## Problem G

Mosaic Browsing

## Time limit: 6 seconds

The International Center for the Preservation of Ceramics (ICPC) is searching for motifs in some ancient mosaics. According to the ICPC's definition, a mosaic is a rectangular grid where each grid square contains a colored tile. A motif is similar to a mosaic but some of the grid squares can be empty. Figure G. 1 shows an example motif and mosaic.

The rows of an $r_{q} \times c_{q}$ mosaic are numbered 1 to $r_{q}$ from top to bottom, and the columns are numbered 1 to $c_{q}$ from left to right.

A contiguous rectangular subgrid of the mosaic matches the motif if every tile of the motif matches the color of the corresponding tile of the subgrid. Formally, an $r_{p} \times c_{p}$ motif appears in an $r_{q} \times c_{q}$ mosaic at position $(r, c)$ if for all $1 \leq i \leq r_{p}, 1 \leq j \leq c_{p}$, the tile $(r+i-1, c+j-1)$ exists in the mosaic and either the square $(i, j)$ in the motif is empty or the tile at $(i, j)$ in the motif has the same color as the tile at $(r+i-1, c+j-1)$ in the mosaic.

Given the full motif and mosaic, find all occurrences of the motif in the mosaic.


Figure G.1: Motif (left) and mosaic (right) of Sample Input 1.

## Input

The first line of input contains two integers $r_{p}$ and $c_{p}$, where $r_{p}$ and $c_{p}\left(1 \leq r_{p}, c_{p} \leq 1000\right)$ are the number of rows and columns in the motif. Then $r_{p}$ lines follow, each with $c_{p}$ integers in the range $[0,100]$, denoting the color of the motif at that position. A value of 0 denotes an empty square.

The next line of input contains two integers $r_{q}$ and $c_{q}$ where $r_{q}$ and $c_{q}\left(1 \leq r_{q}, c_{q} \leq 1000\right)$ are the number of rows and columns in the mosaic. Then $r_{q}$ lines follow, each with $c_{q}$ integers in the range $[1,100]$, denoting the color of the mosaic at that position.

## Output

On the first line, output $k$, the total number of matches. Then output $k$ lines, each of the form $r c$ where $r$ is the row and $c$ is the column of the top left tile of the match. Sort matches by increasing $r$, breaking ties by increasing $c$.

| Sample Input 1 | Sample Output 1 |
| :---: | :---: |
| 22 | 3 |
| 10 | 11 |
| 01 | 13 |
| 34 | 22 |
| $\begin{array}{llll}1 & 2 & 1 & 2\end{array}$ |  |
| $\begin{array}{llll}2 & 1 & 1 & 1\end{array}$ |  |
| $\begin{array}{llll}2 & 2 & 1 & 3\end{array}$ |  |

