7670 Asa's Chess Problem

Asa comes up with a chess problem.

There are $N \times N$ chesses on a board with $N \times N$ grids, one chess in one grid.

Some chesses are black while others are white.

The $N \times N$ grids are divided into $(N \times N)/2$ pairs (N is even), and each grid only belongs to one pair.

The two grids of a pair are in the same row or the same column.

We can swap the chesses in a pair of grids.

Suppose the number of black chesses in row i is $R[i]$, and the number of black chesses in column j is $C[j]$.

The problem is whether there is a solution satisfy that $Rl[i] \le R[i] \le Rh[i]$ and $Cl[j] \le C[j] \le Ch[j]$. $Rl[i]$, $Rh[i]$, $Cl[j]$ and $Ch[j]$ are constant integers.

Please calculate the minimum number of swaps Asa needed to make the chess board satisfy the restriction.

Input

There are no more than 100 test cases.

For each test case, the first line is an integer N ($2 \le N \le 50$), indicating the size of the board.

Then an $N \times N$ matrix filled with '0' and '1' follows.

'0' represents a white chess, and '1' represents a black chess.

In the next N lines, the i-th line contains two integers $Rl[i]$ and $Rh[i]$.

In the next N lines, the i-th line contains two integers $Cl[i]$ and $Ch[i]$.

($0 \le Rl[i] \le Rh[i] \le N$; $0 \le Cl[i] \le Ch[i] \le N$)

Then $N \times N/2$ lines follow. Each line contains four integers x_1, y_1, x_2 and y_2, indicating that (x_1, y_1) and (x_2, y_2) make a pair.

(x, y) means the grid at row x, column y. ($1 \le x_1, y_1, x_2, y_2 \le N$)

Output

For each test case:

If there is a solution, output one line containing an integer indicating the minimum number of swaps needed.

Otherwise output '-1'.

Sample Input

```
2
0 0
1 1
2 2
0 1
0 2
0 2
1 1 2 1
1 2 2 2
```

```
4
0 0 1 1
0 0 1 1
1 1 0 0
1 1 0 0
2 2
1 3
1 3
2 2
0 1
3 4
0 1
3 4
1 1 1 3
1 2 1 4
2 1 2 3
2 2 2 4
3 1 3 4
3 2 3 3
4 1 4 4
4 2 4 3
```

Sample Output

```
2
4
```