**AI -lab-1**

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**Task: Dynamic calculator**

**Explanation of the code:**

1. **Main Function (main)**
   * This is where the program starts.
   * It shows a welcome message and a sample expression.
   * It runs a loop that keeps asking the user for input until they type "quit".
   * For each input, it calls the calculate() function and prints the result.
2. **Calculate Function (calculate)**
   * First, it removes all spaces from the input so it’s easier to process.
   * Then it converts the expression into a list of tokens (numbers, operators like +, -, \*, /, and parentheses).
   * Example:  
     Input: "1 + (2 \* 3)"  
     Tokens: [1.0, '+', '(', 2.0, '\*', 3.0, ')']
   * After tokenizing, it sends the tokens to the parse function to compute the result.
3. **Parsing with Correct Order (Math Rules)**The program uses three levels of parsing to follow math rules:
   * parse\_expr() → Handles addition (+) and subtraction (-)
   * parse\_term() → Handles multiplication (\*) and division (/)
   * parse\_factor() → Handles numbers and parentheses ( )

This ensures that:

* + \* and / are done before + and -
  + Anything inside ( ) is calculated first

1. **Handling Special Cases**
   * If the user types a negative number like -5, the code handles it correctly.
   * If there's a division by zero (like 5 / 0), it shows an error: *"Cannot divide by zero"*.
   * If parentheses are missing or there's an invalid symbol, it shows a clear error.

It follows the rules of mathematics such as:

* Operator precedence (e.g., multiplication and division come before addition and subtraction)
* Parentheses first (solve inside brackets first)
* Left-to-right evaluation for same-level operators

**Screenshoot:**

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