on the New York Mercantile Exchange, the largest one-day percentage jump since June 2012. Most of the surge came in the last 45 minutes of trading as investors squared up their books with the end of the month. $48.24 a barrel is really a low point for oil. (Standard expectation for oil price is $60 per barrel.) Based on my analysis, Mideast countries may reduce production recently. So in the future weeks, it stands a good chance to raise the price.

Market Analysis:
US stocks fall for the second consecutive month. European markets rally on ECB bond buying.
The US stock indices fell for the 2nd consecutive month with the Dow Jones Industrial average falling -3.69%. The broader S&P index fell by -3.10% while the tech heavy NASDAQ composite fell by -2.13%. The global flows shifted out of the US, and into the EU, on the back of the ECB's bond buying announcement, that they would be buying bonds to the tune of 60B per month starting Investor feel that what was so good for the US and the Japanese stock markets, must be good for the European markets now.

The German Dax led the way higher, surging by 9.06%. The French CAC 40 was next at 7.76% and the Euro Stoxx index added 6.52%. The UK FTSe and the Asian indices were up but by more modest amounts.

Below are the month end changes for some of the major global indices.[35]

Month Global Equity Market Changes (Points/Percentages)

For this week, as professor Radzicki mentioned, I started to focus on the radar screen. I made this 60 min range indicator to answer some questions;
1) What trading hour am I in at the moment? (I dislike the military time format)
The text colors change from white/black to cyan/blue for the 'current' hour.
2) What pairs have the most 'volatility' *relative to the 60 min range avg and the bid-ask spre*ad?
I use the "multi" column, the higher the number the higher the range relative to the Bid-Ask
3) what hour of day are the ranges are the highest?
Color codes;
white = this is the hour of the maximum average range
green = then avg range is > 90% of max range
dark green = then range is > 75% of max range
Days = calculated total days looked at, biased on total of the 60 min bars.
So far, the indicator works perfectly on the radar screen.

This code is too long and too complicated to draw the flowchart. I will send a separate ELD file to you about this code. (My friend who's a professional trader gave me a great help on this.)

For the trading this week, I keep using the fast med slow moving average and re-entry strategy for the USDJPY. I was thinking fluctuation is just a combination of lots of uptrends and downtrends. If I can respond to the small trend quickly enough, I may get better result. But for this week, my prediction of fluctuation seems to be correct. In the fluctuation, the new code makes quick and more frequent responses than before. The good news is that although the response and the time of enter the market increased, the probability of getting profit is kept in 100%. So the result is quite good.

I still have the problem with the trade manager on tradestation. In the all five trades during the week, all trades get profit. For this week, the total profit of USDJPY is $1355.93 in a standard lot. The maximum profit in a single trade is $559.78.

Easylanguage Code Flow Chart

Time:

For this week, I spent 3 hours reading news (about 0.5h per day). Modification for the code is around 5 hours. At last 3 hours to finish the report.

News:

The strongest and weakest currencies for the trading week ending February 6th[36]

