The basis of our senior design project is to create and train a machine learning AI to be able to take in a video lecture and return a page of notes. Through this project I hope to be able to expand my areas of knowledge which I have gained over my time at UC and through my various co-ops to complete this task. This project will be my capstone for my UC undergraduate experience and as such I have a passion for the work that it will require. Knowing this, the project will lead me to learn more than if I was to be assigned one by a professor or manager. However, this will come with needing to utilize what I have learned within class and co-op to come to a complete and fulfilling result. This project will teach me how to research, design, and implement a whole idea, which will give me a good basis for my next stages after graduating from UC.

Throughout my time as a UC student I have taken a large number of classes and have learned a great deal from each one. While a majority of the classes will not impact this particular project, a few stand out as being very beneficial. Starting off, as of this Fall semester (2022) I am taking Deep Learning (CS 5173), which as the name implies, is about the implementation and creation of deep learning AI networks. Utilizing the techniques and information gained from this class will be exceptionally helpful for completing this project. Next up would be Python Programming (CS 2021), as we will be primarily creating this project within a Python environment utilizing packages such as Pytorch and Tensorflow. Understanding the basis for Python will be critical for creating a working and clean final result. Lastly of the major impacting classes would be Artificial Intelligence: Principles and Applications (CS 4033). As this class taught me the basics for creating AI and machine learning. Utilizing the information gained from this class will be critical for the development of the project. There are a few other classes that may play a role within the development and process of the project, such as User Interfaces 1 (CS 5167) for any front end related pieces that we may end up needing to implement, as well as Data Structures (CS 2028C) for any back end data storage and cleanup needed. The last class which would be helpful, not for the project creation itself but for documentation and outside sourcing, would be Technical/Science Writing (ENGL 4092). This class taught me how to create good looking papers, reports, and documentation for technical projects such as this one.

While classes were a large part of being a UC student, I also learned and grew from the co-ops that I had over my five year sted. My first co-op was at Siemens where I was a Co-op Student Developer. While I was there I learned basic Java as well as touched up on my Python skills. I also was able to learn the basics of working on projects, a skill in which I would use almost daily in my other co-ops. Lastly, during my stay there COVID struck, so I was forced to work from home, again a skill which is still being used today. After Siemens, I went on to LCS as a Co-op Student Quality Assurance for API/APX Team. While I was with them I learned how to check my own, as well as others, code to try to find bugs or any unintended features. Additionally, I had to work with the other developers to be able to help them understand what was broken as well as how to fix the problem. After one rotation I then became a Co-op Student Software Developer for API/APX Team, still at LCS. There I learned how to create new sections to code within their massive code base as well as understand the basics for Git. During this time I also learned how to debug properly within this same massive codebase in order to utilize proper working code. All of these lessons I learned from LCS will help me understand and work with the large amount of code and data that will be required to make our project a reality. During my final co-op, at Kinetic Vision where I was a Software Developer, I was able to do a large number of small tasks with little direction. This is similar to what we will need to do for our project as we are having to create it from scratch. Additionally, I also learned how to research new tools for both the company as well as myself to utilize for work. This research will help within the current project as we are not fully aware of all the limitations and tools we will need to utilize in order to fully complete this project. Lastly, and most importantly, I learned how to work with others to create a working product from scratch, very similarly to how we will be working on this project.

Working on this kind of project has always been a passion of mine. During my free time I would look up ways to create an AI that would learn to do; anything. However, up until now I did not have enough time or reason to finish those projects. Additionally, I believe that if we do this correctly and have a good working prototype, we will be able to give it to others to help them in their course studies. Even if we don't end up getting exactly what we are after, we will still have something that can be applied to other projects or areas of interest. Whether that is some literal code base, or just the experience gained from trying, it will come in handy somewhere. Now, in order to work on this project we will not be going head first into the deep end. Our goal is lofty so we will likely start by working on smaller projects that will build into the larger one. Starting off with a basic speech to text we will then move on to a basic note taker, and beyond.

As for our expected results, we hope to be able to give the AI a video/audio file, and request a notes document about what was given in the lecture. However, we know that this will not be straightforward and will have to be done in parts. Those parts we still do not have set in stone, however they will be small enough to be able to notice progress towards the whole project. In terms of self evaluations, I will be keeping a close eye on the time and effort that we each put into the section of the project in order to figure out how much work I put in. This way I can figure out how much my work actually contributed to the completion of the section. Additionally, I will request that the others help do the same, so we can all try to give the same amount of effort and positive contributions.