Rational Number Calculator – Part 1

Description

Accept from a user an arithmetic expression containing fractions or an exit command. Each operand shall be in the form of i/j, where i and j are integers (e.g., -11/52). The output shall have this same format. Valid operators are +, -, *, and /. Reject invalid expressions; output an error message for each invalid expression that is input. An invalid expression contains an invalid operator or is missing any portion of the arithmetic expression (such as an operator, a numerator, a denominator, or a slash). Loop until the user specifies to quit. Terminate the program when the user inputs "quit". Otherwise, perform the specified operation and output the result as a fully reduced fraction (e.g., 4/1).

Your solution shall include two classes using separate definition and implementation files (hpp and cpp). Name one Expression and the other Fraction. An Expression object shall contain one operator and two operands. Each Fraction object shall contain exactly one fraction composed of a numerator and a denominator.

Use new and delete to manage your objects. Using new, instantiate each object just before you need it. Destroy each object using delete immediately after results are output.

Do NOT use friends.

Output

```
Enter an arithmetic expression using fractions
      (such as 1/2+3/4) or quit
   Input: 11/52+30/104
   1/2
   Input: 3/4*4/3
   1/1
   Input: 7/11+0/3
   7/11
   Input: 17/-5/-17/-5
   -1/1
   Input: 7/3-36/-12
   16/3
   Input: 5/8/0/3
   Error: cannot divide by zero
   Input: Quit
```