Foundations Paper (Problem-Solving)

In its most simplistic form, problem solving is the process of defining a problem, determining the cause of the problem, identifying the problem, selecting alternatives for a solution, and finally implementing the solution. Problem solving occurs on a day-to-day basis across hundreds of corporations. I enjoy problem solving because I enjoy the principles and steps of problem solving and its relation to finance. There are many quantitative algorithms that people on wall street try and develop in order to deliver alpha while simultaneously managing risk. I also enjoy problem solving because it can be used not only for profit-motive activities, but also for many environmental/social issues that the world faces. These issues can range anywhere from ozone layer depletion to malnutrition and hunger. The general process of problem solving consists of ten primary steps. In order, these steps include document, identify, analyze, formulate, evaluate, test, iterate, create a plan, implement, and finally reflect and revisit (Paul, 2019).

Recently, wall street has made a massive transition to a more quantitative and algorithmic approach in the way business is conducted each and every day. Financial firms primarily utilize algorithms to both increase their transaction volume and spot inefficiencies within global financial markets. Simply put, an algorithm is a set of guidelines that describe how to perform a task (Brogan, Brogan). Algorithms are most commonly associated with high frequency trading which allows firms, such as hedge funds, to execute hundreds of millions of orders daily. By being able to develop algorithms, can not only increase speed and awareness of market transactions and sizing, but also
become more efficient in the ways they conduct business because the individuals who previously did the work algorithms are now conducting can use their energy on other ways to increase cash flow. Financial algorithms are developed using all of the primary steps used in problem solving. However, reviewing and revisiting the algorithms is the step that requires the most amount of attention due to the fact that markets are ever-changing.

The topic of financial algorithms in high frequency trading (HFT) is interesting to me because I enjoy the structuring of the algorithm and how you can develop a strategy and tell the computer what to do during certain instances. Being a trader myself, there is nothing more satisfying than being able to develop a functioning and profitable algorithm that can make you money while you kick back and monitor/maintain the algorithm. I had always wondered about the process that goes into building an algorithm. However, the lecture on problem solving manifested the steps and knowledge needed to develop the algorithm. After learning about these steps, I was able to bridge the gap between the process and the outcome. I also realized that trading algorithms do not follow the traditional process of problem solving whereby the differential between the problem and solution are more structured and follow predetermined steps of gathering data, analyzing data, formulating data, and finally implementing the solution. Problem solving and its correlation to electronic trading follows the modified process. The modified process is more suitable to electronic trading because trading is not linear. Being able to quickly substitute variables within the algorithm to adapt to market conditions and various risks is crucial to becoming successful. In other words, a programmer can develop an algorithm that meets the desired outcome. He can then test it, going from gathering data to implementation, and then find himself back to square one of gathering and analyzing the data. The
programmer can do this over and over again, jumping back and forth from the different problem-solving steps, until he develops the ideal algorithm.

The process for algorithm trading is quite similar to problem-solving with some slight variations. First, one needs to formulate a trading plan. This is the process of understanding your parameters and identifying what type of trader you are. The next step is conversion. This is the process writing code for the trading plan that you identified in step one. Third is backtesting. Backtesting is the validation process. One can do this by taking ten years of prior asset class performance and observing your algorithms outperformance/underperformance to that asset class’s actual performance. Fourth is the optimization phase. This is the process whereby one finds the best trading parameters. For example, using different technical indicators. Fifth, and perhaps the most important step is risk management. Implementing risk management helps an algorithm sidestep unpredictable market risks. Without implementation of risk management is like driving a car on the highway without any breaks. The sixth step includes automation. Before, the trader would execute and monitor its algorithm on a more manual basis. However, after months of altering the algorithm, one should feel comfortable with automating the algorithm. Automation also takes out any emotions involved with trading. The final step is observance. This step involves noting any system performance that doesn’t perform when it is supposed to (Pratik, 2018).

The topic of automation within the financial services industry is a very sensitive topic and makes me feel as if there will be a limited amount of job availability in the future. Sure, there are some jobs that will be completely automated within finance, however, some positions in finance will still require human need. For example, private wealth management will always require human interaction. When
clients’ portfolios turn on them, they don’t want to talk to a computer, but rather a tangible individual that can provide guidance. I think jobs within sales and trading on the other hand will still require humans for two reasons. One, computers/algorithms lack common sense and that is something that is crucial within sales and trading. Second, is the ability to just pick up the phone and actually speak to people and develop relationships. Recently, a managing director who works in sales and trading came to speak to us and he was telling us how he encourages his employees to consistently pick up the phone and talk to clients.

Problem-solving is a skill that I think everyone should be familiar with because it provides forward momentum in both business and in life. The world is becoming more and more automated and individuals need to be familiar with how to deal and adapt to these changes. This class provides an impeccable foundation for problem solving development and can be implemented to real-world situations such as financial algorithm development.
References

