Sorting

Introduction

A number of mathematicians participate as a group in a mathematics competition. There are n mathematicians and n problems. The idea is that each mathematician solves exactly one problem.

However, not every problem can be solved by every mathematician. Every problem o has a difficulty level m_o and every mathematician w has a cleverness level s_w . A mathematician can only solve a problem if he is at least as smart as the difficulty level.

In addition, every mathematician also has an ego: a mathematician does not want to solve problems that are easier than half his smartness.

Assignment Description

Write a function that given two lists of integers returns whether it is possible for each mathematician to solve exactly one problem. The first list contains the difficulty levels of the problems (m_o) , and the second list contains the intelligence levels of the mathematicians (s_w) .

The output is the boolean value **True** if it is possible to divide the problems in such a way that each mathematician has a problem that he can and wants to solve, otherwise the output is **False**. You can assume that the input lists are of equal length.

Input-Output specification

The input is comprised of two lists of integers with each list separated by a space and each element in a list by a comma. Example: "[1,2,4,3] [4,2,8,3]"

Example

Input 1	Input 2	Output
[1,2,4,3]	[4,2,8,3]	True
[16, 15, 14, 13, 12, 11, 10]	$[30,\!25,\!20,\!25,\!30,\!25,\!20]$	False

Further Reading

Wikipedia sorting algorithms: MergeSort, HeapSort, QuickSort and we can't forget about Bogosort

Notes

You are **NOT** allowed to use the built-in function **sort()**. So if you would like the list to be sorted you will have to write a sorting algorithm yourself. Keep in mind that your program will be tested for performance (So your algorithm must have a time complexity of $O(n \log n)$ at most)

Hint

You can show that if a solution exists, that there also exists a solution in which the hardest problem is given to the best mathematician. (Prove this on paper)