

# CPSC 224 Final Project

## PROJECT PLAN

<April 6, 2025>

<The Ultimate Connect Four™>

## <Algorithm Avengers>



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# **1 Project Overview**

## **1.1 Project Summary**

The game that this group will be recreating is *Connect Four*, a board game traditionally played with two players. The objective of a traditional game of *Connect Four* is for two players, both with different colored discs, to drop their discs, in alternate turns, into the vertical grid columns provided by the game set in an attempt to have four of their colored discs in a line. A player wins once they connect four of their discs continuously either vertically, horizontally, or diagonally with no empty spaces or discs from their opponent in between, hence the name “*Connect Four*.” If the board fills up with discs and no more discs can be added, the game is a draw. Although there are many different variations and house rules to this board game, such as having a bigger grid, connecting five instead of four, etc., this is the conventional way to play the game.

As for a digital version of this game, this game will be expanded to allow more than 2 players to play, and the user will be able to choose between different sizes of the board. However, this project will limit the game to four players to maintain the length of the game. Additionally, due to the challenge in outputting colors, mimicking the different colored discs representing players in the real-life game, this project will instead use symbols (such as O, X, etc.) to represent discs. Otherwise, this project will simulate the conventional gameplay of a traditional game of *Connect Four*, in terms of players taking turns in adding their “disks” to the grid to connect four in a row to win the game.

## 2 Project Requirements

### 2.1 Major Features

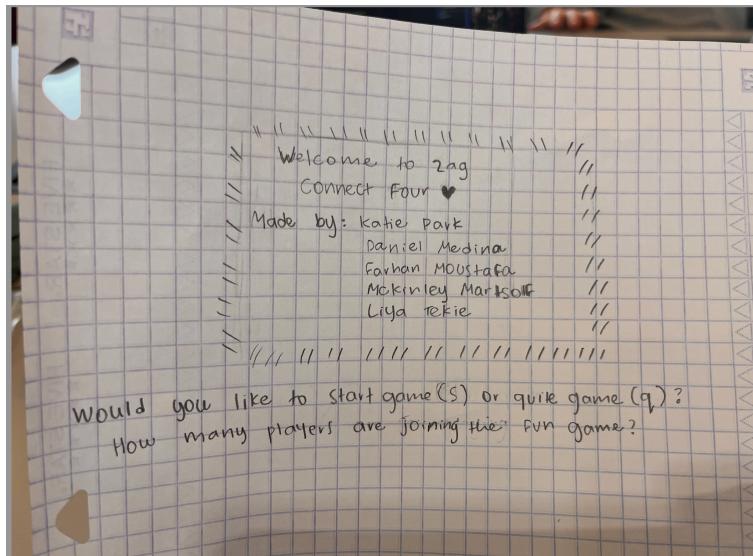
**Table 1: Major Features**

<i>Feature</i>	<i>Description</i>
<i>Intro Screen</i>	The game will automatically output an intro screen with the game and programmer names. The user will also have the choice to play the game or quit the program.
<i>Multiple Players</i>	The game will ask the user the number of players that will play the game, as well as the names of each player. If a name is not inputted, the game will provide a default name (Player 1, Player 2, etc.).
<i>Token Types</i>	The game will ask the player which token they would like to have as a representation of the “disks” in the real-life game.
<i>Size of Board</i>	The game will ask the user how large they would like the game board to be and will be given the options of small (6x7), medium (7x8), and large (8x9)
<i>Gameplay</i>	The game will then “play” the game <i>Connect Four</i> , in which each player takes turns in inputting a column they would like their token added to. The token will be added to the bottom-most empty board space.
<i>Recognizing a Win</i>	The game will continuously check to see if any player has connected four of their tokens in a continuous line (either vertically, horizontally, or diagonally) after every player ends their turn.
<i>Winner’s Screen</i>	The game will recognize which player has won the game and output a winner’s screen. The game will also automatically end.
<i>Option to Quit</i>	At any point during gameplay, any player will have the option to end the game.