In this week, USD was strong against JPY and weakest against the CAD. As for EURUSD, despite of the fluctuation in the EURUSD today, the exchange rate dropped 0.32%. As for CAD, because of the rebounding oil price, the CAD was getting stronger than I expected. Although the oil price raised a little bit recently, it still kept in a low position which means that there's still a big space for CAD's growth. So in the next week, I will try to enter USDCAD market to prove my thoughts.
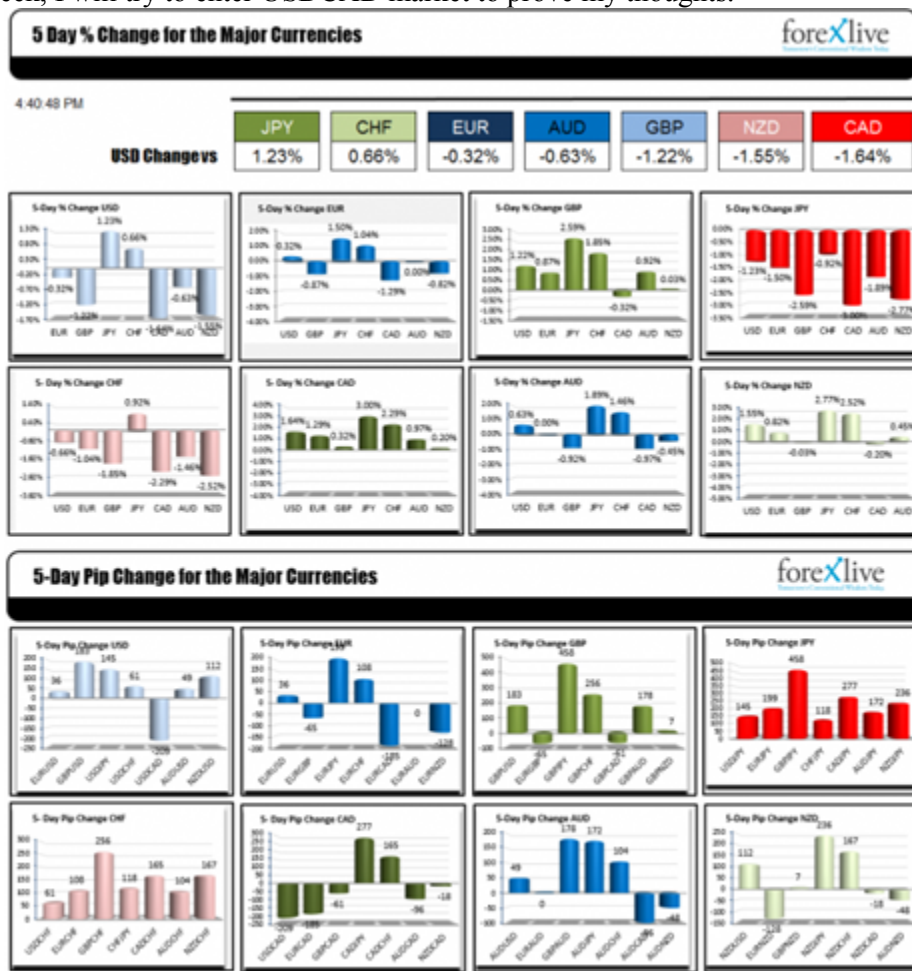
The strongest and weakest currencies for the week.

Market Analysis:

EURUSD takes the steps lower as planned[37]

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[36] "The Strongest and Weakest Currencies for the Trading Week Ending February 6th." The Strongest and Weakest Currencies for the Trading Week Ending February 6th. N.p., n.d. Web. 30 Apr. 2015.

In the pre-employment report, I outlined the target levels given a bearish report included (see green numbers in the chart above):

1. 1.1405 = 100 hour MA (blue line in the chart above). This is 72 pips from the high. The range for the day should be larger than that on a bearish release
2. 1.13923 = Old 38.2% retracement level
3. 1.1372/82 = 1.1372: low from November 2003. 1.1382: Channel trend line
4. 1.1362 = 200 hour MA. 115 pip trading range for the day. On a bearish report for the EURUSD, this is a doable target.
5. 1.1300/03 = Recent lows (blue horizontal line). This would be a 177 pip trading range and should slow the trend down.

In the 1 minute chart, the initial plunge moved below the first line and the second line at 1.1405 and 1.1362 levels at 100 hour MA. And it quickly move downward below the 3rd and 4th line. Based on the recent employment report of U.S., the labor market conditions index is lower than the expectation, which is also less than the record 7.3 on last month. As for the EUR, the problem of Greece is kept for a long time. The investors are all tired of this news. Except Greece, all Europe seems to be strong for now. German got 19.1 billion euro last December, which is lot higher than the expectation of 16.0 billion euro. And German also made a record that get trade profit 217 billion in 2014. Based on those information, the Sentix investor confidence index on February is 12.4. The expectation was 3.0. And the last month index was 0.9. Those good news for Europe gave the reason that euro goes strong against U.S. So in the next week, the exchange rate of EURUSD seems to be ambiguous. So I decide to stay away from the EURUSD next week and wait for further news.

