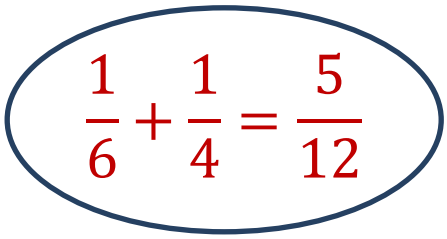
Problem Set 4 Exercise #19: Fraction



Reference: Week 11 notes

Learning objective: Structures

Estimated completion time: 60 minutes

Problem statement:

[Modified from CS1020 assignment]

Write **fraction.c** to

(1) Create a **`fraction_t`** structure type that contains 2 integer members: **`numerator`** and **`denominator`**.

(2) (in the main function) read in values of two **`fraction_t`** variables one by one. You may assume that **`denominator`** is always positive.

(3) write a function **`simplify()`** that returns the simplified form of a **`fraction_t`** variable. For example, the simplified form of $\frac{9}{12}$ is $\frac{3}{4}$.

(4) write a function **`equals()`** that takes two **`fraction_t`** variables, checks whether they have the same value. This function returns 1 if so or 0 otherwise.

(5) write a function **`add()`** that takes two **`fraction_t`** variables, adds them and returns the result in the simplified form.

You may want to calculate the greatest common divisor (GCD) when simplifying a fraction.

Sample run #1:

```
Enter 1st fraction: 2 20
Enter 2nd fraction: 3 30
1st fraction is 2/20
2nd fraction is 3/30
Two fractions are the same.
2/20 + 3/30 = 1/5
```

Sample run #2:

```
Enter 1st fraction: 0 8
Enter 2nd fraction: 6 14
1st fraction is 0/8
2nd fraction is 6/14
Two fractions are not the same.
0/8 + 6/14 = 3/7
```

Sample run #3:

```
Enter 1st fraction: 1 10
Enter 2nd fraction: -5 10
1st fraction is 1/10
2nd fraction is -5/10
Two fractions are not the same.
1/10 + -5/10 = -2/5
```

Sample run #4:

```
Enter 1st fraction: -2 5
Enter 2nd fraction: 14 6
1st fraction is -2/5
2nd fraction is 14/6
Two fractions are not the same.
-2/5 + 14/6 = 29/15
```