Project Title: Scientific Calculator using Python (Tkinter)

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Objective

The main objective of this project is to develop a **Scientific Calculator** using Python's Tkinter library that performs both **basic arithmetic operations** and **advanced mathematical functions** such as trigonometric, logarithmic, and exponential calculations.

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1. **Technologies Used**

- **Python 3.11+**
- **Tkinter Library (GUI)**
- **Math Library (Scientific Calculations)**

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3. **Description**

This project is a graphical calculator application built with Python Tkinter. It provides a modern dark-themed user interface with buttons for all basic and advanced functions. It also includes mathematical constants like π and e.
The calculator safely evaluates mathematical expressions without exposing system-level access through eval().

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4. **Features**

- User-friendly dark interface
- Handles trigonometric, logarithmic, and square root calculations
- Includes mathematical constants π and e
- Error handling for invalid inputs
- Secure and lightweight execution
- Supports both scientific and arithmetic operations

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5. **Working Mechanism**

1. User clicks number or operator buttons.
2. Expression is stored in a global string variable.
3. On pressing “=”, the expression is evaluated securely.
4. Result is displayed in the entry field.
5. Error messages appear for invalid inputs.

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6. **GUI Layout**

- Top display area (Entry widget) shows user input and results.
- Below that, buttons are arranged in a **6×6 grid layout**.
- Each row contains buttons of equal size for a balanced design.
- The last row contains π and e constants, perfectly aligned.

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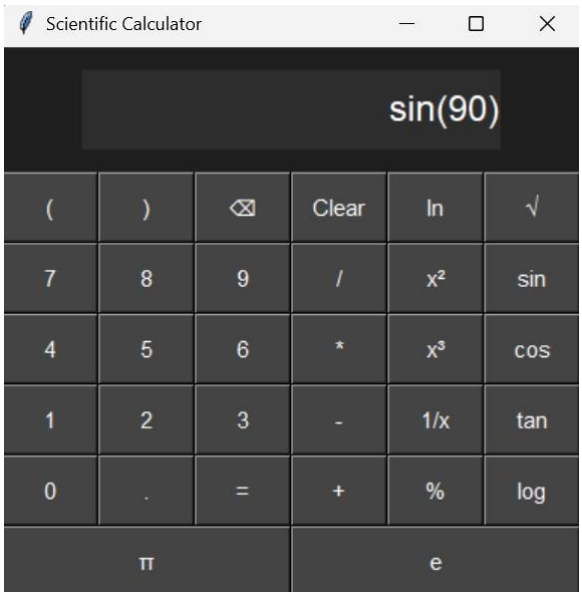
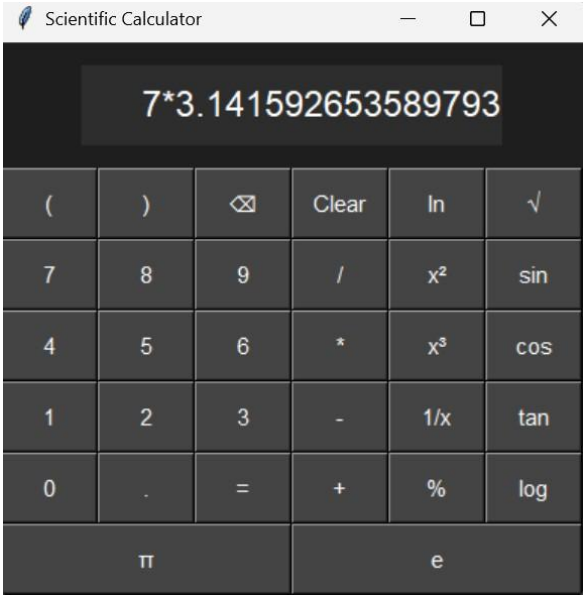
7. **Screenshots (Add your screenshots here)**

- Screenshot 1: Calculator Interface
- Screenshot 2: Performing sin(90) operation
- Screenshot 3: Using π and e





8. **Conclusion**

The Scientific Calculator successfully performs both basic and complex mathematical operations with an interactive GUI. It demonstrates efficient use of Python libraries and event-driven programming concepts.

This project helped in understanding GUI design, function-based programming, and data handling in Python.