Q12. Partitioning Rectangular Block (60 Marks):

As illustrated in Figure Q12(a), a major rectangular block is composed of $N \times 2$ cells, and each cell contains an integer, $a_{i,j}$, where $1 \leq i \leq N$ and $1 \leq j \leq 2$.

$a_{1,1}$	$a_{1,2}$
$a_{2,1}$	$a_{2,2}$
...	...
...	...
$a_{N,1}$	$a_{N,2}$

Figure Q12(a): A major rectangular block composed of $N \times 2$ cells

The major rectangular block can be divided into a number of disjoint rectangular subblocks, as shown in Figure Q12(b). Note that each subblock must be composed of an integer number of cells and any two subblocks must not share the same cell. In this example, the major rectangular block is divided into four rectangular subblocks, which contains one, two, three, and four cells, respectively.

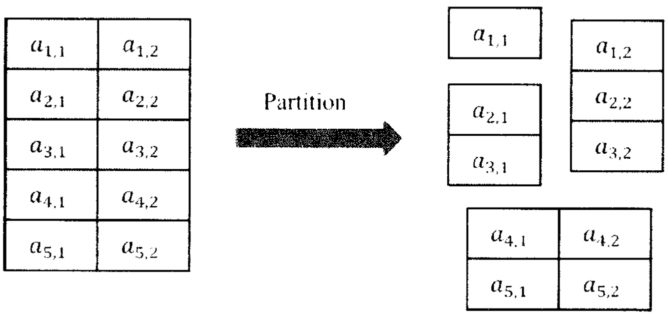
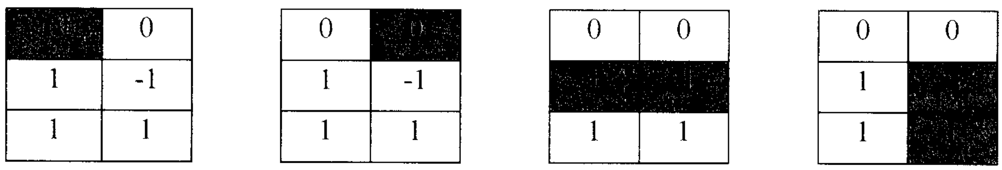


Figure Q12(b): Dividing a major rectangular block

The value of a rectangular subblock is equal to the sum of the integer(s) inside its cell(s). If a subblock has a value of 0, then it is called a **zero-subblock**. You are required to find out the maximum number of disjoint zero-subblocks that can be partitioned from a rectangular block. For example, if $N = 3$, consider the following sample input

0	0
1	-1
1	1

There are four possible subblocks which has a value of 0.



However, **NOT** all the above zero-subblocks can be simultaneously obtained because some of them are not disjoint. So, the maximum number of disjoint zero-subblocks is 3 for this major rectangular block.

Write a programme to

Input, in sequence,

1. A positive integer, N, where $1 \leq N \leq 10000$, to indicate the number of rows in the major rectangular block.
2. Then N lines of data; for each line i, two integers, $a_{i,1}$ and $a_{i,2}$, are given; note that $a_{i,j}$ indicates the value of the cell in the i-th row and j-th column of the major rectangular block, where $-10^9 \leq a_{i,j} \leq 10^9$ for $1 \leq i \leq N$, $1 \leq j \leq 2$.

Output the maximum number of disjoint zero-subblocks that can be partitioned from the major rectangular block.

试题 12. 分割矩形块（60 分）：

如图 Q12(a)所示，一个主矩形块是由 $N \times 2$ 个单元格所组成。其中每个单元格包含了一个整数，$a_{i,j}$，已知 $1 \le i \le N$ 和 $1 \le j \le 2$。

$a_{1,1}$	$a_{1,2}$
$a_{2,1}$	$a_{2,2}$
…	…
…	…
$a_{N,1}$	$a_{N,2}$

图 Q12(a): 由 $N \times 2$ 个单元格所组成的主矩形块

如图 Q12(b) 所示，此矩形块可被分割成多个分离的子矩形块。请注意，每个子块必须由整数个单元格组成，同时两个子块之间不得共享同一单元格。在这个例子中，主矩形块被分割成四个子矩形块，这些子块分别包含了一个、两个、三个以及四个单元格。

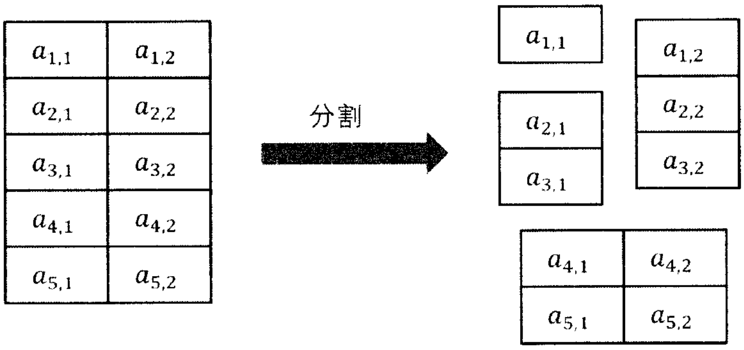


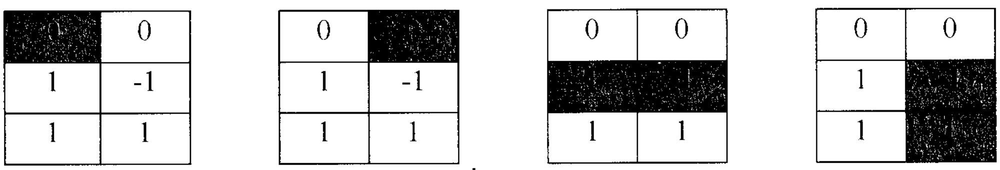
图 Q12(b): 分割一个主矩形块

假设子矩形块的值等于其所包含单元格内的整数之和，同时若此和为 0，我们则称该子块为**零-子块**。给定一个主矩形块，找出可以从中分割出来、最大数量的零-子块。

例如：假设 $N = 3$，考虑以下范例

0	0
1	-1
1	1

其中有四个可能的零-子块，如下所示。



然而，并非所有的零-子块都可以被同时分割出来，因为当中有些零-子块是共享同一单元格的。因此，从这个主矩形块中可以被分割出来的零-子块的最大数量为 3。

<u>试写一程式以</u>

依序输入

(1) 一个正整数 N，以表示主矩形块的行数，同时已知 N 满足条件 $1 \le N \le 10000$。

(2) 接着，N 行的数据；其中第 i 行的数据包含了两个整数，$a_{i,1}$ 和 $a_{i,2}$；且已知在 $1 \le i \le N$，$1 \le j \le 2$，的范围内，$-10^9 \le a_{i,j} \le 10^9$，而 $a_{i,j}$ 表示了主矩形块里、第 i 行和第 j 列的单元格的值。

输出 可以从这主矩形块中分割出来、不相交的零-子块的最大数量。

Example (例子)

Input (输入)	Output (输出)
3 0 0 1 0 0 -1	4
8 65 90 -35 90 -30 90 30 90 -30 90 45 -45 25 55 25 -55	4
4 500000000 499999999 499999999 -500000000 -500000000 -499999998 499999998 -499999999	1
10 1 2 3 4 5 6 7 8 9 10 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1	2
12 6 36 12 -24 -12 -18 24 18 -6 -36 48 -48 30 -6 12 -6 -24 -6 0 30 -12 0 0 12	7

4 -2 -3 1 4 -1 5 -2 -2	2