

## **AAR Milestone 1**

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### **Research Question**

**How can a program be written to develop a percentage value for a stop loss on any security that minimizes loss (or maximizes profit), based on analysis of that security's historical price?**

Clarifications/Definitions:

1. A stop loss is a type of market order where shares in a security are sold if the price drops below a pre-specified limit. A trailing stop loss is similar, but where the lower limit follows the price upwards if it increases.
2. A security is a tradeable asset that represents ownership of a publically traded company, essentially stocks, ETF (exchange traded funds), etc.
3. (Technical) analysis refers to analyzing the stock's past price, and looking for patterns or trends.

A paraphrased, simplified version of our research question (without the necessary detail) is as follows:

**How can a program be written to accurately determine the point at which one should sell a security based on the past history of that security?**

### **Background and Significance Research**

1. **Research Problem** Right now, investors use either trailing stop losses or regular stop losses to mitigate their losses. However, these stop losses often do not account for past history, volatility, and volume of the stock, and the restrictions placed on them often are too loose (too much money lost) or too tight (shares sold too early). In essence, these stop losses are not "smart." If "smart" stop losses were to exist, it would be a big step in reducing the amount of money lost in investments. Also, by nature, it is difficult for us to analyze a large data set in our heads, but computers are very adept at this. Sifting through large sets of numbers becomes significantly easier with computers, as they are excellent tools for applying complicated computations.
2. **Why Is This Important?** Every day, countless financial analysts, day traders, and investors go to work trading securities on various stock exchanges around the world. Every time they buy shares, they risk their money to make a profit. Our project could be important because if successful, our program will have the potential to save money, or even make money. Our project at heart is a computer science project. However, it very much relates to the economy and finance, because the project demands an understanding of key terms and concepts related to them.

3. **Past Research Done on Topic** Technical analysis is already well studied and well commercialized. Many financial analysts' jobs revolve around technically analyzing securities, and capitalizing off of their analysis. There is also abundant software for technical analysis, although this can be extremely expensive. We cannot dream of recreating this software for our project, so we should look at some of the simpler techniques - singling out certain patterns in stocks. For example, the theory of mean reversion (the principle that a share price tends to, after sudden movements, move back towards its historical mean) was developed, and has been used in analyzing patterns in stocks. Unfortunately, technical analysis for setting stop losses, which is what we are trying to do, is a much smaller field. People have produced research papers on rules governing stop losses, and there are many different articles that have guidelines or advice on where to set stop losses.
4. **Examining Our Research Question** At first glance, our research question may seem complicated, but it can essentially be boiled down into: *Is it possible to write a program that accurately tells the point at which one should sell a security based on the past history of that security?* It may even be possible that we take this as our research question, but with slightly more detail. Using our research question, as well as the background information presented (especially in the research problem section), our main objective moving forward is to take the first step to developing "smart" stop losses (explained above).

## Citations

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