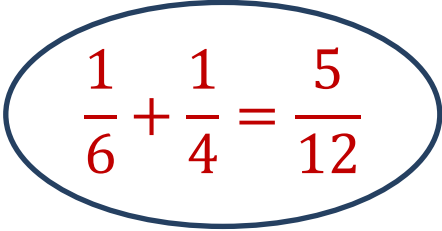


Problem Set 4 Exercise #19: Fraction

Reference: Week 11 notes

Learning objective: Structures

Estimated completion time: 60 minutes


$$\frac{1}{6} + \frac{1}{4} = \frac{5}{12}$$

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
```