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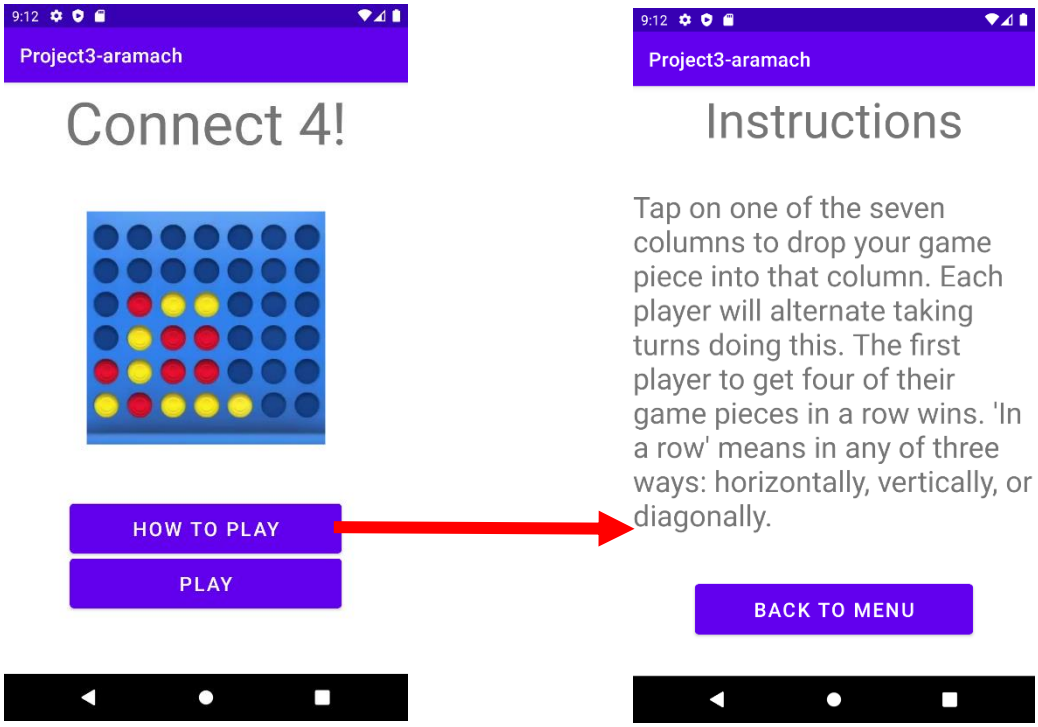
Project 3 Report: Connect Four Game Using Firebase

Idea: Have a Connect Four game that 2 players can play from each of their phones, where each move that a player makes is updated in a Firebase database.

When the app is launched, users are brought to a home screen where they can start the game, or look at instructions on how the game works:



Firebase Database

When both users press "Play", the game will begin and they will see a blank game board. Using a Firebase database, I plan to make a few collections:

- Game Board Collection:
  - This collection will hold key-value pairs related to the game board itself
  - Example keys include "Column0", "Column1", and so on, having a column key for each of the 7 columns
  - The values of these keys will be an array or list that will hold the players' pieces (or any sort of unique identifiers of the players) of players that have placed their pieces into the respective column thus far (think of the array/list functioning as a stack to represent the game board's column, except of course I will not be allowing to "undo" moves so we will not be every popping off of this stack)
  - Each time a player makes a move on a board, it will be reflected with an update to the database (adding to the array/list of the respective column that the player

placed their piece in), and the game board interface that both users see will constantly update its view based on data that it pulls from the database

- Player-Specific Collection:
    - This collection will hold data pertinent to the players
    - Both players will be given an option to give themselves a name before beginning the game, and this will be stored in a key-value pair where the keys are “Player1” and “Player2”, and their values are their respective chosen player names that they will enter
    - There will also be key-value pairs representing which color game piece corresponds to which player
- Game-Specific Collection:
    - This is slightly different data than that of the game board
    - This collection will hold 2 flag variables, that indicate once both players are ready to start the game (they have both entered their player names and have pressed “start”); the game can only start once both players have done this, so I will need to represent that data somehow so this is how I will choose to implement it
    - There will be a key-value pair where the key is something like “turn”, and the value is the identifier of the player whose turn it currently is to place their game piece on the board

At a basic level, these are my primary considerations thus far. Implementing a basic game of Connect Four is quite simple, the only tricky thing is trying to get it to work with a database, which is why that is my main point of consideration and discussion in this document.

Android Studio

As far as just architecture in purely Android Studio, I already have the Activities for the home page and the instructions page, once the player hits “Play” I plan to launch them into a new activity that lets them enter their player names and press “Start”, and potentially have to wait for the other player to also do those same steps. Once both players have done that, then I plan to launch a new activity which will be the actual game and the users will see the game board that they will interact with and play the game on. For the structure of the game board itself, I plan to use buttons for each of the columns, since when a column is clicked on the game piece must fall all the way down as far as it can (by nature of the game). Each time a move is made, I will check to see if there is a winning board based off of the move just made. Once a winner is declared (or a draw is found), The users will have the option to play again or quit; they both must answer “Yes” to play again in order to restart the game, else the game will quit for both players.