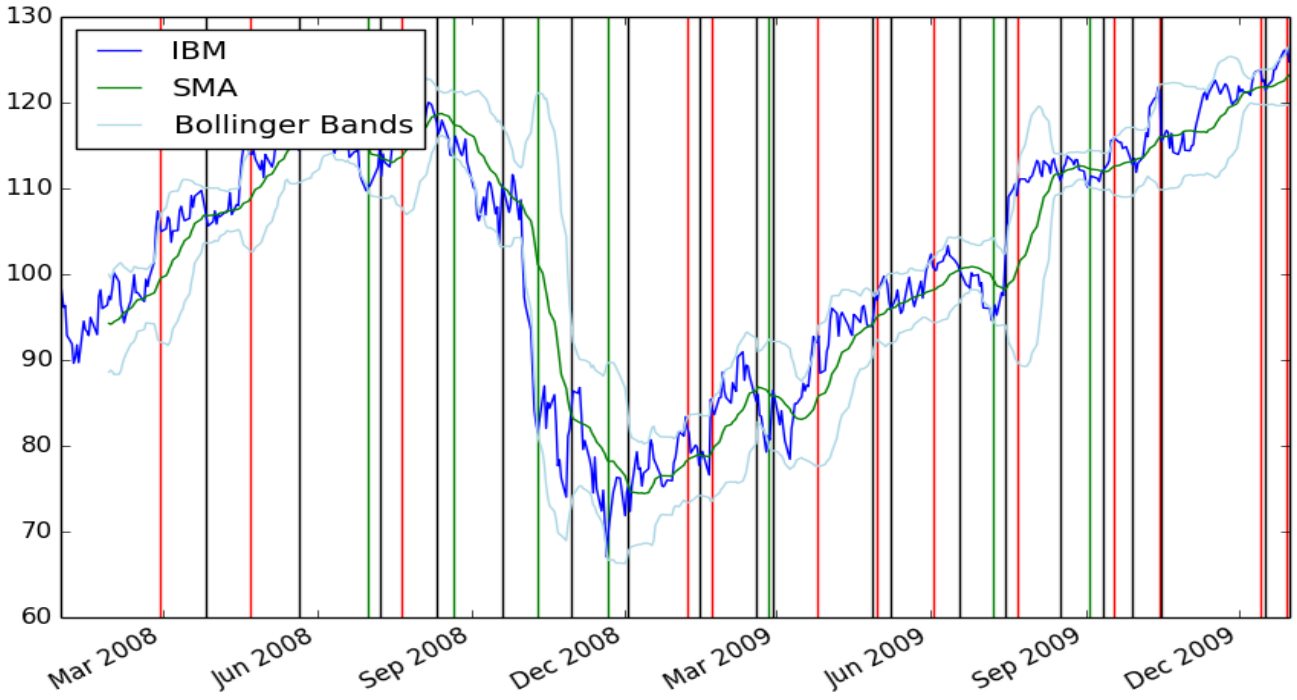
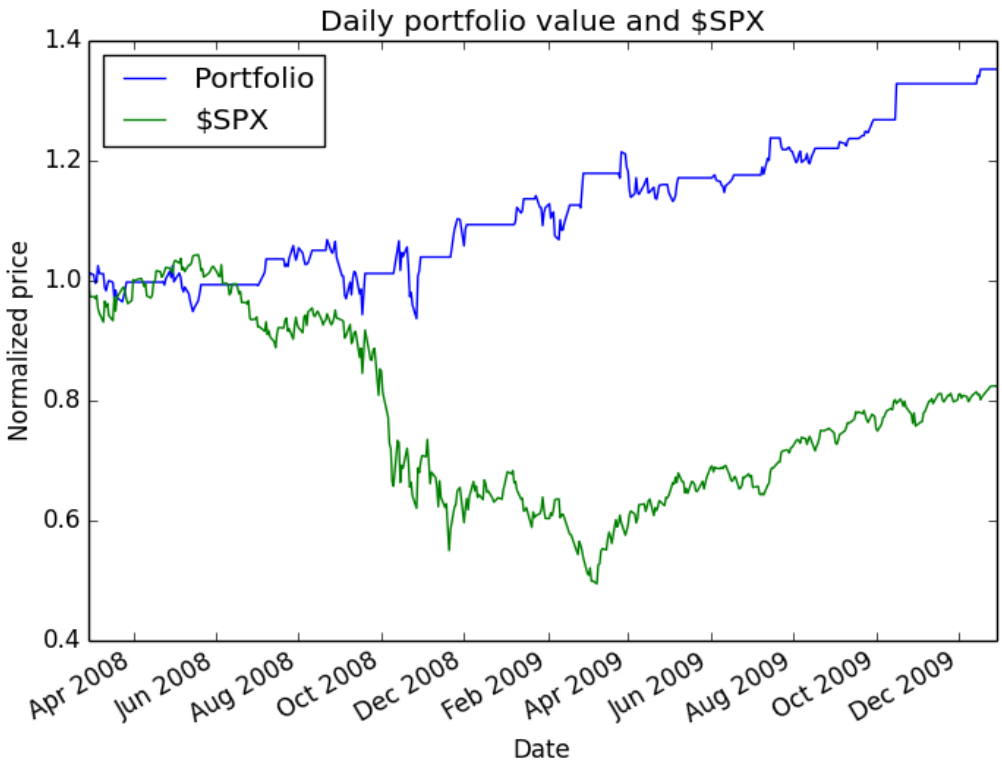
MC2-P2
Tyler Bobik

