Conway's Game of Life - Pygame Implementation Documentation

Overview:

This Python script implements Conway's Game of Life using the Pygame library. The game features a graphical interface where the user can select cell colors, toggle simulation, and observe cell generations based on the rules of the game.

Modules and Libraries:

- pygame: Used for rendering graphics and handling events.
- sys: For system exit functionality.

Configuration Constants:

- CELL_SIZE, GRID_WIDTH, GRID_HEIGHT: Define the dimensions of each cell and the entire grid.
- SCREEN_WIDTH, SCREEN_HEIGHT: Screen dimensions derived from cell and grid sizes.
- FPS: Controls the update rate of the simulation.

Color Definitions:

Color constants such as BLACK, GRAY, YELLOW, etc., are used to customize the appearance of cells and interface elements.

Functions:

1. create_grid():
   - Initializes the grid as a 2D list filled with False (dead cells).

2. draw_grid(screen, grid, chosen_color, active):

- Draws the grid on the screen, filling alive cells with the chosen color.

- Applies a different background color based on simulation state.

3. count_neighbors(grid, x, y):

- Counts the number of alive neighbors around the cell at (x, y).

4. next_generation(grid):

- Applies Conway's rules to generate the next state of the grid.

5. draw_menu(screen, font):

- Displays the main menu with color selection and play button.

- Also loads and displays an instructions image.

Main Function - main():

- Initializes Pygame, creates the grid and GUI elements.

- Manages simulation state, user input, and screen updates.

- Allows users to select cell colors, start the simulation, and manually toggle cells.

Controls:

- Mouse Click: Toggle cells on/off.

- Spacebar: Start/stop simulation.

- 'C': Clear the grid.

- 'X': Advance one generation.