Summer Internship Project Report

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During the summer I was interned as a quantitative modeler at interest rate modeling team in FID, Morgan Stanley. Our team serves as a model center supporting many front desk quants, developing and maintaining many pricing and trading algorithms. The main difference of a modeling quant and a strat quant is that we are consolidating many existing libraries instead of creating new alphas. Many good trading ideas are firstly written informally using Python or Java, however, if it wants to be generalized and shared to other teams in the production, more rigorous coding quality is required. Therefore, many of our tasks are initiated from the front desk traders, implemented by desk quants and lastly formally enhanced by modeling quant.

The product lines we cover are mostly interest rate derivatives, including but not restricted to Bonds, Swaps, Swaptions, Bermudan Options, Cancelable Swaps, etc. Among all, I was assigned to working on a Bond pricing and relative value model, which is used in an electrical trading algorithm on U.S. Treasury Bond. The goal is to using daily market dirty prices to inspect the relative rich / poor Bonds and hedge on their risks.

During my first two weeks I was mainly deriving the mathematical proof of a stochastic model. Later, I was given a program which is implemented by a desk quant and asked to consolidate it with our existing algorithm library. Generally, the task is not hard once you understand both the logic of original algorithm and the new environment. But it takes a long time for me to truly understand both sides. After I am used to the new library design, I started to transform the original implementation to the new framework. Many of the self-implementation should be changed to using standard libraries to increase code reusability. Lastly, I need to change to our Linux QA server to fetch the market data from our KDB server and compare the result after migration. Finally, code review and version control are required before push to production.

My typical day of work started at 8:00 to 8:30. The first thing I need to do is to check my calendar to prepare my day. There might be conference meeting call request from my colleague who are working in London or Budapest last night. Next, I would to check the mail from different mail groups. Everyday there are a lot of tickets shot from different desks with many questions either about using our applications or referring our libraries. I will try to find if I am capable to help them or provide some of insights into the bugs. At noon, I usually choose to have lunch with my friends or some colleagues at out cafeteria or some kitchen around the office. In the afternoon, I will mainly focus on developing my own project. Sometimes I will invite senior colleagues to have a coffee when market closes. At the end of day, our team are more flexible on when you can leave. If you finish your task early, you may leave around 5:30 – 6:00 PM.

However, I usually choose to leave around 6:00 – 6:30 PM. There are very rare situations that I need to work overtime, except for the week of our final presentation. However, some of my colleagues will work on weekends especially when there is a major change or deadline for their projects. I usually update my progress to my manager once or twice a day and sometimes I will also ask for help from my peers to fix some bugs.

Modelers are playing an important role in the world of quantitative models, especially in such large organization as Morgan Stanley. Every desk can produce some edges every day, but we have the responsibility to keep these codes organized and shareable. We are like the librarians keeping the firm's algorithms in order. This unique opportunity provides me capability to learn a broad set of products and models.

In all, this is an unforgettable summer experience. I learned to code like a professional and met many great people teaching me different prospective. I got an return offer after the internship and I am eager to learn more in this great community next year.