Bollinger Band Strategy





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bollinger_strategy
/System/Library/Frameworks/Python.framework/Versions/2.7/b
Date Range: 2008-02-28 00:00:00 to 2009-12-29 00:00:00

Sharpe Ratio of Fund: 1.00195922396
Sharpe Ratio of $SPX: -0.116052774605

Cumulative Return of Fund: 0.3524
Cumulative Return of $SPX: -0.176561768835

Standard Deviation of Fund: 0.0113472713465
Standard Deviation of $SPX: 0.0225771006222

Average Daily Return of Fund: 0.000716211380412
Average Daily Return of $SPX: -0.000165053001441

Final Portfolio Value: 13524.0


          Date Symbol Order  Shares
0  2008-02-28    IBM  SELL     100
1  2008-03-27    IBM   BUY     100
2  2008-04-22    IBM  SELL     100
3  2008-05-21    IBM   BUY     100
4  2008-07-01    IBM   BUY     100
5  2008-07-08    IBM  SELL     100

Process finished with exit code 0
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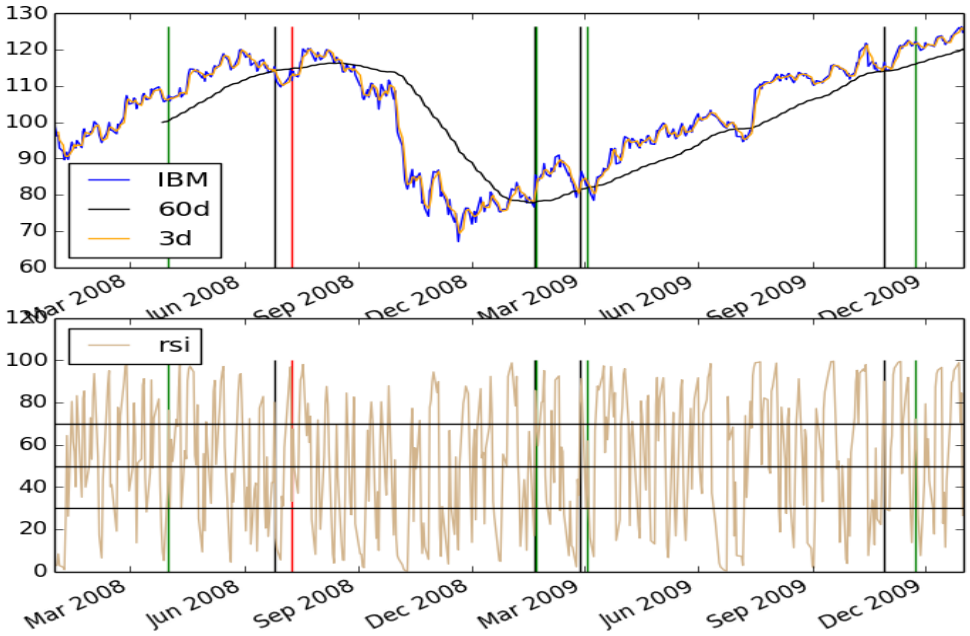
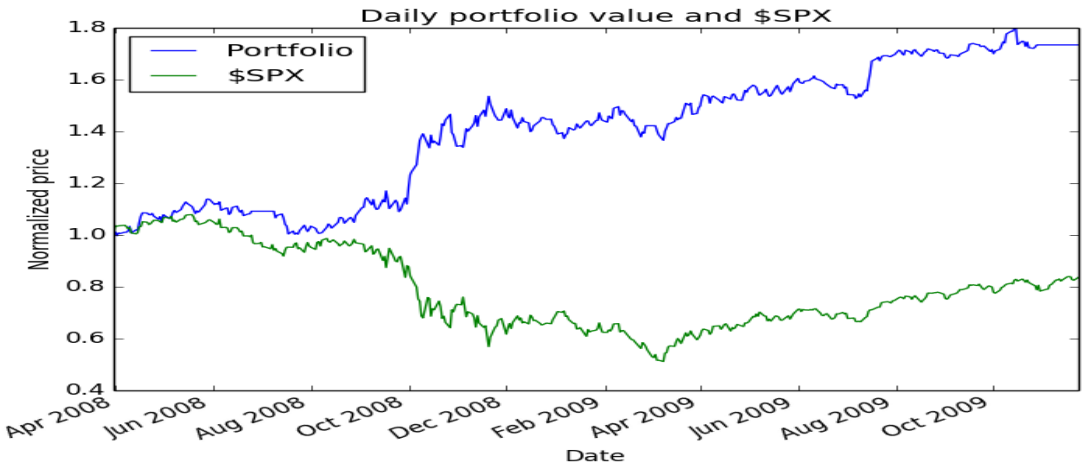
My Strategy in Sample





