My senior design project is to create an implementation of a NetworkQuality client. A NetworkQuality client is defined in <https://github.com/network-quality>, but can be described as a tool to test the responsiveness of an internet connection/network under load. It will be written in Kotlin, a newer object-oriented language based on Java. I will utilize my knowledge of networking to create the measurement tool using the JVM network stack. The client will be primarily built towards a mobile application for android. This will utilize a GUI for the necessary inputs and to display the test results or interim information.

There are a few college courses that will help me to excel in the design and creation of this project. In **Software Engineering** we were taught about diagrams, specifically, class diagrams, which I will utilize to design/model the tool. Something else that we were taught in **Software Engineering** was different ways to manage a project, I will utilize Agile (specifically sprints with backlog) to manage the project, as well as Unit Testing with possibly Test Driven Development to create my tool. Another class that I will utilize is **Programming Languages**, specifically, the exposure to different styles of programming languages and paradigms will help me to learn and utilize Kotlin (a language I am not familiar with) effectively. **Requirements Engineering**, a class I am currently taking, has also helped me to really think about what I want my tool to accomplish (create requirements) and helped me to design it.

My co-op experiences will also help in creating this project. While working at Siemens as a DevOps, we used SAFE Agile. This exposure to Agile will help me to manage my project using Agile. I have also completed an EEP, which helped me to structure my days while having minimal supervision. Lastly, I participated in RHEST, an REU summer research. During this experience I got to work on a Go implementation of the client, which helped me to learn a new language as well as find and read source code. Having worked on a different implementation has also given me some insight as to what I want my implementation to achieve.

I am excited about this project because it tackles an everyday problem that we face, namely bad responsiveness. I was first formally exposed to this problem in my REU experience, where I was able to test and make contributions to the Go implementation. My main goal during that experience was to test the capability of running the client on different embedded devices. The reason I think this is important is because it allows the tool to be able to track specific problem areas within the network. The second reason is to allow more people access to the client. This is important because the tool is meant to highlight why we have bad user experiences (slow responsiveness), Buffer Bloat. My project, written in Kotlin, will utilize the JVM to be able to reach more platforms, and Android phones. It will also help to cross validate the existing project(s) and potentially lay framework for more contributors to the open-source project.

My initial idea for the project is to loosely create a library for the back end of the tool, while also creating a full GUI application. The reason I want to create a library is to create a framework for other implementations (such as native, JS), but also to allow integration of this tool into other applications. This would allow developers to easily integrate this tool into their projects and spread awareness of the problem, while also providing solutions(explanations) for bad user experience. By the end of this project I hope to have at a minimum created the GUI client, that is accessible to Android and JVM, and optionally have created the library to allow for integrations.