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Professor Annexstein

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Individual Capstone Assessment

For my Senior Design project, myself and my project partner, Baru, will be completely revamping a proof-of-concept mobile app we once developed that calculates ideal pizza orders for large groups of people. The main problem this will be solving is satisfying large groups of people with primarily the variety of toppings on pizzas ordered, and perhaps secondarily the overall volume of pizza ordered. For me, this project represents a culmination and combination of many of the different things I have learned between my classroom and co-op experiences. Simultaneously, it relates to solving a very common problem that faces plenty of folks in their everyday lives. I am also very excited to have the opportunity to take another shot at a project that was not quite as polished or efficient as we would have liked the first time that we attempted it. Additionally, I am very excited to have the help of Professor Vellambi to guide us through the set theory issues that our project explores.

The most obvious way that this project ties into my CS coursework is that the problem we are solving essentially boils down to one of set theory, which has been discussed in many courses in the Computer Science curriculum. Among the classes that such topics have been discussed are CS2071: Discrete Computational Structures (wherein set theory was formally introduced), and CS4071: Design and Analysis of Algorithms (wherein many algorithms pertaining to set-related problems were introduced and discussed). One algorithm that we were introduced to in coursework was the Gale-Shapely algorithm, which provides a solution to the stable-matching problem. This algorithm, or a variation of it, may prove to be useful for us to decide who ought to share pizzas with whom in a large group. However, the stable-matching problem is not exactly what we are attempting to solve here, since in that problem each individual expresses their preferences as rankings (which could work if we were looking for one-topping pizzas only). In reality, according to the set theory terms discussed in Discrete Structures, we are concerned with finding the highest cardinality unions among a group of sets representing preferred pizza toppings.

In terms of bringing co-op experience, I feel that I am bringing several relevant skills from my co-ops into this Senior Design project. Specifically, when I was a Software Engineer Co-op at FOX Sports, I worked primarily on mobile apps. I believe that while we may or may not be building this project with the same architecture as the apps I worked on in co-op, my experience has given me the ability to understand what considerations need to be made in mobile app development, specifically when it comes to performance and UI/UX. Another important skill I acquired at FOX was the ability to break down and estimate tasks from working in an Agile environment, which we will certainly be doing on this project. Additionally, when it comes to the backend component(s) of our app stack, I bring experience working on backend services from my Software Development Engineer Internship at Amazon. Specifically, I gained experience working with and learning about many of the different tools available through Amazon Web Services (AWS). I believe that having this understanding will help with making choices for what structure we want our backend to have.

When it comes to attempting to build out this project, we have something of a starting point being the POC app that we built years ago. I believe our first steps will be taking a look at that old app and evaluating the technologies and approaches we used on our first attempt and researching alternatives in order to decide what to use this time around. Additionally, we will begin to take a more mathematical look at the set theory problem our app addresses and attempt to break it down completely independently of our app in order to explore solutions before trying to implement them. This will involve performing research, and likely some trial and error. When it comes to evaluating our work at the end of the year, we expect to have a polished user experience that would be acceptable for the average mobile phone user. The most important criteria for our project being finished, however, will be having a working and efficient implementation of an algorithm that calculates ideal pizza orders, as this is the heart and soul of our project.

I am very excited to have the opportunity to do this project the right way this time and overcome its previous shortcomings. I believe that with a couple more years of experience both on co-op and in the classroom, we are much more equipped to build out a polished app and solve the problem we are addressing. This project also lies at a very interesting intersection between a hard mathematical problem and a seemingly simple application of the solution that can be understood and appreciated by most people. Philosophically, I think that this is what Computer Science ought to be all about. Namely, solving complex algorithmic problems and finding a real-life application for those solutions. After all, what good is a solution looking for a problem?