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[37] "Forex Technical Trading: EURUSD Takes the Steps Lower as Planned." Forex Technical Trading: EURUSD Takes the Steps Lower as Planned. N.p., n.d. Web. 30 Apr. 2015.

A period of consolidation/correction ensued for the next 25 minutes. During that time, the price corrected back to the 1.1392 area. The high peaked at 1.1395. This was the perfect level to lean against for a short trade as:

It was the 38.2% of the move down (see chart above),

It was against the #2 target at 1.13923

It was below the key 100 hour MA at 1.1405

It was below the 50% of the move down today at 1.1408

When trading an event like the employment report, it is important to monitor the corrections for those clues and trading opportunities. Today, it provided those who missed the move down, to get in *after the data was known* (no risk from the event). It also allowed for those traders who were on the wrong side, to get out of jail with a manageable loss.

The best trade – with risk after the employment numbers – was to sell in the 1.1390s, stop above 1.1405-08 and hope "the market" agrees.

The price moved lower and reached a low of 1.1314 so far.
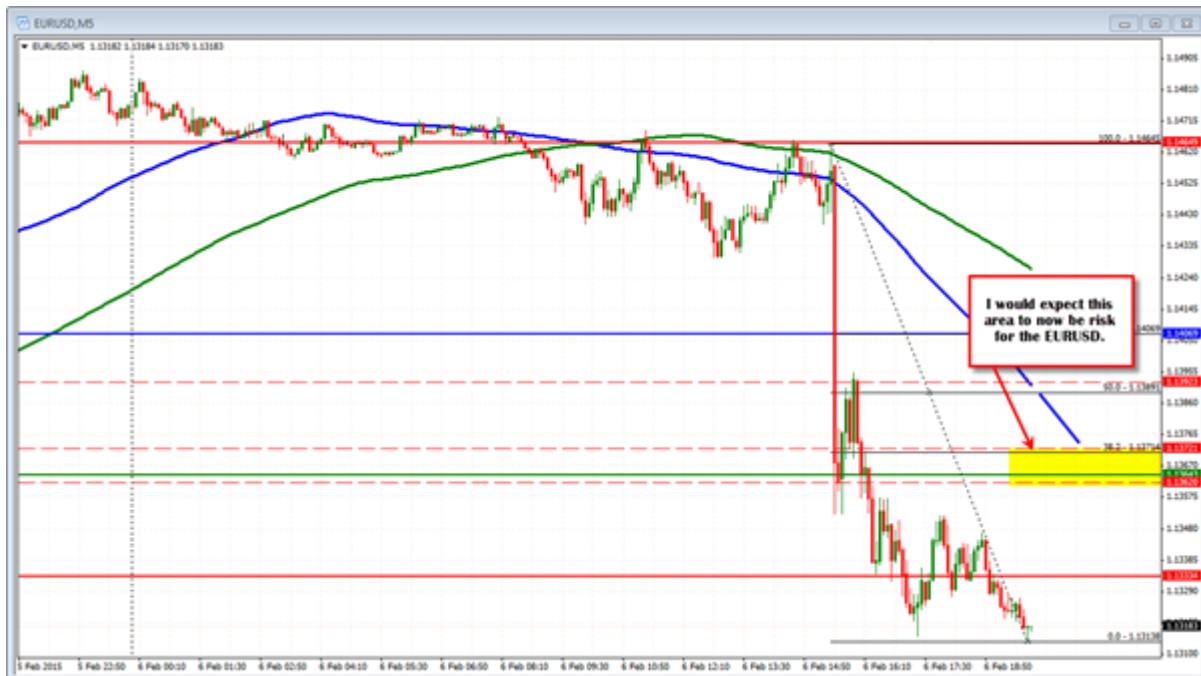
Based on the last week analysis, I keep trading on EURUSD this week. Since the Euro bank printed so much money, it's not hard to predict that the EURUSD will keep going down for a long time. So I decided to keep my strategy. During the week, keeping the re-entry strategy seems to be still perfect. Based on the test for trending recently, the code works well without modification. In the total of four trades, three trades gained profit and earned $1877.57 in a standard lot. I'm pretty happy about.

