

238 Jill's Bike

Jill Bates hates climbing hills. Jill rides a bicycle everywhere she goes, but she always wants to go the easiest and shortest way possible. The good news is that she lives in Greenhills, which has all its roads laid out in a strictly rectangular grid – east-west roads are *streets*; north-south roads are *avenues* and the distance between any two adjacent grid points is the same. The bad news is that Greenhills is very hilly and has many one-way roads.

In choosing a route between where she starts and where she ends, Jill has three rules:

1. Avoid any climb of more than 10 meters between adjacent grid points.
2. Never go the wrong way on a one-way road.
3. Always travel the shortest possible route.

Your program should help Jill find an acceptable route.

Input

The input file contains data in the following form:

- The first line contains two integers, separated by one or more spaces. The first integer n represents the number of streets, and the second integer m represents the number of avenues, $1 \leq n \leq 20$, $1 \leq m \leq 20$.
- The next n lines contain the altitudes of grid points. Each line represents a street and contains a sequence of m integers separated by one or more spaces. These integers represent the altitude in meters of the grid points along that street. Even if a particular street and avenue have no intersection, the altitude is still given for that grid point.
- One or more lines follow that define the one-way roads. Each road is represented by two pairs of integers, separated by one or more spaces, in the form:

street avenue street avenue

The first street and avenue define the starting point of the road and the second pair define the ending point. Since Greenhills is a strict grid, if the two points are not adjacent in the grid, the road passes through all the intervening grid points. For example,

5 7 5 10

represents roads 5-7 to 5-8, 5-8 to 5-9, and 5-9 to 5-10. Road definitions are terminated by a line containing four zeroes in the above format.

- Finally, one or more lines will follow that contain pairs of grid points between which Jill wants to find an optimal path, in the form:

street avenue street avenue

As before, the integer pairs are separated by one or more spaces. The end of the input set is defined by a line containing four zeroes, formatted as before.

You may assume that all street and avenue numbers are within the bounds defined by the first line of input, and that all road definitions are strictly north-south or east-west.

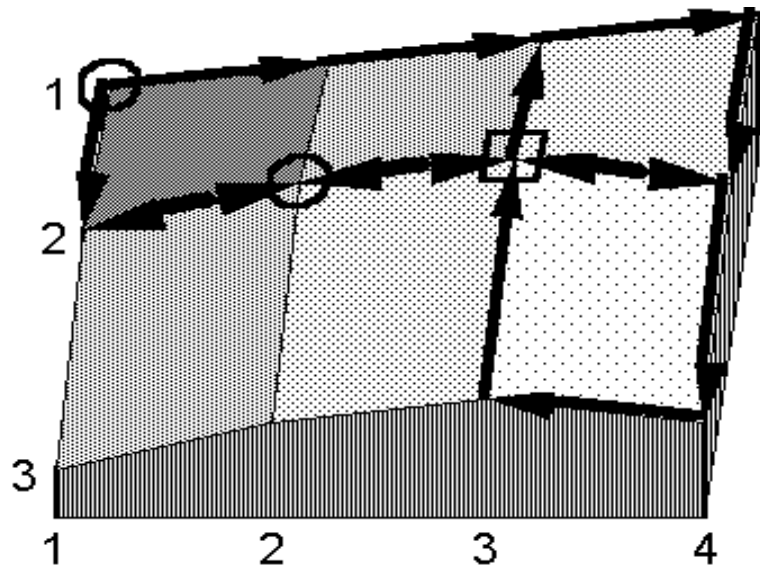
Output

For each path query in the input file, output a sequence of grid points, from the starting grid point to the ending grid point, which meets Jill's three rules. Output grid points as '*street-avenue*' separated by the word 'to'. If there is more than one path that meets Jill's criteria, any such path will be acceptable. If no route satisfies all the criteria, or if the starting and ending grid points are the same, output an appropriate message to that effect. Output a blank line between each output set.

Sample Input

```
3 4
10 15 20 25
19 30 35 30
10 19 26 20
1 1 1 4
2 1 2 4
3 4 3 3
3 3 1 3
1 4 3 4
2 4 2 1
1 1 2 1
0 0 0 0
1 1 2 2
2 3 2 3
2 2 1 1
0 0 0 0
```

Diagram of the Sample Input



Sample Output

1-1 to 1-2 to 1-3 to 1-4 to 2-4 to 2-3 to 2-2

To get from 2-3 to 2-3, stay put!

There is no acceptable route from 2-2 to 1-1.