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 \( a, b, \ldots, f \) 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 \( ae - db \neq 0 \).)

\[
\begin{align*}
ax + by &= c \\
dx + ey &= f
\end{align*}
\]

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

\[
x = -(b/a)y + c/a.
\]

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

\[
-d(b/a)y + d(c/a) + ey = f
\]

which further simplifies to

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

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

\[
y = \frac{af - dc}{ae - db}
\]

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

\[
x = -\frac{b}{a} \cdot \frac{af - dc}{ae - db} + \frac{c}{a} = \frac{ce - fb}{ae - db}
\]

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.