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## Final Report

For our term project, we created a blackjack card game. We learned lessons along the way such as how to work together more effectively, and algorithms we would have to use for our game to function properly. Breaking the project into smaller parts so that smaller groups of members could work on different parts together prevented the project from having several pieces of disjointed code. It helped to have changes be made on the same source code files, and for those changes to be easily tracked using a web-based version control service such as GitHub. In retrospect, I think everyone benefitted from having meetings to make sure we had the same understanding of the game rules and the required algorithms. For example, to implement a random deck shuffle, we had to seed the random-number generator. We used the `srand(time(0))` function for this purpose, because it caused the starting number of the first card in the stack to be dependent on the time the program starts running, so that every run of the program--every gameplay--would have a different succession of random card numbers. While writing up the code, we began to realize how the different parts of the game worked with each other in Blackjack, and learned that much of our code could be reused and be correctly referenced with pointers. We also had trouble with various objects interacting with each other. Other than that, the object-oriented aspect of C++ programming made our code easy to follow.

As for adding modifications to our project in the future, so that it would stand alone as a more developed game, we have a few ideas. Rather than restricting the user to interacting with the game through phrases, we could create a GUI so that the user would be able to click through a more user-friendly interface to perform an action, as well as see certain information displayed on the screen. Our current game has a dealer that is a “computer” player and one another player who is the user. We could introduce a multiplayer mode and host an online version of the game on a server, so that multiple users could play blackjack together. Machine learning and neural networks can be used to develop an AI for the dealer and additional “virtual” players that operates using statistical models and data aggregated from previous rounds. User accounts and an active betting system using a cryptocurrency such as Bitcoin can be implemented as well.