### 3 Project Game Design

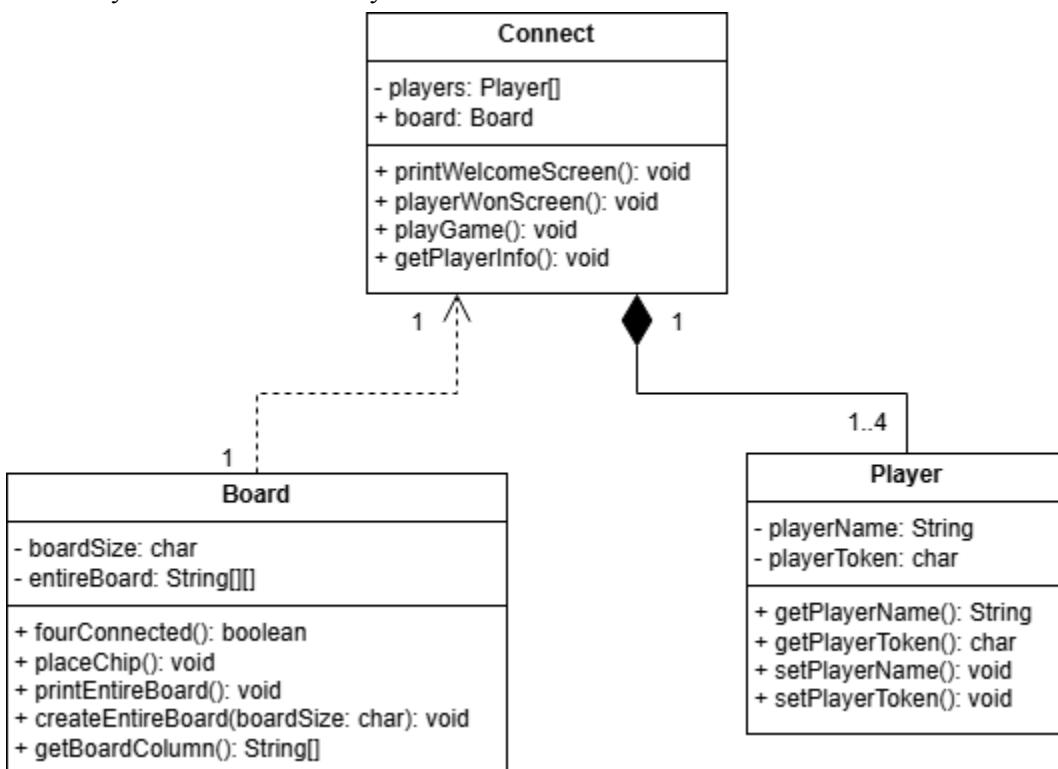
#### 3.1 Initial User Interface Design

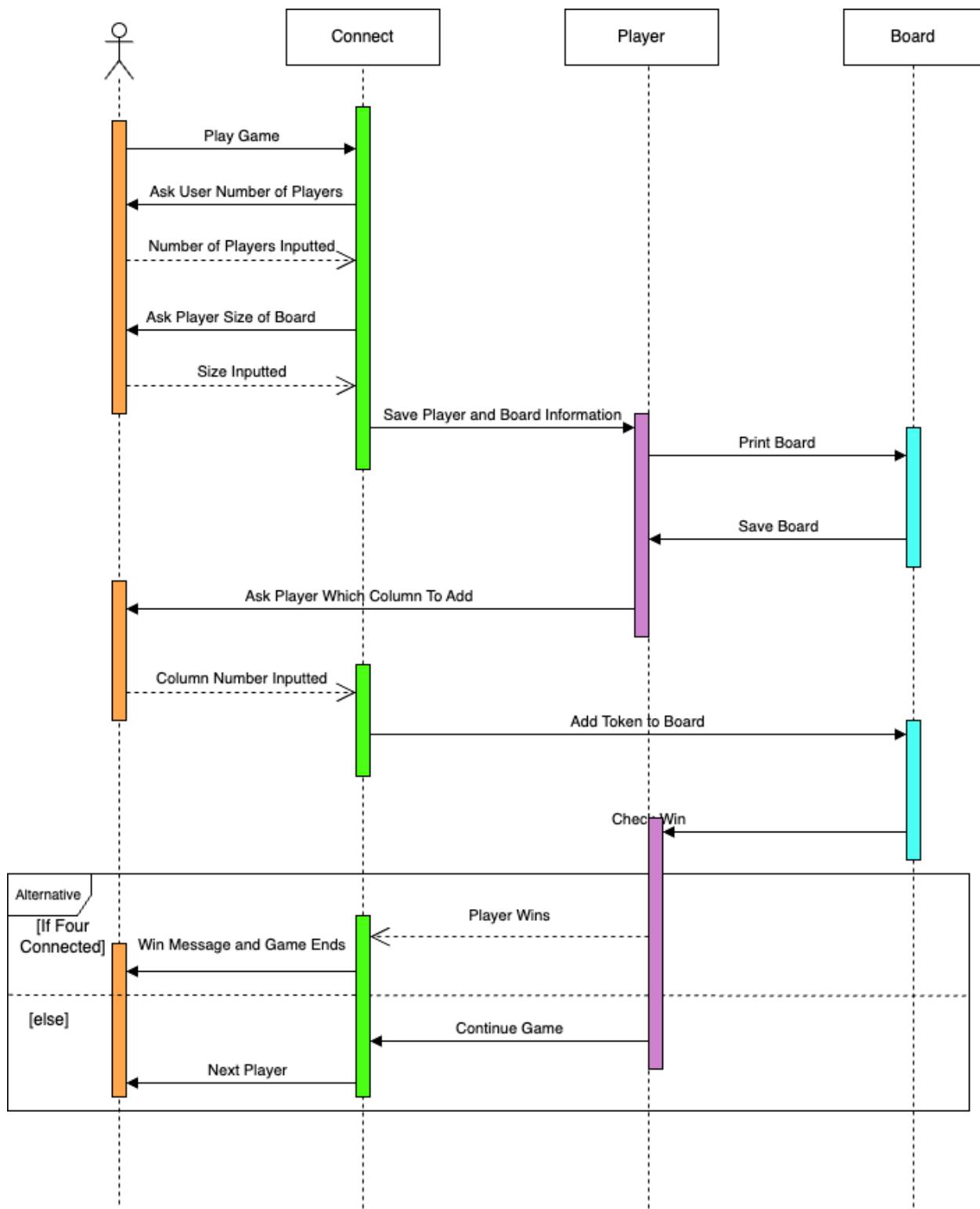
This User Interface design has a menu banner that includes a welcome message and the creators of the game connect.



