Homework #1

Released: 01-09-2018
Due: 01-18-2018 11:59pm

Getting started

Use the ZIP file on the course web site..

Solving a Two-Variable System of Equations

Write a program that reads the coefficients a, b, ..., f of the following system of equations, solves for x and y and prints the solution to the terminal. It is guaranteed that all coefficients will be integers and the given system of equations has exactly **one** set of **integral** solution. (So $ae - db \neq 0$.)

$$ax + by = c \tag{1}$$

$$dx + ey = f \tag{2}$$

For your reference, here is one way to solve these equations. We will derive a formula for x and y in terms of the coefficients $a, b, \ldots, f$. Let's assume $a \neq 0$. We divide (1) by a and move $(b/a)y$ to the right to obtain

$$x = -(b/a)y + c/a. \tag{3}$$

Substituting $-(b/a)y + c/a$ for x in (2), we have

$$-d(b/a)y + d(c/a) + ey = f \tag{4}$$

which further simplifies to

$$\frac{ae - db}{a} y = \frac{af - dc}{a}.$$

Thus we arrive at a formula for y provided that $ae - db \neq 0$.

$$y = \frac{af - dc}{ae - db} \tag{5}$$

Substitute (5) back into (3), we see that

$$x = -\frac{b}{a} \cdot \frac{af - dc}{ae - db} + \frac{c}{a} = \frac{ce - fb}{ae - db} \tag{6}$$

We can verify that (5) and (6) satisfies both (1) and (2) provided $ae - db \neq 0$, regardless of whether $a \neq 0$ or not. We have thus obtained a formula for x and y.

Input Format

The input has one line containing six integers $a, b, \ldots, f$.

We guarantee that $-10000 \leq a, b, c, d, e, f \leq 10000$.

Output Format

Print two lines to the terminal. The first line is x and the second line is y.

We guarantee that $-10000 \leq x, y \leq 10000$.

Examples

 # 1

When given the input

```
1 1 5 1 2 3
```

Your program should print

```
7
-2
```

 # 2

When given the input

```
1 0 10000 0 1 -10000
```

Your program should print

```
10000
-10000
```

Submission

Submit `syseqs.cpp` on GSC.