Part A - Two Paragraphs: What was your individual contribution to this project? Did you apply and build upon the skills identified in your initial assessment from last Fall? What did you do and how did you do it? What did you learn and what competencies did you build? What were your successes, what were you obstacles?

My primary contribution to this project centered around backend development and the design of our machine learning model and pipeline using Python. I assisted in developing the full game simulation logic, including turn rotation, trick resolution, and score tracking, and other in-game features to track. This allowed us to simulate thousands of euchre games and collect each aspect of the round with respect to the player’s cards. A key part of my work involved collecting and structuring the data in each game state using pandas DataFrames to manage the data in Python and CSV files to store the data. This data was used to train a RandomForest regression model that estimated the winning probability of each card play of the players hand given the current game state. These tasks were built directly upon the Python programming, data aggregation, and machine learning skills I wanted to expand upon in my initial assessment from the Fall semester.

During development, I greatly expanded my knowledge in developing machine learning models, simulation-based data collection, and encoding datasets to feed to various models. I also became more comfortable working with python, pandas, and numpy for efficient model training and data handling. A major success was designing an accurate and scalable data generation process that could feed our model with high-quality training data, which in turn improved our model’s ability to make sensical decisions. A key challenge that I faced was ensuring that the generated features accurately represented the game state while avoiding overfitting certain features. Although there still is overfitting to certain feature inputs, we added important data features and certain hyperparameters to allow the model to find other features that could impact the cards winning percentage value. This project allowed me to apply machine learning theory to a hands-on project revolving around a game that I enjoy playing.