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<center>Home Inventory System Capstone Project</center>

The primary goal of this senior design project is to create a tool that allows for the easy organization, classification, and retrieval of common household items. This application will have a server side that stores a database of items that a user has (food items, craft materials, clothes) and a client side application that allows for users to access their items easily. To make this project stand out from other inventory management software, there will be a heavy emphasis on gamification and user accessibility. From an academic perspective, this senior design project is about incorporating elements from all previous classwork into functional and utilitarian application that can be practically used beyond graduation. This project requires knowledge of database design, algorithms, networking, user interface, and object oriented programming. My hope is that this application will demonstrate my knowledge in all of these areas, as well as be a useful tool for me and friends to use for our hobbies.

To be able to complete this project, many skills that have been developed over my 4 years of college education will need to be employed. This project will heavily rely on a database, and require time efficient queries as discussed in CS4092. There will also need to be a flexible data structure (CS2028C) that holds all of our items; this data structure must be flexible and easily adapted to the needs of the type of item we would like to represent. After the basic implementation of the database and data structures, many algorithms will need to be employed on top of the data to make the database easily traversable. In classes CS4071 we learned time efficient algorithms, and in CS5154 we learned how to tokenize and compare relevance between a query and an array of documents. Although I am more comfortable working on backend development, my partner is taking CS5167 which will be helpful in designing an accessible user interface client.

Over my five co-op semesters, I learned a lot of useful skills that will be helpful in the completion of this project. For a majority of my development I worked on the backed development; this included algorithms, databases, and implementing API's. These skills parallel those that will be needed to implement the inventory system's database, flexible data structures, and query algorithms. During my coop, I also had to deal with a client/server setup with an API. This will be similar to how the database will need to be accessed in the project, with items being added and removed upon an API call. Since many of the algorithms being used will require a reasonable amount of computational power, there are plans to dedicate an entire physical machine to the database; on my coops I also often worked with hardware so this shouldn't be a difficult problem to solve.

To begin this project a basic database, as well as client and server, will need to be constructed. This database will be the center of the home directory project so it is important to build it as modular and generalized as possible. On top of this database we hope to employ various algorithms to query, sort, and classify the items. There will also be attempts to streamline the in/out system, for example by adding features such as scanning receipts to automate adding or making guesses when food items go bad to warn users to dispose of them. The end goal would be to gamify the inventory management by displaying interesting statistics,

showing recipes/crafts that can be made, and comparing items over time. Being conscious of our consumption is an important thing, so inspiring users to use what they have would be a major focus of this application.

       The idea for this project came to me about two years ago; I work on many side projects related to arts & crafts, engineering, computer hardware, and woodworking. I often found myself purchasing more things than I needed and losing track of where all my supplies were stored. That's when I thought it would be convenient to have a piece of software that could track where and how much stuff I have around my house, giving me a visual representation of my home inventory. My success metric for this project is to create a software that I find myself using consistently and effortlessly to track all of my supplies. Ideally a user shouldn't find it a hassle to add and remove items, and it should be rewarding and fun. I'm looking forward to working on this project, and I hope that it will become a useful tool I use into the future.