On the other hand, USDJPY also goes well in the trending situation. So I just keep running the strategy this week without any changes.

	All Trades	Long Trades	Short Trades
Total Net Profit	$619.29	$0.00	$619.29
Gross Profit	$619.29	$0.00	$619.29
Gross Loss	$0.00	$0.00	$0.00
Profit Factor	n/a	n/a	n/a
Roll Over Credit	($55.18)	$0.00	($55.18)
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	$619.29	$0.00	$619.29
Select Gross Profit	$619.29	$0.00	$619.29
Select Gross Loss	$0.00	$0.00	$0.00
Select Profit Factor	n/a	n/a	n/a
Adjusted Total Net Profit	$0.00	$0.00	$0.00
Adjusted Gross Profit	$0.00	$0.00	$0.00
Adjusted Gross Loss	$0.00	$0.00	$0.00
Adjusted Profit Factor	n/a	n/a	n/a
Total Number of Trades	1	0	1
Percent Profitable	100.00%	0.00%	100.00%
Winning Trades	1	0	1
Losing Trades	0	0	0
Even Trades	0	0	0
Avg. Trade Net Profit	$619.29	$0.00	$619.29
Avg. Winning Trade	$619.29	$0.00	$619.29
Avg. Losing Trade	$0.00	$0.00	$0.00
Ratio Avg. Win:Avg. Loss	n/a	n/a	n/a

The main reason I didn't keep update my strategy is that I'm focused on the new radar screen indicator. The code is a model from my father's friend. So last week, I just simply make it work in the forex market. But actually, I didn't know how it works. That's why I didn't provide the flow chart for that indicator last week. For this week, I spent a lot of time on reading the code and try to understand it. I'm really bad at coding. So I still have some problems to understand it. I need to meet my group mates so that I can figure it out.

<center>IQP Report from Feb 9th to Feb 15th</center>

Time:
For this week, I spent 3 hours reading news (about 0.5h per day). Modification for the code is around 10 hours. This week, I totally upgraded my system. So it took a lot more time to upgrade a simple strategy to a full functional system. At last 3 hours to finish the report.

News:
USD/CAD leading the dollar charge lower as oil keeps on bubbling[38]
Because of the sinking sentiment and strong positive view drive up in oil, USDCAD has fallen to 1.2435 and just below is short term support at 1.2425.