my_strategy

```
/System/Library/Frameworks/Python.framework/Versions/2.7
Date Range: 2008-03-31 00:00:00 to 2009-11-23 00:00:00

Sharpe Ratio of Fund: 1.63865206844
Sharpe Ratio of $SPX: -0.105667142134

Cumulative Return of Fund: 0.7339
Cumulative Return of $SPX: -0.163650109624

Standard Deviation of Fund: 0.0136629832427
Standard Deviation of $SPX: 0.0233449685071

Average Daily Return of Fund: 0.00141036660412
Average Daily Return of $SPX: -0.00015539354833

Final Portfolio Value: 17339.0


         Date Order  Shares Symbol
0  2008-03-31   BUY     100    IBM
1  2008-06-25  SELL     100    IBM
2  2008-07-09  SELL     100    IBM
3  2009-01-20   BUY     100    IBM
4  2009-01-21   BUY     100    IBM
5  2009-02-26  SELL     100    IBM
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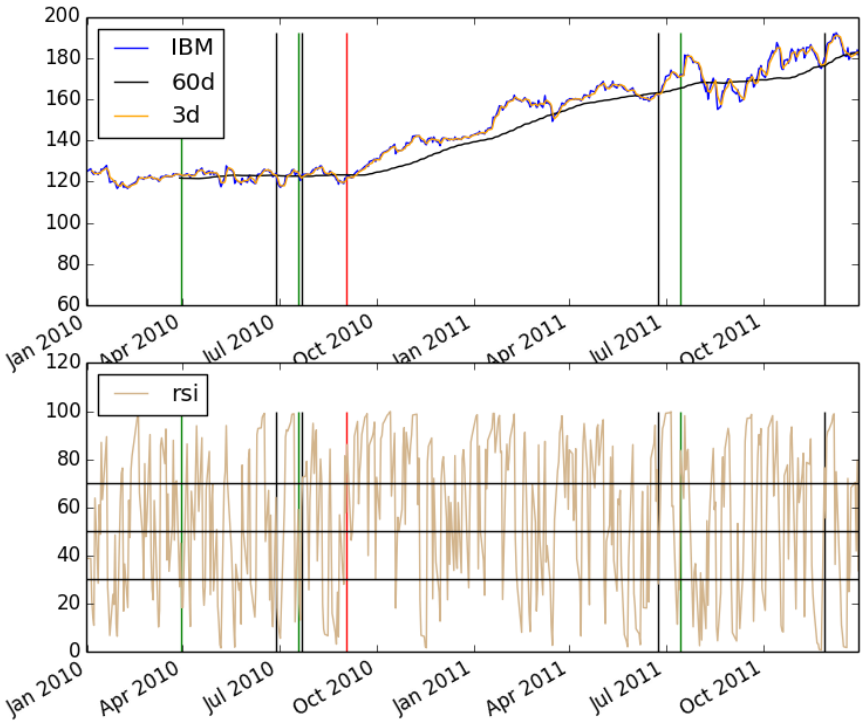
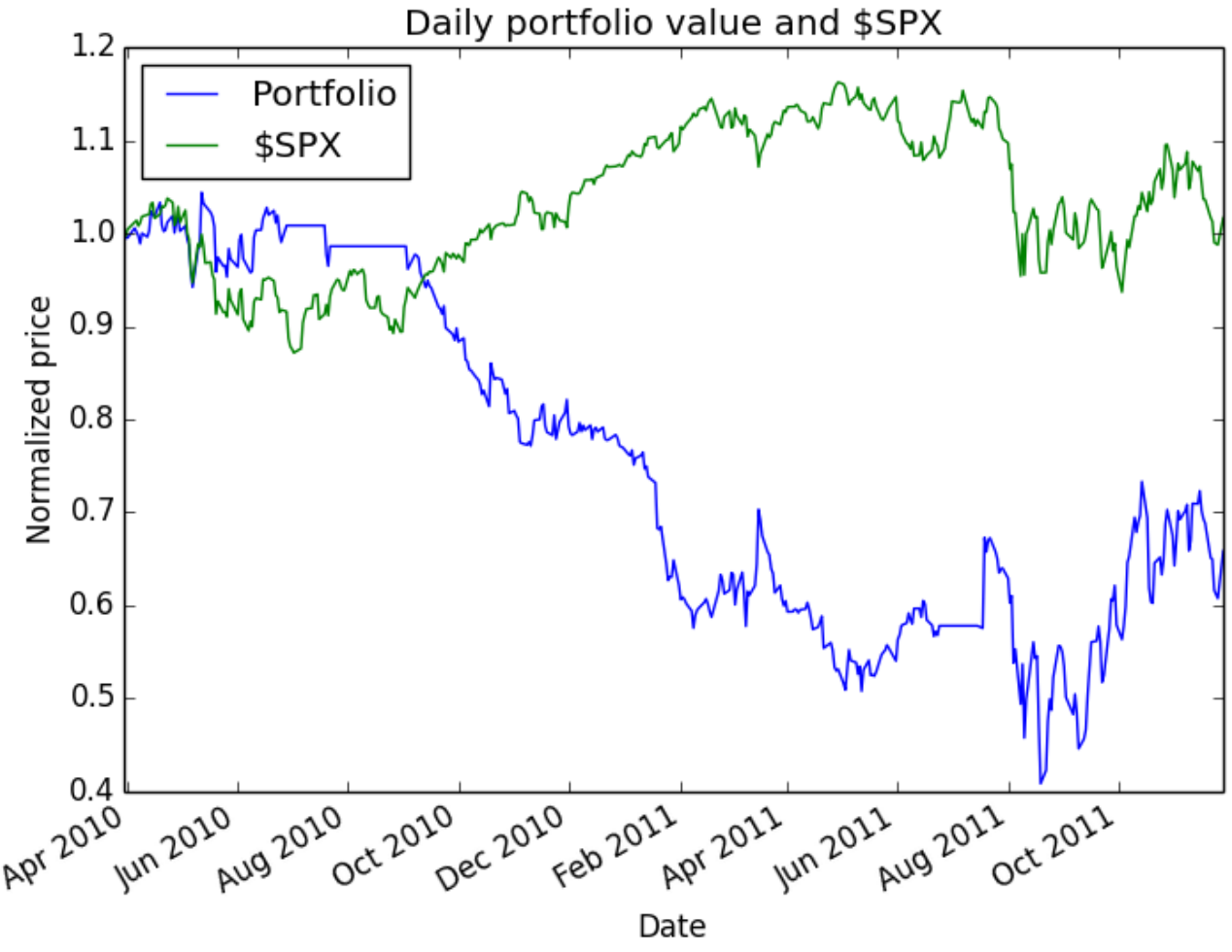
My Strategy Out of Sample




Daily portfolio value and $SPX
Portfolio
$SPX
Normalized price
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
Apr 2010
Jun 2010
Aug 2010
Oct 2010
Dec 2010
Feb 2011
Apr 2011
Jun 2011
Aug 2011
Oct 2011
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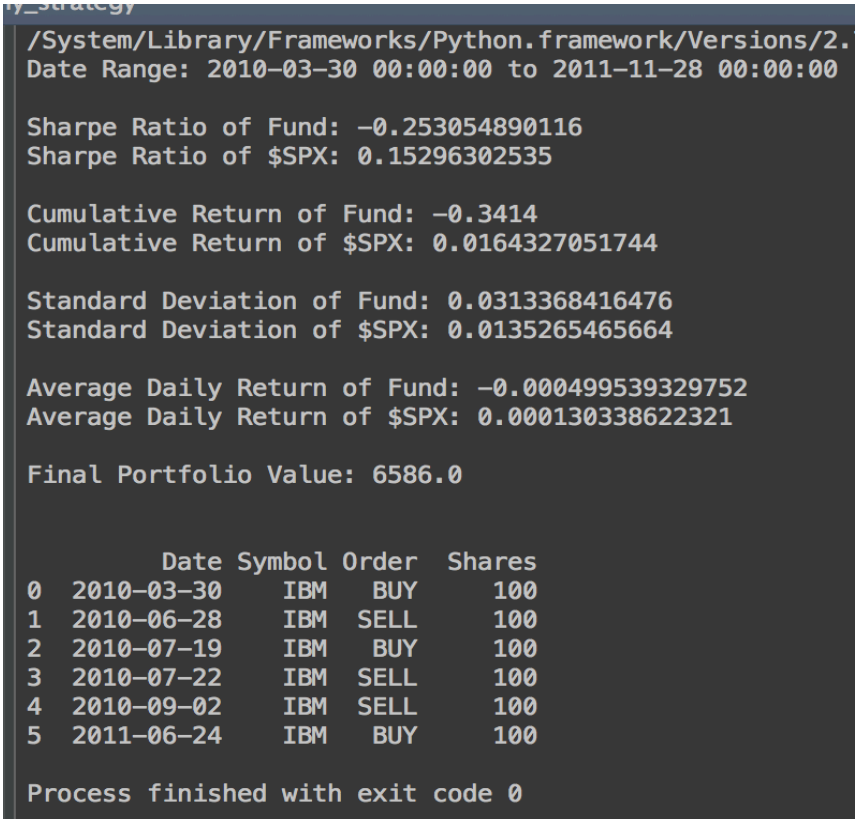

Summary

For the strategy I developed I decided to not use Bollinger Bands and try to use two simple moving averages. I used the public domain of our Python for finance book for the first strategy I tried. I set it up so that I had a shorter day period simple moving average and a longer day period simple moving average. I needed to see how much the shorter moving average was for the first time threshold values above, below or in between the longer moving average. I accomplished this by