COMSATS University Islamabad, Sahiwal Campus.

Assignment No 04

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Subject: OOP

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Calculator Class Structure and Explanation

Class Overview

The GUICalculator class contains the following components:

- Attributes: These store GUI components, colors, fonts, and variables used for calculations (e.g., `num1`, `operator`).
- Methods: These handle the creation of the GUI, button interactions, and history management.

Key Components and Their Interaction

- Main Frame (JFrame): The main window of the application that contains the display field and buttons. It has a black background matching the dark theme.
- Display Field (JTextField): This field shows the current input or result. It is located at the top of the frame. Users cannot type into it; it updates based on button clicks.
- Button Panel (JPanel): A grid layout (5x4) containing all calculator buttons. It manages numeric, operator, and special function buttons.
- Buttons (JButton): Each button represents a function like numbers (0-9), operators (+, -, *, /, =), clear (C), and history. Buttons have unique colors and styles based on their type.
- History Frame (JFrame): A secondary window that displays the calculation history stored in a file. It also includes a 'Clear History' button to delete all history.

Interaction Flow

- Calculator Functionality: When a button is clicked, it updates the display or performs operations based on the button's purpose. For example, number buttons add digits, and operator buttons store the operation.
- History Management: After each calculation, the result is saved in a file named 'history.txt'. Users can view this history by clicking the 'History' button.
- History Frame: When opened, it loads the saved history into a text area. The 'Clear History' button deletes the file content and updates the history display.

Design Considerations

- Color Scheme: The calculator uses a classy black-and-dark-red theme for a modern look and better readability.
- Modularity: Each part of the calculator (display, buttons, history) is built using separate methods, making the code easier to understand and maintain.

- User Experience: The design ensures an intuitive layout and smooth interactions. Users can easily view and manage their calculation history.

How GUI Components Interact
- Button clicks trigger actions (e.g., updating the display, performing operations).
- The 'History' button opens a new frame that shows calculations stored in the file.
- The 'Clear History' button deletes all saved calculations and refreshes the history display.