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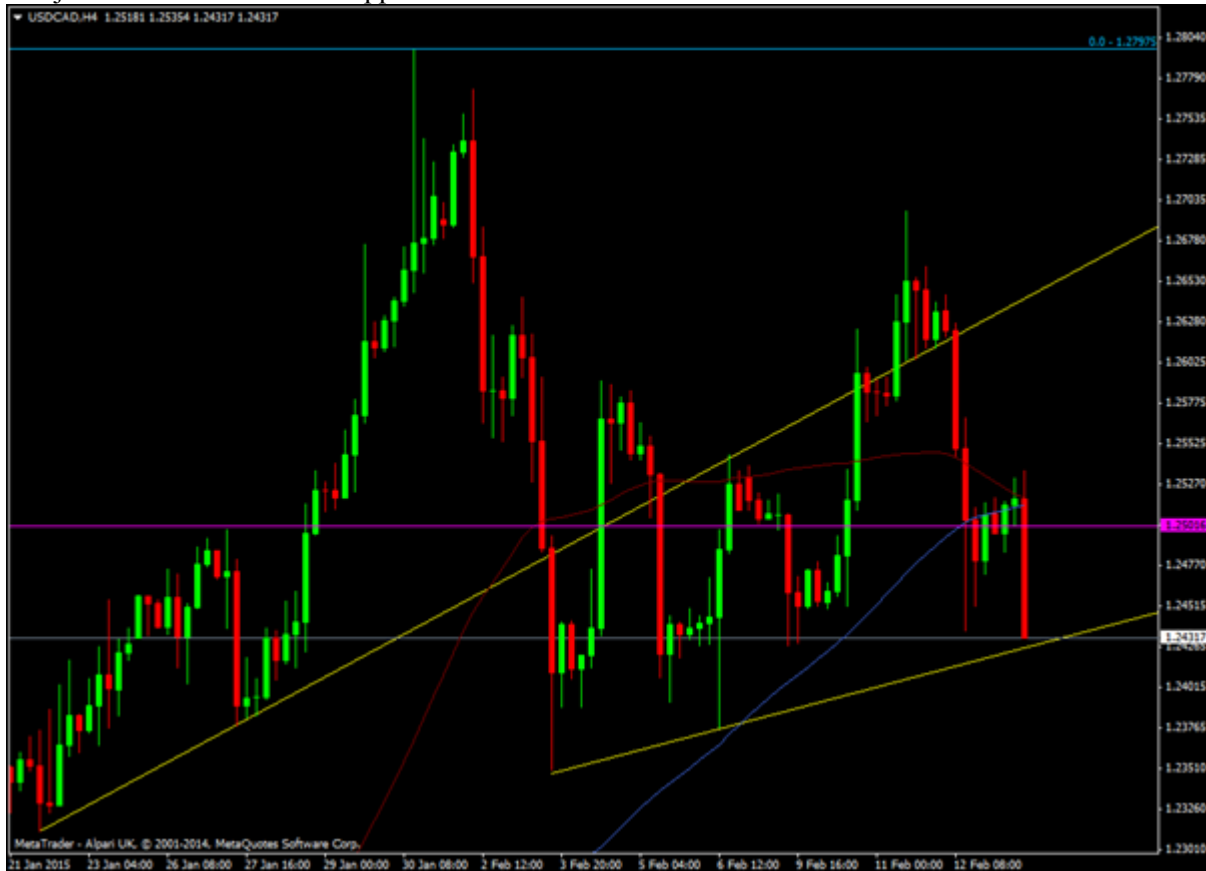
[38] "USD/CAD Leading the Dollar Charge Lower as Oil Keeps on Bubbling."USD/CAD Leading the Dollar Charge Lower as Oil Keeps on Bubbling. N.p., n.d. Web. 30 Apr. 2015.

On the other hand, the euro is making more of the dollar slump than the pound is, rising around 50 pips to 1.1432 over the same time that the quid put on about 30 to 1.5420.

Market Analysis:
For this week, I focused on developing my own system. I added weighted moving average into the previous triple average. The reason I made this change is that the weighted moving average not only is more accurate than the others, but also shows more importance on the stock. Since in different bars, the number of trades are so different that we cannot analyze them equally. I think the level of importance is quit crucial in analysis.

Also, I used Keltner Channel to work on my long & short trading. The reason I chose Keltner Channel is that it is more sensitive than the Percentage Envelopes. The main problem for my re-entry code is that it cannot do well in the fluctuations. So I chose Keltner Channel instead of Percentage Envelopes.

The main logic for this system is that it will go long if weighted moving average drops lower band then crosses above. Entry is only if next bar hits the highest high of the last 3 bars. It will go short if weighted moving average goes above upper band then crosses below. Entry is only if next bar hits the lowest low of the last 5 bars. 5 bars seems to work better when going short. To catch the moves that don't start above or below the bands, I combined the above with the standard Keltner strategy provided by TradeStation, but I changed the average to a weighted average too.

I tried the system on the major currencies that I'm focusing recently. The system did a great job on USDJPY and EURUSD. But on USDCAD, it loss a little bit. But so far, it still capable for the trend

situation. My strategy is that I will win a lot of profit in the trending and no loss in the fluctuation. As I expected, the main profit came from the long period trending. In the other trades except the trending, the loss is well stopped around 0. So it worked perfectly. But the USDCAD shows another problem. The system will miss the best exit when the trending situation has a flat slope. I will focus on this problem next week.