#### 3.2 Initial Software Architecture

Our UML has a main class called Connect. Connect has a compositional relationship to Player and Dependency relationship to Board. Connect can have one to four Players, and one Board of differing sizes. Player and Board can only have one Connect.





## 4) Project Schedule

**Table 3: Major Scheduling Milestones**

Milestone	Description	Target Completion Date
<i>Finish Planning Stage</i>	<ul style="list-style-type: none"> <li>● Create the project plan document: All members           <ul style="list-style-type: none"> <li>○ ~2 hours</li> </ul> </li> <li>● Finalize the Connect 4 game template: All members           <ul style="list-style-type: none"> <li>○ ~1 hour</li> </ul> </li> <li>● Assign individual roles and responsibilities: All members           <ul style="list-style-type: none"> <li>○ ~30 minutes</li> </ul> </li> <li>● Review and approve the plan: All members           <ul style="list-style-type: none"> <li>○ ~10 minutes</li> </ul> </li> </ul>	4/4
<i>Finish coding the Connect 4 game</i>	<ul style="list-style-type: none"> <li>● Implement game logic (board setup, moves, win conditions): All members           <ul style="list-style-type: none"> <li>○ ~3 hours</li> </ul> </li> <li>● Develop the user interface for gameplay: All members           <ul style="list-style-type: none"> <li>○ ~1 hour</li> </ul> </li> <li>● Test and debug core functionalities: All members           <ul style="list-style-type: none"> <li>○ ~2 hours</li> </ul> </li> <li>● Integrate player vs. player: All members           <ul style="list-style-type: none"> <li>○ ~2 hours</li> </ul> </li> </ul>	4/11
<i>Make The Presentation</i>	<ul style="list-style-type: none"> <li>● Outline key points for the presentation: All members           <ul style="list-style-type: none"> <li>○ ~30 minutes</li> </ul> </li> <li>● Design PowerPoint slides or visual aids: All members           <ul style="list-style-type: none"> <li>○ ~1 hour</li> </ul> </li> </ul>	4/18

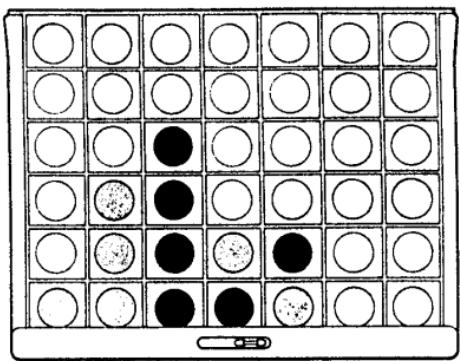
	<ul style="list-style-type: none"> <li>● Assign speaking roles for team members: All members           <ul style="list-style-type: none"> <li>○ ~15 minutes</li> </ul> </li> <li>● Review and refine content: All members           <ul style="list-style-type: none"> <li>○ ~15 minutes</li> </ul> </li> </ul>	
<i>Final Project stage and presentation</i>	<ul style="list-style-type: none"> <li>● Final testing and bug fixes: All members           <ul style="list-style-type: none"> <li>○ ~15 minutes</li> </ul> </li> <li>● Polish UI/UX and add extra features if possible: All members           <ul style="list-style-type: none"> <li>○ ~15 minutes</li> </ul> </li> <li>● Conduct a practice presentation (4/28): All members           <ul style="list-style-type: none"> <li>○ ~30 minutes</li> </ul> </li> <li>● Make final adjustments before the official presentation (4/30 - 5/1): All members           <ul style="list-style-type: none"> <li>○ ~30 minutes</li> </ul> </li> </ul>	4/21 - 5/2

## Appendix

Rules (from <https://www.unco.edu/hewit/pdf/giant-map/connect-4-instructions.pdf>):

1. Decide who plays first. Players will alternate turns after playing a checker
  - a. NOTE: The player starting the first game will play second in the next game
2. On your turn, drop one of your checks down ANY of the slots at the top of the grid
3. Play alternates until one player gets FOUR checkers of his or her color in a row. The four-in-a-row can be horizontal, vertical, or diagonal.
4. If you're the first player to get four of your checks in a row, you win the game!
5. Example of a winning game:

*Figure 3.*



FOUR IN A ROW VERTICALLY