subtracted the shorter period with the longer period moving average to find out what the difference is between the two moving averages. After finding this difference I found when the difference was greater then the set positive threshold and when it was less then the set negative threshold. The values I then returned were, 1, -1 or 0. A value of 1 means that you should go long, -1 is when you should short and 0 is when you hold. Then used this information to either enter short, enter long, sell short or sell long. After implementing this strategy, I tried to adjust the threshold, the slower moving average and the longer moving average but I could only match or do just a bit better then the Bollinger Bands.

So, I decided to implement an RSI strategy in conjunction to this one. I knew from prior knowledge that RSI is used to see if a stock is overbought or oversold and can be used as a good technical indicator especially when added to other indicators. After experimenting with the values I came up with a strategy that does over 2 points above what I got for the Bollinger Bands. This strategy was a short/long period moving average of 3 days and 60 days with a signal threshold of 1, combined with an RSI with a 2 day window. For my RSI strategy I used a 2 day window and because this is a short 1 year period I set my indicator parameters as, 70 for my top band, 50 for my middle band and 30 for my lower band. Where 70 means that the stock is over bought and 30 means the stock is over sold. In conjunction with my moving average long, short and hold entries I set it so that my stock will go long when the RSI crosses from below the lower band to above it and will long exit when the RSI goes from below the middle band to above it. It will signal a short entry when the RSI crosses from above the top band to below it, and it will short exit if the stock crosses from above the middle band to below it and all else it holds. These long, short and hold entries are also used with the moving average strategy I described above and they both have to have matching times where they both go long, short or exit for the order to execute. I came to a cumulative return of .7339 for my in sample using this strategy. This strategy worked well in the short term with a very low signal threshold, small RSI window, and lower RSI Entry and Exit points. This strategy does poorly if you increase the longer moving average because the trades only start when the first look back window begins which for a year anything over 60 days is a lot of time. Also

I had to decrease the RSI which made it very sensitive, but it was the only way to generate enough data for the trades to execute or else there would be no time that the RSI and moving average strategies would overlap.
When I executed my strategy out of sample I got a very low cumulative return of -.3414. If I applied this strategy in the real world, it would not do well because I adjusted my parameters just for this 1 year period and I can see how the stock did. Also, in the real world we do not know how the stock is going to preform, just use our best judgment with the indicators we use.
By having a longer time period my strategy did worse then having a shorter one. If I were to implement this strategy for a longer time period I would increase the windows of my moving averages and also increase my RSI bands as well as my RSI window.