Instructions

Following are a umber of programming problems. We ask that you read all problem descriptions thoroughly then create a program to solve *ONE* of the problems.

You may craft your solution using your language of choice. Include with your submission a description of the language(s) and tools used. Indicate why you made the selections and let us know anything you think is significant about your solution.

You have three days to work on your selected problem. The three days begin the moment we send you the problem descriptions. If you need an extension, please let us know right away.

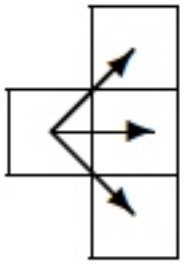
Introduction to the Problems

All problems require some kind of input. You are free to implement any mechanism for feeding input into your solution (for example, using hard coded data within a unit test). You should provide sufficient evidence that your solution is complete by, as a minimum, indicating that it works correctly against the supplied test data.

Path of Least Resistance

The Challenge

Water flows through the path of least resistance. For this challenge, you are provided a grid of integers where each integer represents the amount of resistance encountered at a given point on the grid. Water enters the grid from the left (at any point) and passes through the grid to the right, moving only one column per round. Movement is always to an adjacent row; meaning water can flow horizontally or diagonally. For the sake of this challenge, we assume the first and last row are also adjacent. Effectively, the grid "wraps".



The total resistance of a path is the sum of the integers in each of the visited cells. The solution needs to handle grids of various sizes with a minimum of 1 row and 5 columns up to 10 rows and 100 columns. If in the next move, the total resistance will exceed 50, the water cannot continue.

Programming Challenges

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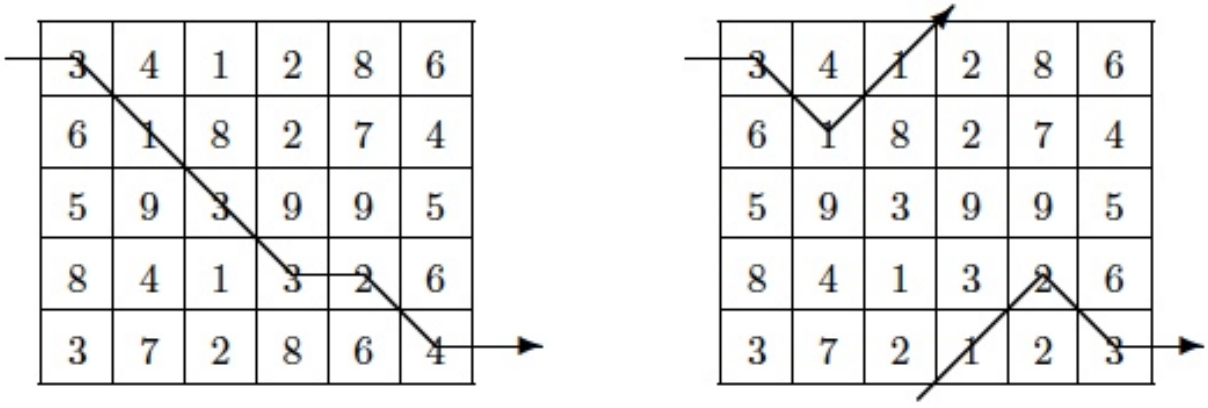
Challenge 01

Path of Least Resistance

The minimum paths through two slightly different 5 x 6 grids are shown below. The grid values differ only in the bottom row. The path for the grid on the right takes advantage of the adjacency between the first and last rows.



Input

The input consists of a sequence of row specifications. Each row is represented by a series of delimited integers on a single line. Note: integers are not restricted to being positive.

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Challenge 01

Path of Least Resistance

Output

Three lines should be output for each matrix specification. The first line is either yes or no to indicate the water made it all the way through the grid. The second line is the total resistance. The third line shows the path taken as a sequence of n delimited integers, each representing the rows traversed in turn. If there is more than one path of least resistance, only one path need be shown in the solution.

Examples

Example	Input	Output
One	3 4 1 2 8 6 6 1 8 2 7 4 5 9 3 9 9 5 8 4 1 3 2 6 3 7 2 8 6 4	Yes 16 1 2 3 4 4 5
Two	3 4 1 2 8 6 6 1 8 2 7 4 5 9 3 9 9 5 8 4 1 3 2 6 3 7 2 1 2 3	Yes 11 1 2 1 5 4 5

Path of Least Resistance

Example	Input	Output
Three	19 10 19 10 19 21 23 20 19 12 20 12 20 11 10	No 48 1 1 1

Color Combination

The Challenge

You recently had a state of the art security system installed in your home. The master control panel requires a series of bi-colored chips to be placed end to end in a specific sequence in order to gain access. The security provider split up the chips and gave a random number to each of your family members. All of you must convene in order to assemble the chips and create the correct color combination.

The access panel has a channel for the security chips. On each end of the channel is a colored marker. Chips are placed end to end such that the adjacent colors match and the starting and ending chips are color matched to the corresponding markers.

Write a program to see if the family has all the chips necessary to unlock the master control panel.

Input

The input consists of a single line indicating the beginning and ending marker colors followed by a series of chip definitions. All lines consist of a pair of color indicators; you may use integers, strings, or characters to represent each color. For our example purposes, we will use strings.

Challenge 02

Color Combination

Output

If the combination cannot be achieved by using all of the chips once and only once, then report "Cannot unlock master panel". If the combination can be achieved, then print the chips in the order required to unlock the master control.

Examples

Example	Input	Output
One	blue, green blue, yellow red, orange red, green yellow, red orange, purple	Cannot unlock master panel

Programming Challenges

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Challenge 02

Color Combination

Example	Input	Output
Two	blue, green blue, yellow red, orange red, green yellow, red orange, red	blue, yellow yellow, red red, orange orange, red red, green
Three	blue, green blue, green blue, yellow green, yellow orange, red red, green red, orange yellow, blue yellow, red	blue, yellow yellow, red red, orange orange, red red, green green, yellow yellow, blue blue, green

Color Combination

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