CONNECT FOUR GAME USING PYTHON

Presented By- Shalu Jain
Manisha Goyal
Gargi Sharma

PROJECT OBJECTIVE

What is Connect Four?

Connect Four is a classic two-player strategy game where players take turns dropping colored discs into a 7-column, 6-row vertically suspended grid. The goal is to be the first to form a horizontal, vertical, or diagonal line of four discs.

Why this project?

- To learn and apply fundamental programming logic in a visual, interactive way.
- To gain hands-on experience with Pygame, a Python library for creating 2D games.
- To challenge problem-solving skills in game design and user interaction.

GAME DESIGN OVERVIEW

GAME STRUCTURE

- 6 rows × 7 columns grid
- 2-player turn-based play
- Each player drops a disc into a column
- Win conditions:
- 4 in a row horizontally
- 4 in a row vertically
- 4 in a row diagonally (positive and negative slopes)

GAME DESIGN OVERVIEW

FEATURES

- Real-time interaction using mouse
- Dynamic board update
- Win detection
- Color-based player turns

CODE BREAKDOWN – GAME LOGIC

BOARD CREATION

python Copy Edit

```
board = np.zeros((ROW_COUNT, COLUMN_COUNT))
```

DROP PIECE FUNCTION

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```
def drop_piece(board, row, col, piece):
    board[row][col] = piece
```

CODE BREAKDOWN – PYGAME INTEGRATION

DRAWING THE BOARD

python

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```python
def draw_board(board):
    for c in range(COLUMN_COUNT):
        for r in range(ROW_COUNT):
            # Draws rectangles and circles
```

EVENT HANDLING

python

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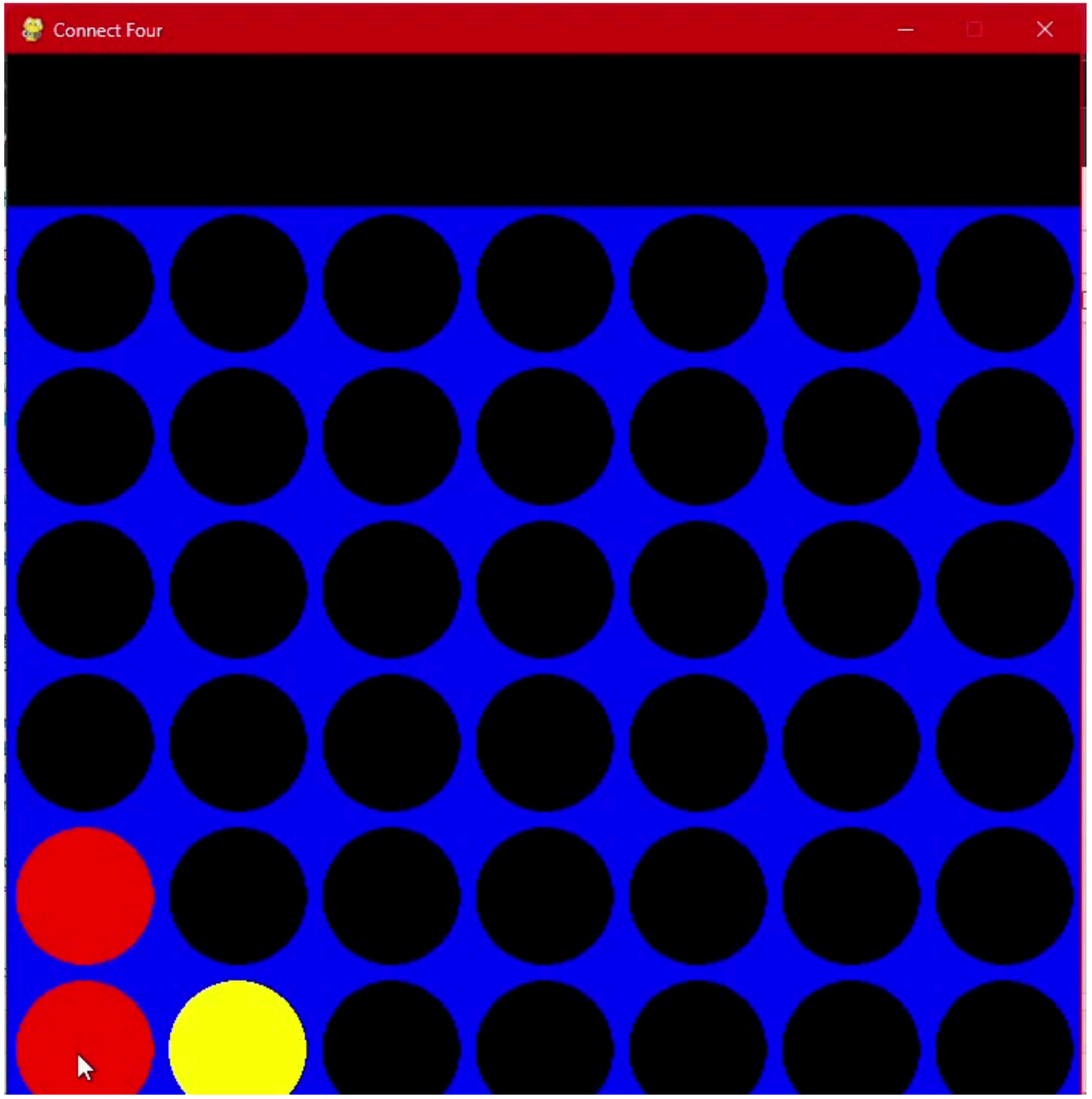
```python
for event in pygame.event.get():
    if event.type == pygame.MOUSEBUTTONDOWN:
        # Check position and player move
```

GAMEPLAY DEMO

Gameplay Steps

- Mouse hover shows the preview disc
- Click to place a disc in the selected column
- Switch turns between players
- If a player connects four, display a win message


Connect Four

LEARNINGS & TAKEAWAYS

Technical Skills Gained

- Mastery of matrix manipulation using NumPy
- Handling events in real-time with Pygame
- Logic building for game rules and win conditions

Conceptual Learnings

- Importance of breaking down problems (game logic, UI, win checks)
- Debugging efficiently using print statements and testing edge cases
- Enhancing user interaction via real-time feedback (e.g., hover discs)

THANK YOU