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Senior Design
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Individual Capstone Assignment

For senior design, our group has decided to create an interactive Dungeons and Dragons monster and challenge-rating simulating tool. From my perspective, our project is about data gathering, information retrieval, and machine learning. As a student, I see this as an opportunity to create something using the knowledge I have gained over the past years. The many skills I have learned through classes will be put to use in this project. Also, the skills I have picked up from my multiple Co-ops will help keep this project flowing. This project also allows us to work with other students who have similar interests to make something using all of our skills.

Throughout my time at the university, I have taken a lot of interesting and useful courses. This continues into my last two semesters where I am taking new classes that challenge my understanding. For this project, earlier classes like Python programming and data structures helped with my fundamental programming skills. More recent classes like machine learning and software engineering have a direct impact on this project as well. Even this semester I am taking information retrieval, which will be pivotal in helping us make sense of our data. I am more focused on this side of the project but the little bit I have learned about front-end development through software engineering should help if I need to help in that area.

Regarding my Co-op experience, I have learned some valuable skills. My first company, Matthews Automation Solutions, taught me a lot about organizational skills and working together to meet deadlines. In regards to technical skills, my electrical intern position required me to use AutoCAD electrical which is not too helpful for this project but the work I did in Excel could prove helpful. At the other and more recent company, Leonardo DRS, I learned more technical skills that will help with this project. As a software intern, I worked in Python and C++ and developed some code to be used in our applications. Most of this was on encryption but the skills will still be helpful. I also used JIRA, a service for tracking our sprints which got me more accustomed to that quicker style of development.

The project we decided on came from a mutual interest in Dungeons and Dragons. All three members of our group are Dungeon Masters for groups that meet regularly. Once we realized this common ground the idea for this project came pretty quickly. We are extremely excited to use not just the knowledge we gained in school and Co-op, but from playing the game so much ourselves as well. Our preliminary approach to this project is to split up the work into areas that each one of us feels most comfortable in. Then we plan to set up sprints that we can

work on separately and as a group. We all see each other throughout the week but we plan on holding weekly in-person meetings to keep us all accountable.

Our goal right now is to create a website/extension to address issues with creating balanced encounters. Through gathering and applying processed data, we expect to have a program that can take in a group of characters and see how hard a fight with different monsters would be. What makes our idea stick out though is the use of most commonly used attacks and movement patterns to more accurately deal with the challenge. If we end up doing an extension, we would like for it to work with Roll20, a popular online D&D website. We will be evaluating all of our contributions based on our separate and combined areas in our workflow. This will give us a visual representation of how much we have done regarding the project. Our group will be satisfied and consider it a success if our program can work with a variety of monsters and characters, especially if we can make it functional with other programs like Roll20 or Foundry.