APS 105 — Computer Fundamentals

Laboratory 2

Winter, 2001

To be submitted by noon on Tuesday, February 13

Objective

In this lab, you are required to use selection constructs together with a simple loop.

The Problem

Write a program in a class called `Fractions` that repeatedly prompts the user to supply a single character representing an operation followed by four integers representing two fractions. The operator can be any of `+` (addition), `-` (subtraction), `*` (multiplication), or `/` (division). For example, input of

```
+
1
3
-19
-8
```

should be interpreted as a request to evaluate

$$\frac{1}{3} + \frac{-19}{-8}$$

For each expression read, the program should print the input, perform the indicated operation, and print the result in standard form as indicated by the examples below. (The input in each example is shown on one line for convenience.)

Example 1

Input: `+ 1 3 -19 -8`
Output: `1/3 + -19/-8 = 2 and 17/24`

Example 2

Input: `* 2 -5 7 3`
Output: `2/-5 * 7/3 = -14/15`

Example 3

Input: `- 5 2 -1 -2`
Output: `5/2 - -1/-2 = 2`

Example 4

Input: `/ -17 3 5 3`
Output: `-17/3 / 5/3 = -3 and 6/15`

Notice that

- Fractional results with numerators larger than denominators are written as mixed fractions.
- Results in which the numerator is a multiple of the denominator are written as integers.
- Denominators of fractional results are always written as positive numbers.
- Negative mixed number results only have the negative sign associated with the integer part.
- Fractional results are *not* reduced to lowest terms.

The program should continue to request and process expressions until the user supplies an operation code of `!` (an exclamation mark). At that point, the program should terminate.

The program should reject any expression that has an invalid operator and any expression for which the result would be a fraction whose denominator is zero. In such cases, the program should print an error message before going on to process the next expression.

What to Submit

Submit your `Fractions.java` and `Stdin.java` files using the command

```
computer.ecf% submitaps105f 1 Fractions.java Stdin.java
```