

Swap Game

Time: 10 sec / Memory: 2GB MB

Problem Statement

You are given a 3×3 grid containing the numbers $1, 2, \dots, 9$. Your task is to perform a sequence of moves so that the grid will look like this:

1 2 3

4 5 6

7 8 9

On each move, you can swap the numbers in any two adjacent squares (horizontally or vertically). What is the minimum number of moves required?

Input

The input has three lines, and each of them has three integers.

Output

Print one integer: the minimum number of moves.

Example

Input:

2 1 3

7 5 9

8 4 6

Output:

4