

Software Requirements for Connect Four

Connect Four

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Overview

This document describes requirements for the software implementation of the classic game of Connect Four. This software will allow for two players to play against each other or for one player to play against the computer. A description of the game plus the requirements of this implementation are provided below.

The game

Two players are presented with a 6x6 grid of empty slots. The players take turns dropping colored tiles into an empty slot; the first to move uses red tiles and the second player uses white. The first player to drop four consecutively placed tiles in a row, column, or diagonal line, wins. If all slots are filled and neither player has a winning set, then the game results in a tie.

Software Implementation

UI Elements

The software will present the Connect Four game with the UI elements listed below:

- 6x6 grid of slots
- Row of buttons on top of the screen (like a toolbar) that has:
 - o Option buttons to choose between 2 Player or Play Against the Computer
 - o Start button / Label to display Game Status message (hybrid)

Player Modes

There are two modes of play – (1) Two player and (2) Play against the computer – as described below.

Two Player

In this mode, as you would expect, each user clicks on a column with the desired empty slot and their tile is dropped into the lowest available slot in that row.

Play Against the Computer

In this mode, the computer is represented by the white tiles. After red's turn, the computer will make its move with an algorithm that follows the steps below sequentially:

1. Offense: If there is an opportunity to take a winning slot, then take it.

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2. Defense: If the other player can win, then take the slot to block the win.
3. Take the spot with the highest rank. The ranks are:
 - a. Any slot that's next to two consecutive red tiles
 - b. Any slot that's next to a single red tile
 - c. Any available slot chosen randomly

Game Process and Rules

- The game starts when the player clicks Start. Until then all clicks on the grid columns are ignored, and the game status message on the Start button is: "Click Me to Start Game."
- After Start is clicked: The message "Current Turn: White" is displayed. White takes a turn by clicking on an a column within the grid where he wishes to drop the tile, and the tile drops into the lowest available slot. Then, the current turn changes to "Red," which is reflected in the game status message and when the player drops a tile. If a player clicks on a column with no available slots, then the click is ignored, with no effect to the grid or current turn.
- When there is a winner: The back color of all colored tiles changes to the winning color to indicate a win. Game status displays "Winner is: " followed by the winning color.
- If all spots are filled but there is no winner (tie): Game status displays "Tie."
- In the game state of Win or Tie all column clicks should be ignored. Do not disable the buttons because that will cause them to look faded out.
- If the user clicks Start in middle of a game, then the game should interrupt and begin a new game.