**Math 430 – Advanced Math Modeling**

Project Description:

This project concerns optimizing the frontend business model for a redacted café in St. Paul, MN. It was assigned as a team project for groups of three. We were prefaced with background information about what the café serves, a brief 15-day history of their sales during lunch rush. We were given a goal to create a model from the 15-day history of sales, then modify this model to hypothesize different business models; add another cashier or add cashier duties to the barista. With these three models we were to perform a cost-benefit analysis to determine which would be more profitable, in revenue, and customer loyalty.

Analysis:

Given we were to model the data, and that the data was uniquely shaped, we had to determine the best way to model each variable of the sales history individually, then bring it all together and validate the model to ensure the model was appropriate. Most of the variables followed known distributions, and others depended on the state of the system. Early in the project, all three of us agreed that using Monte Carlo Simulations was a suitable way to determine the effects of the hypothesized models compared to the base model.

At first, we attempted to utilize Excel for everything, but found that model synthesis was impossible through it. This forced one of my colleagues to redesign the model using programming software.

Programming Language:

C#

Transferable Skills Practiced:

Presentation Skills, Writing Skills, Time Management Skills, Team Working Skills, Self-Learning Skills

Post Project Debrief:

This project had a much larger scope than any other I’ve worked on before. The three of us were all impressed by the new concepts centered around teamwork and collaboration we learned in this class, and did our best to adhere to them, given how unfamiliar we were with the concepts. The task schedule we utilized was more of a guideline we updated weekly, simply because we did not have the foresight to know what needed being done at the later stages of the project. I personally was comforted when we learned that the task schedule is a work in progress that needs constant updating.

On the technical side, I have this gut feeling that we could’ve gone more in depth about why we chose to model specific variables a certain way. Like we didn’t explain it rigorously enough. This will be easily overcome once I get more experience with these kinds of projects.

I’d also like to see about collaboratively creating the code, rather than just having one author; but the program was rather short, and if the author is anything like me, it was created as on the fly. So there wouldn’t be any foresight to say “Create this block for the program” if we don’t know how it would interact with other blocks.