I used 30 minutes chart. My dad's friend recommend me to use the four hour chart to view the chart in a macro perspective. But since we need to make weekly report, the 30 minutes chart seems to be more proper in this situation.

USDJPY:

EURUSD:

USDCAD

USDJPY&EURUSD (Each currency has one standard lot. The total profit of two standard lot is $12,778.)

TradeStation Performance Summary			Collapse ≈
	All Trades	**Long Trades**	**Short Trades**
Total Net Profit	$12,778.00	$12,863.15	($85.15)
Gross Profit	$20,430.28	$20,272.04	$158.24
Gross Loss	($7,652.28)	($7,408.89)	($243.39)
Profit Factor	2.67	2.74	0.65
Roll Over Credit	$0.00	$0.00	$0.00
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	$12,778.00	$12,863.15	($85.15)
Select Gross Profit	$20,430.28	$20,272.04	$158.24
Select Gross Loss	($7,652.28)	($7,408.89)	($243.39)
Select Profit Factor	2.67	2.74	0.65
Adjusted Total Net Profit	$517.27	($2,154.28)	($440.43)
Adjusted Gross Profit	$11,293.58	$8,567.97	$46.35
Adjusted Gross Loss	($10,776.32)	($10,722.25)	($486.78)
Adjusted Profit Factor	1.05	0.80	0.10
Total Number of Trades	11	8	3
Percent Profitable	45.45%	37.50%	66.67%
Winning Trades	5	3	2
Losing Trades	6	5	1
Even Trades	0	0	0
Avg. Trade Net Profit	$1,161.64	$1,607.89	($28.38)
Avg. Winning Trade	$4,086.06	$6,757.35	$79.12
Avg. Losing Trade	($1,275.38)	($1,481.78)	($243.39)
Ratio Avg. Win:Avg. Loss	3.20	4.56	0.33
Largest Winning Trade	$10,198.12	$10,198.12	$109.24
Largest Losing Trade	($6,985.00)	($6,985.00)	($243.39)
Largest Winner as % of Gross Profit	49.92%	50.31%	69.03%
Largest Loser as % of Gross Loss	91.28%	94.28%	100.00%

USDCAD

TradeStation Performance Summary			Collapse ⌃
	All Trades	**Long Trades**	**Short Trades**
Total Net Profit	($128.57)	($177.57)	$49.00
Gross Profit	$49.00	$0.00	$49.00
Gross Loss	($177.57)	($177.57)	$0.00
Profit Factor	0.28	0.00	n/a
Roll Over Credit	$0.00	$0.00	$0.00
Open Position P/L	$0.00	$0.00	$0.00
Select Total Net Profit	($128.57)	($177.57)	$49.00
Select Gross Profit	$49.00	$0.00	$49.00
Select Gross Loss	($177.57)	($177.57)	$0.00
Select Profit Factor	0.28	0.00	n/a
Adjusted Total Net Profit	($303.14)	($303.14)	$0.00
Adjusted Gross Profit	$0.00	$0.00	$0.00
Adjusted Gross Loss	($303.14)	($303.14)	$0.00
Adjusted Profit Factor	0.00	0.00	n/a
Total Number of Trades	3	2	1
Percent Profitable	33.33%	0.00%	100.00%
Winning Trades	1	0	1
Losing Trades	2	2	0
Even Trades	0	0	0
Avg. Trade Net Profit	($42.86)	($88.79)	$49.00
Avg. Winning Trade	$49.00	$0.00	$49.00
Avg. Losing Trade	($88.79)	($88.79)	$0.00
Ratio Avg. Win:Avg. Loss	0.55	0.00	n/a
Largest Winning Trade	$49.00	$0.00	$49.00
Largest Losing Trade	($132.57)	($132.57)	$0.00
Largest Winner as % of Gross Profit	100.00%	n/a	100.00%
Largest Loser as % of Gross Loss	74.66%	74.66%	n/a

IQP Report from Feb 15[th] to Feb 22[th]

Time:
For this week, I spent 3 hours reading news (about 0.5h per day). Modification for the code is around 3 hours. About 3 hours to finish the report.

