How the design accounts for possible future networking

The newest version of the Kivi game only works offline on a single computer. Players can choose to play with 2, 3, or 4 people, and they also have the option to play against the computer. To turn this into an online multiplayer game, we need to focus on two main areas.. The first one is how the information in our Kivi game will be passed between several computers, and the second is how control will be passed between them.

To pass information between several computers in the multiplayer online version of the Kivi game, we can use a client-server model. The server will keep the main copy of the game and handle all the game data. All players (clients) send their moves to the server, and the server checks if the moves are valid. If they are, it updates the game state and sends the updated board, scores, and turns to all players using JSON. Right now, the game only works on a single computer and keeps everything like the board and player turns in memory. To support more than one computer, this data needs to be sent across the network. At the start of the game, the player can choose between Offline or Online modes. If online is chosen, the player becomes the host, creates a game code, and others can join using that code. The same user interface can be used for the game, but a few things need to be added, like a “Join a Game” button at the starting and a new option called Game Type, which includes choices for Online or Offline, along with options for number of players, computer player, computer difficulty, and game colors.

To pass control between players on different computers, the server will be in charge of deciding whose turn it is. Only the server can change turns. When a player finishes their move, the server sends a message to the next player saying it's their turn. If it’s not, the player won’t be able to make a move. The turn order follows the same pattern as before, from player 1 to player 2, and so on. The host will get an extra user interface to see who has joined the game. Once all players have joined, the host starts the game, and the server sends a "game start" message to everyone. When the game ends because someone wins or quits, the server sends a "game over" message, and all players see the winner. This way, the game setup, turn control, and all data are handled properly in the online version while keeping the interface simple and similar to the current one.