Entrance Test Assignment

Test Overview

This entrance test evaluates your basic Java programming skills and problem-solving abilities. Successful completion of this assignment is required for admission to the Gehtsoft Training Program.

Implementation Task

You need to implement two console applications that provides two main functionalities:

1. Caesar Cipher encryption/decryption
2. Arithmetic expression evaluator

Part 1: Caesar Cipher Implementation

- Accept text input in Russian and English languages from console
- Accept text input in Russian and English languages from a file
- Accept a shift value (integer)
- Encrypt plaintext using Caesar cipher algorithm
- Decrypt ciphertext back to plaintext, with and **without** receiving a shift value

Encryption Requirements:

- Support both Cyrillic (Russian) and Latin (English) alphabets
- Preserve case (uppercase/lowercase)
- Non-alphabetic characters (spaces, punctuation, numbers) should remain unchanged
- Handle wrap-around (e.g., with shift 3: 'z' becomes 'c', 'я' becomes 'в')
- Support both positive and negative shift values

Input/Output Format:

```
Encryption mode:
Input: "Hello World", shift: 3
Output: "Khoor Zruog"

Input: "Привет Мир", shift: 5
Output: "Хумёзй Рну"

Decryption mode:
Input: "Khoor Zruog", shift: 3
Output: "Hello World"
```

Part 2: Arithmetic Expression Evaluator

Functionality:

- Parse and evaluate arithmetic expressions
- Support basic operations: addition (+), subtraction (-), multiplication (*), division (/)
- Support parentheses for operation precedence
- Return the calculated result

Requirements:

- Follow standard mathematical order of operations (PEMDAS/BODMAS)
- Handle nested parentheses
- Support decimal numbers
- Handle division by zero appropriately
- Support negative numbers

Input/Output Format:

```
Input: "2 + 3 * 4"
Output: 14

Input: "(10 + 5) / 3"
Output: 5

Input: "2 * (3 + 4) - 1"
Output: 13

Input: "-5 + 3"
Output: -2
```

Technical Requirements

1. **Language:** Java (any version 8+)
2. **Application Type:** Console application
3. **Architecture:** Clean, modular code with separate classes for each functionality
4. **Error Handling:** Proper exception handling for invalid inputs
5. **User Interface:** Simple console menu to choose between operations

Sample Application Flow

```
Welcome to Gehtsoft Technical Assessment
Please choose an option:
1. Caesar Cipher Encryption
2. Caesar Cipher Decryption
3. Arithmetic Expression Evaluation
```

```
4. Exit

Enter your choice: 1
Enter text to encrypt: Hello World
Enter shift value: 3
Result: Khoor Zruog

Continue? (y/n):
```

Evaluation Criteria

This assignment helps us assess:

- Basic Java programming skills
- Problem-solving approach
- Code organization and readability
- Understanding of fundamental algorithms
- Ability to follow instructions

Important Notes

- This is an individual assignment
- Use only standard Java libraries
- Focus on correctness and clarity over optimization
- Don't hesitate to add comments explaining your logic

Next Steps

After submitting your solution:

1. We'll review your code within 3-5 business days
2. Successful candidates will be contacted for the next steps
3. You'll receive feedback regardless of the outcome

Good luck with your entrance test!

Submission Requirements

1. **GitHub Repository:**
    - Create a public GitHub repository for your solution
    - Include all source code files
    - Add a clear README.md file with:
        - Project description
        - How to compile and run the application
        - Your approach and any assumptions made

        - Examples of usage
2. **Submission Method:**
    - Send the GitHub repository link to: training@gehtsoft.com
    - Subject: "Entrance Test - [Your Full Name]"
    - Include your full name and contact information in the email