News:
Forex technical trading: EURUSD completes 6 laps in trading this week[39]

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[39] "Forex Technical Trading: EURUSD Completes 6 Laps in Trading This Week."Forex Technical Trading: EURUSD Completes 6 Laps in Trading This Week.N.p., n.d. Web. 30 Apr. 2015.

The EURUSD closed last week at 1.1391 level. For this week, the midpoint of 2 week range is around 1.1359. So this week the price will close lower than the last week about 20 to 35 pips. The price range is around 171 pips which is almost same as the 172 pips in last week. For this week, there's another feature. It has a very steady price floor at 1.1269 and a strong ceiling at 1.1442 to 1.1449. I was pretty worry about this week's trading. Because my profit mostly comes from the trending situation. But I was definitely wrong about that.

Market Analysis:
In this week, I keep trading with EURUSD, USDJPY and USDCAD. Since last week, I got a perfect consequence from that code. So I didn't make any modification. I just let the code keep running. But the outcome is not as what I expected. Only EURUSD keeps a high percentage of winning trade.
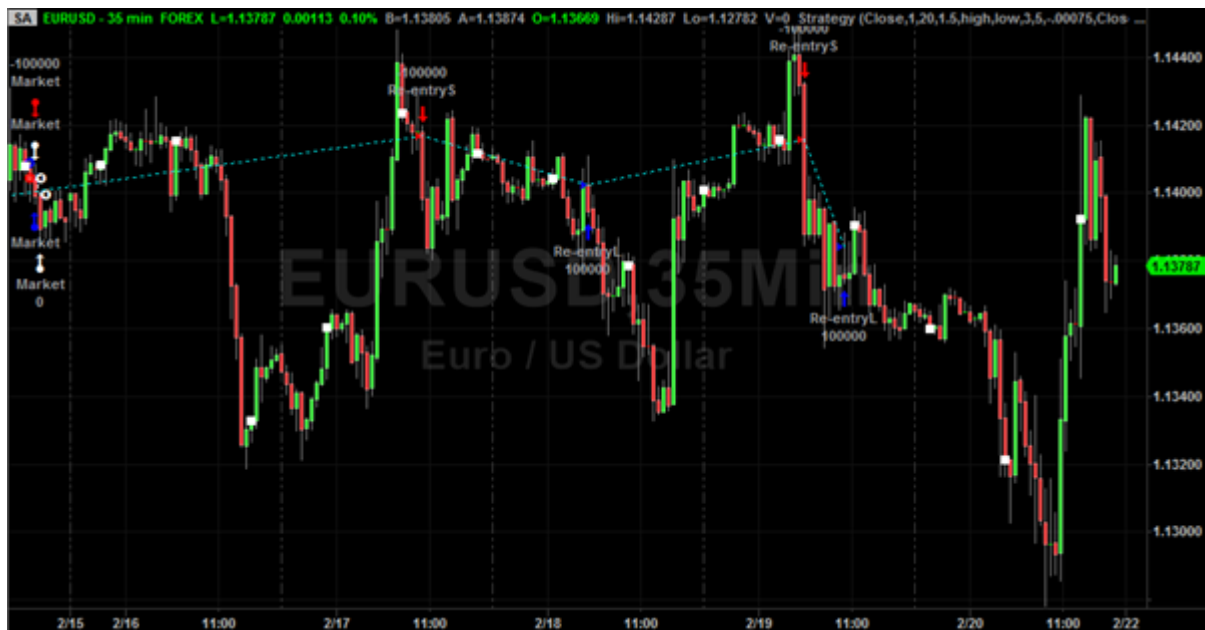
USDJPY:

