Depression affects 280 million people globally, with limited access to treatment, particularly in low- and middle-income countries, due to barriers like stigma and a shortage of trained professionals. This project aims to develop a computerized therapy device combining cognitive behavioral therapy (CBT) with guidance on building social connections to offer a holistic approach to treating depression. By leveraging existing large language model APIs for the CBT component, the system will focus on fostering positive relationships and maintaining accountability. The project will also provide valuable experience in product development, including user research, validation testing, and iterative design.

In my college studies, I have been deeply focused on machine learning courses. I have completed several relevant classes, including CS5101 Intro to Applied AI & ML Tools, CS5152 Intelligent Data Analysis, CS5173 Deep Learning, and CS4033 AI Principles and Applications. While these courses did not extensively cover large language models (LLMs), aside from a few weeks in Deep Learning, they provided a strong foundational understanding of machine learning concepts. This background has been instrumental in preparing me for more advanced work in the field. Additionally, I am currently pursuing a Master of Science in Computer Science, where I am conducting thesis research specifically focused on LLMs. Through this research, I am gaining deeper expertise and hands-on experience with LLM technology.

In my co-op experiences at Siemens, I focused on machine learning and artificial intelligence for three of my four co-ops. In my most recent co-op, I worked as an AI/ML researcher on a cutting-edge product that extensively used large language models (LLMs). The technical skills I developed during that co-op will enable me to be a significant contributor to the LLM we plan to use. I also created a chatbot interface for a demo, and I believe that experience will strongly benefit this project. Beyond technical skills, I led a small agile team on the project, which gave me a solid foundation in communication, project management, and planning. I expect to apply this by helping create our LLM and UI, as well as helping lead the project and define the scope and requirements.

My motivation for this project stems from the fact that the product we are planning to create is something I could see myself using or recommending to others with major depressive disorder. Having personally gone through the process of cognitive behavioral therapy (CBT), I believe our project has strong potential to help people facing difficult times. The combination of CBT principles and modern technology gives this product the ability to offer meaningful support. In our initial design approach, I plan to create class diagrams and high-level software architecture diagrams to map out the product's structure. Alongside development, we are conducting research in the CBT field to identify best practices for incorporating them into our product. To guide this aspect, we have a Biomedical Engineer working on research and defining user requirements to ensure we are on the right track.

For self-evaluation, I will assess whether the final product meets my personal standards and aligns with my goal of creating something I would recommend to those close to me. I will measure my contributions by focusing on my role in designing the user interface and implementing the large language model. A key indicator of success will be if the user interface is intuitive and easy to navigate. Additionally, I will evaluate the effectiveness of the LLM in guiding users through the CBT process. If both elements are well-executed and provide value, I will consider my work on the project a success. Ultimately, I want the product to offer meaningful support to users and meet my own expectations.