Overview:

My proposal is a flexible game server that facilitates two-player games. The server will maintain a database of usernames and their encrypted passwords, available games, the state of each game, and a list of active matches between players. In order to implement a particular game, one must provide a client for the game that communicates with the server using an API common to all games, and a plug-in for the server that implements the game’s rules using a common API for creating and updating the encoded game state. To keep things simple, I will be using the game of checkers to test the server.

The project will cover a variety of topics that I have studied in my time at Yale: It will crutch heavily on object-oriented programming to create instances of games, rely on a well-designed database to store player and game information, and use a variety of cryptographic primitives in order to maximize the security of the database and deter cheating in game play.

In addition, the project will touch on several topics that I am interested in but have not had the opportunity to study, such as networks and the client-server model. With the hopes of porting my project to smart phones, I will hopefully gain experience in app development as well. In addition, if the stretch goals are achieved then I will be able to work with digital systems in order to implement a physical chessboard. As the semester progresses, I hope to develop a clean and easy to use
interface that provides users a more aesthetically pleasing way to play checkers. This transition from a simple text-based program will allow me to experiment with graphical interfaces.

**Deliverables:**

- A flexible and secure server that facilitates two-player games by verifying client input and monitoring game play.
- An easy to use client interface that allows players to conveniently set up games against other players.
- The ability to play against bots in order to enable solo play on the server.

**Stretch Goals:**

- Create a physical board that implements a touch screen surface to enable play without physical pieces and the ability to play on the server via an Internet connection.
- Developing an Iphone or android application to play checkers using the game server.

**Functions:**

The first steps will be setting up a program that allows new players to register and stores their information in a well designed database. This will allow players to sign in using a username and password. A large portion of time will be spent developing the APIs used to allow for the creation/customization of new games. The
program will then be extended to allow users to look for game types and express interest in playing a particular game. The program will look for other players who have expressed interest in this same game type and then send an invite to them. Players will be notified when someone has begun a game with them. In addition, players will be able to look up other players using their username and create a new game with them. The database will maintain a list of each player’s games in order to allow interleaved game play.

**Topics:**

This project will cover a variety of topics related to Computer Science that I have covered during my time at Yale:

**CPSC 437: Introduction to Database Systems** - Information about players and ongoing games will be stored in a well-designed database.

**CPSC 467: Cryptography and Computer Security** - Passwords will be encrypted and stored using a hash function in order to maximize security. Security measures will be put in place to guard from unwanted attacks and illegal game play.

**CPSC 427: Object Oriented Programming** – The creation of games will crutch heavily on object-oriented programming.