USDCAD:
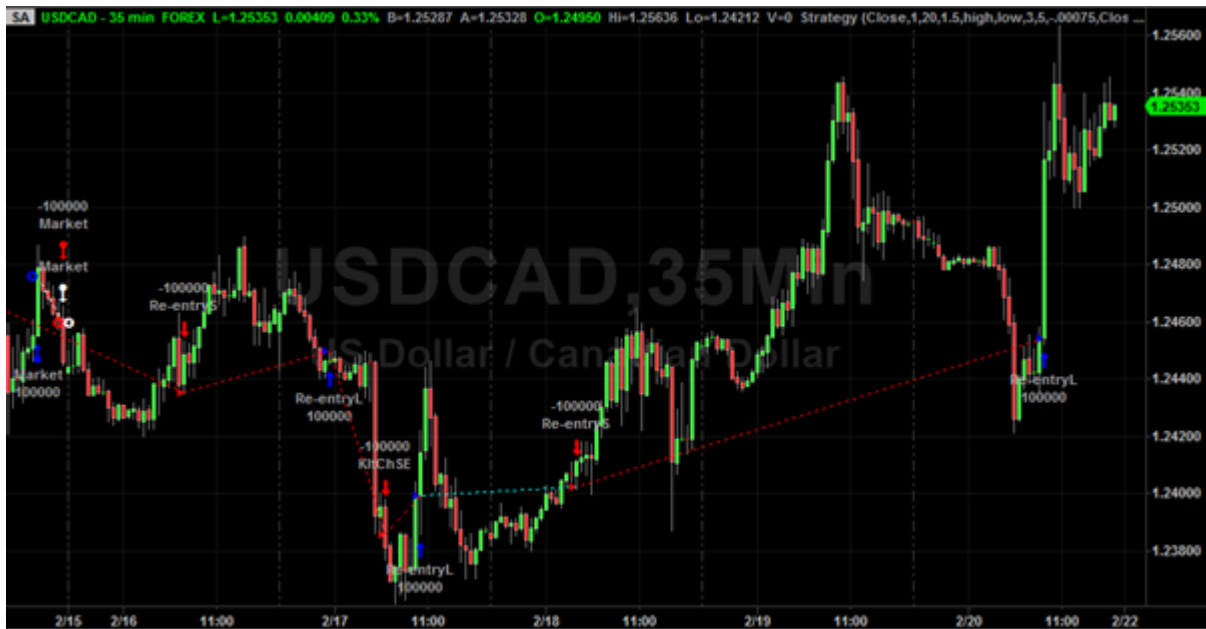
EURUSD:

I started to analysis why this week failed. The first thing I need to do is that I have to know the main difference between the situation in last week and this week. The main difference between the two weeks is that this week the fluctuation is a lot more than last week. And the problem is that the strategy couldn't find the right exit point in the fluctuation. This problem can exist in two parts of the code. The first part is the Keltner Channel. The second part is the Keltner strategy I used inside Channel. As we know, the Keltner Channel make enter and exit decision if the price cross the lower band or the upper band. I checked each trade one by one to see whether the Keltner Channel is easy to make the wrong decision. To my surprise, the losing trade mostly started and ended up within the strategy used for the range between the lower and upper band. For these losing trade, mostly, the trades are close to the upper or lower band. But the increments are not large enough to cross the line. I think I need to change something about the Keltner strategy since it doesn't work well on the situation near the bands. But since the last week, the Keltner long and short strategy did a good job in the tiny fluctuation. So I got confused that whether I need to modify the Keltner inside the weighted moving average. Then I came up with a good idea. I changed the gap between the weighted moving averages so that the upper band and the lower band are closer to each other. With smaller channel, the Keltner Channel can handle the trades which is too large for the Keltner strategy. I modify the channel from 20 to 15.

Here's the outcome after the modification:

USDJPY:

USDCAD:

EURUSD:

After the modification, the situations changed dramatically. In the USDCAD and USDJPY, although it still loss a little. But mostly, the strategy catch up with the trending and made a lot of profit. Also, the modification does not decrease the profit in EURUSD. For EURUSD, the profit does not change at all after the modification. I'm satisfied about that.

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