

# CPSC 490: Project Proposal

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## *Building a Versatile, Abstract API for Creating Digital Board Games*

### **1 Introduction**

Board games have been a popular form of entertainment among children and adults alike for decades. As technology advances and entertainment becomes ever more digitalized, video games have become increasingly popular. Yet board games have not become outmoded; rather, they have maintained popularity by shifting from physical boards and pieces to a digital medium, as they become available as online games and iPhone apps.

Unfortunately, creating board games from scratch can be difficult and time-consuming, requiring large amounts of boilerplate code and networking overhead just to create the basic components necessary for the game. Only after creating all of the basic pieces can the game logic be included, resulting in a long process for the creation of even simple games.

Yet many components of board games can be abstracted and generalized to fit numerous seemingly-different games. Although each game may have distinct game logic, there are certain core components that can be reused for a multitude of board games. If common game parts could be abstracted and provided in an easy-to-use and reusable format, it would foster the digitalization of more games and make them more accessible to our technologically-oriented generation.

### **2 Project**

#### *Motivation*

My project aims to reduce the overhead of such core game components and simplify the game-creation process by offering an API of ready-to-use but easily customizable

components and functionality, so that more beloved board games can be digitalized in an easy, abstracted way. The API will thus allow game creators to focus on the game logic and game-specific details, rather than on the implementation details of basic pieces like boards, decks, or even the networking layer that allows players to host and join their friends' games.

### *Goals*

Conceptual: My main high-level learning goal for this project is to explore levels of abstraction and figure out how to balance the competing needs of generalizability and customizability in games. An API like this needs to be abstract enough to support many types of games, while at the same time allowing enough specificity that it actually helps simplify game logic by supporting enough desired behavior. Through the process of experimenting and designing a generalizable API for a spread of different board games, each with different gameplay and particular needs, I aim to discover design strategies for abstracting shareable functionality and components in a clear, useful, and flexible way.

Technical: My principal technical goal in creating the API will be focused on learning how to implement the network layer. The most important functionality required across nearly every board game is the ability to play with others. Accordingly, a vital part of the API will include a way for players to host and join their friends' games and play across devices. Since this sort of cross-device communication is mostly unfamiliar to me, I am excited to focus on learning how to implement a network layer that will make connecting multiplayer games easy and simple for game makers.

## **3 Deliverables**

The following items will be included in the final project:

- An API containing customizable components useful for a variety of different board games and encompassing relevant functionality. These components will include components such as:

- Network Layer to allow for multiplayer games, regardless of game type
- Core Game Components, i.e. game board, versatile game pieces, dice, bank, card deck, turn controller
- Sample games created using the API, demonstrating how the API can be used to design a variety of board games with different gameplay
- Final project report, including details about the design process and refinement as part of my experimentation with discovering the optimal level of abstraction for designing a game engine

## **4 Potential Extensions**

There are many ways that the project could possibly be extended. As a major part of this project will be the exploration of optimal abstraction strategies for a board game API, determining the best extensions to pursue will be based on the results of that exploration and the ultimate design chosen. Currently, potential ideas include:

- An expanded library of components to support a larger variety of games
- Deeper dive into certain widely-used components (i.e. card decks), and a more thorough exploration into abstracting these particular parts to enable much greater customizability and complex game play
- Extending the networking layer to connect (and possibly play) over a website
- Optional built-in graphics for certain game components
- Functionality for allowing interactive turns