8 Simplest sudoku
4 points

Introduction

A sudoku is a japanese puzzle in which players insert the numbers 1 to 9 into a grid, consisting of nine squares, which are further subdivided into nine smaller squares, in such a way that every number appears once in each horizontal line, vertical line, and square.

To make things easier, we are going to play with one of the nine smaller squares. We would like you to develop a simple program, that checks that the smaller square has all the numbers from 1 to 9 only once. In case that the square has repeated numbers, we would like to know which are the ones that are missing.

Input

The input will be always three lines. Each line containing three numbers from 1 to 9 separated by white spaces.

Output

The output will print a single line when the square is valid:

`This is a valid sudoku`

Otherwise the output will print a different single line followed by a variable number of lines containing the missing numbers (one number per line) ordered:

`This is an invalid sudoku. Missing numbers are:`

Example 1

Input

1 2 3

4 5 6

7 8 9

Output

This is a valid sudoku

Example 2

Input

1 1 2

3 4 5

5 6 7

Output

This is an invalid sudoku. Missing numbers are:

8

9