Batch 2 – Module 1 (Project 2)

Elementary and Intermediate Algebra Simulator

Features

1. **Basic Operations Calculator**: Input algebraic expressions and see simplified results.
2. **Equation Solver**: Input equations and obtain solutions, visualizing steps.
3. **Graphical Representation**: Visualize functions, inequalities, and relations.

Algorithm

Step 1: Start

- Display a menu with options:
    1. Simplify Expression
    2. Solve Equation
    3. Graph Function
    4. Exit

Step 2: User Choice

- If **Simplify Expression**:
    o Take input expression.
    o Parse the expression.
    o Simplify using algebraic rules.
    o Display simplified result.
- If **Solve Equation**:
    o Take equation as input.
    o Parse left-hand side and right-hand side.
    o Solve for variable(s).
    o Show step-by-step solutions.
- If **Graph Function**:
    o Take function input.
    o Define range (e.g., -10 to 10).
    o Plot graph using matplotlib.
    o Display the function visually.
- If **Exit**:
    o End the program.

Step 3: Repeat

- Keep looping until user exits.

Pseudocode

```
FUNCTION main():
    LOOP:
        DISPLAY menu options
        GET user_choice
        IF user_choice == 1:
            INPUT expression
            PARSE expression
            SIMPLIFY expression
            DISPLAY simplified result
        ELSE IF user_choice == 2:
            INPUT equation
            SPLIT equation into LHS and RHS
            SOLVE for variable(s)
            DISPLAY solution with steps
        ELSE IF user_choice == 3:
            INPUT function
            DEFINE range for x
            COMPUTE y values
            PLOT graph
        ELSE IF user_choice == 0:
            EXIT program
```