**Final Project Script**

**Marshall:**

This is the video tutorial of our final project for computer science 177a taken with Timothy Hickey during the Spring Semester of 2011. The group members are Marshall Santoso, Abhirup Das, and Makensley Lordeous. To view our written tutorial and other related files for our project you can visit my Google site username santosoy. Our project uses MATLAB in order to analyze stock returns and find best strategies regarding buying, holding, or selling a stock through Technical Analysis. We used the built-in financial toolbox in order perform our calculations and analysis. Specifically we used the MACD (Moving average convergence divergence), the RSI (Relative Strength index), the Williams %R, and Bollinger bands. We also used a function created by Josiah Renfree to feed the stock data directly into mat lab through yahoo finance. We made minimal modifications to the function in order to make it more applicable for our needs. In order to obtain the data, we simply had to call on the function hist\_stock\_data.m with the starting date, ending date, and ticker symbol as inputs. Mat lab will then store the following data regarding the stock that you called on: Open, High, Low, Close, Volume, and adjusted Close Price. Now Abhirup will continue to talk about the MACD and RSI methods. While the other two methods will be explained later on by Makensley.

**Abhirup:**

The MACD or the Moving Average Convergence Divergence is a technical oscillator that is used to signal traders to recommend or pursue buying, selling or holding a stock. Like the name suggests, MATLAB uses the function macd.m to model the Moving Average Convergence Divergence there are two components to the MACD. Firstly, it is calculated as the difference between the security’s 26 day and 12 day exponential moving averages of the closing price. Then a 9 day exponential moving average line is plotted alongside to act as a signal.

In my example, I decide to collect data for IBM between the time periods of 1st January 2010 to 1st May 2011 for the short term and 1st May, 2009 to 1st May 2011. On running my script, MATLAB yields two vivid graphs that plot the MACD for IBM over a 6month and 2 year time period. Once again the red dotted line represents the Nine Day Exponential Moving Average Graph. As soon as the blue line or the MACD moves above the NEMA, it is a bullish crossover and a great signal to buy. Conversely, if it drops below the red line, one should think about selling the security.

The Relative Strength Index or the RSI is another technical oscillator that allows traders or analysts to understand overbought or oversold conditions in the equity market to gauge profit maximizing buying or selling situations. The RSI is calculated as a measure of gains or losses using closing prices to capture the momentum or the velocity of the price movement. For instance, my example graphs the RSI index for IBM over a 6 month and 2 year period. We observe two bands (red and green at 70 and 30 that mark the overbought and oversold condition respectively). As such whenever the RSI surpasses these levels, the trader recommends appropriate decisions. If it was an overbought condition he would recommend the stockholder to sell, and conversely if it was oversold, it is probably better to buy.

**Makensley:**

*Williams’s %R*

The next thing that we will look at is the Williams %R. The Williams %R is a momentum oscillator that tells whether a stock is at a relatively high or low point in its trading range. It compares the current closing price of a stock with the highest high and the lowest low of a period. The Williams %R is usually tracked on a 14 day period. The values oscillate from 0 to -100. A Low reading indicates that the price is near its low for the given time period.

Before we start, we will need to load the stock history. For this example, I will be using Apple’s daily price for the past year.

To get the Williams %R, you need call the willpctr function on mat lab. The function will require that you push arrays with the highs, lows, close, and the period you want to look at. If the period is left empty, the default is 14 periods. Let us leave it blank, which will result in a 14 day windows, since our price data is in one day increments.

The function returned an array with the Williams %R. One thing to note, the first 13 slots of the array will be empty because it doesn’t have enough data to calculate the Williams %R for does days.

Let’s plot the %R against time. Now, let’s plot the high-low chart of the price history to give us something to compare it to. Add to horizontal lines at -20 and -80 to help use visualize the data.

When the %R dips below the -80 mark considered over bought. When is above -20, it is over sold. You want to buy when the stock is oversold and starts to move below the -20 mark. You want to sell when the stock is overbought and is moving up pass the -80 mark.

*Bollinger Bands*

Let’s move on to Bollinger Bands. Bollinger Bands envelope around a moving average but take into account of volatility. They could be used to find positions for high probability of profit.

To get the Bollinger Bands on mat lab, we’ll use the Bollinger function. The function takes the closing prices and spits out the simple moving average, the upper bound and the lower bound.

With this information, we are able to graph the Bollinger bands. Let’s look at Apple again. Type in the command.

Now we could chart the Bollinger bands. SMA that is spit out lets us graph the upper, low and a high-low for Apple. The easiest way to interpret Bollinger bands is to look at the price as it approaches the bands. The larger the space between the bands, the more volatile a stock is. You want to buy when the stock approaches the lower band and sell when they are closer to the upper band.

**Marshall:**

This concludes our video tutorial. As mentioned earlier, if you would like to see other related files that have to do with our project, please visit our Google site, username santosoy and click on the final project link. Feel free to contact anyone of us if you have any questions. We hope that you found this tutorial informative, have a great day and thank you.