Connect Four

Description: Connect Four is a two-player game where players take turns dropping colored discs into a vertical grid. The first player to connect four of their discs in a row (vertically, horizontally, or diagonally) wins.

Features to Implement:

- Display the 6x7 grid.
- Allow two players to take turns dropping discs into columns.
- Check for a win after each move.
- Handle invalid moves (e.g., choosing a full column).

Tips for Implementation

1. **Grid Representation:** Use a 2D list (list of lists) to represent the grid for each game.
2. **Input Handling:** Use functions to handle user input and ensure it is valid.
3. **Game Loop:** Implement a main game loop that continues running until the game is over.
4. **Functions for Game Logic:** Break down the game logic into smaller functions to make the code modular and easier to understand.
5. **Display Function:** Create a function to print the current state of the grid to the console.

Project Overview

Connect Four is a two-player game where players take turns dropping colored discs into a vertical grid. The goal is to be the first player to connect four of their discs in a row, either horizontally, vertically, or diagonally.

Step-by-Step Guide

Step 1: Setup the Game Grid

1. **Initialize the Grid:**
    - Create a 6x7 grid initialized with empty slots.
2. **Function:** `initialize_grid` **Purpose:**
    - To create and set up the initial 6x7 game grid for Connect Four.
3. **Description:**
    - Initializes a 6x7 grid with empty slots represented by a specific character or value (e.g., a space or zero).

Step 2: Display the Grid

3. **Function:** `print_grid` **Purpose:**
    - To display the current state of the game grid to the console.

4. **Description:**
    - Iterates through each row of the grid.
    - Prints each row of the grid in a formatted manner to ensure readability.

Step 3: Handle User Input

4. **Function: `get_user_input` Purpose:**
    - To obtain the column number where the player wants to drop their disc.
5. **Description:**
    - Prompts the player to enter a column number.
    - Validates the input to ensure it is within the valid range and the column is not full.
    - Returns the validated column number.

Step 4: Drop the Disc

5. **Function: `drop_disc` Purpose:**
    - To place the player's disc in the chosen column.
6. **Description:**
    - Finds the lowest empty slot in the chosen column.
    - Places the player's disc in that slot.

Step 5: Check for Win or Draw

6. **Function: `check_win` Purpose:**
    - To check if the current move results in a win for the player.
7. **Description:**
    - Checks all possible win conditions (horizontal, vertical, and diagonal) from the position of the last disc dropped.
    - Returns `True` if four consecutive discs of the same type are found, indicating a win.
8. **Function: `check_draw` Purpose:**
    - To check if the game has resulted in a draw.
9. **Description:**
    - Checks if the grid is completely filled without any player winning.
    - Returns `True` if no empty slots are found, indicating a draw.

Step 6: Switch Player

8. **Function: `switch_player` Purpose:**
    - To switch the turn to the other player.
9. **Description:**
    - Alternates between two players (e.g., Player 1 and Player 2) after each move.
    - Updates the current player’s disc type accordingly.

Step 7: Main Game Loop

9. **Function: `play_game` Purpose:**
    - To manage the overall game loop, handling the game flow and user interactions.
10. **Description:**
    - Initializes the game grid.
    - Continuously displays the grid, handles user input, and updates the grid based on moves.
    - Checks for win or draw conditions after each move.
    - Ends the game loop if a player wins or the game is a draw.
    - Switches the turn to the other player after each valid move.

Full Description

Function: `initialize_grid`

- Initializes a 6x7 grid with empty slots.

Function: `print_grid`

- Displays the current state of the game grid to the console.

Function: `get_user_input`

- Obtains and validates the column number where the player wants to drop their disc.

Function: `drop_disc`

- Places the player's disc in the chosen column, in the lowest available slot.

Function: `check_win`

- Checks for a win condition from the position of the last disc dropped.

Function: `check_draw`

- Checks if the game is a draw by verifying if the grid is full.

Function: `switch_player`

- Alternates between Player 1 and Player 2 after each move.

Function: `play_game`

- Manages the main game loop, including initializing the grid, handling user input, updating the grid, checking for win or draw conditions, and switching players. Ends the loop when a win or draw condition is met.