Objective

You are working on the next version of the official application of the transport network of your city. At the request of users, you must implement a new feature to find a metro route from one point to another with the fewest possible connections. You don't need to take into account the travel time.

Data format

Input

Row 1: two integers **N** and **M** respectively between 1 and 50 and between 1 and 1500 respectively indicating the number of lines and the total number of stations on the network.
Row 2: two integers between 1 and **M** indicating respectively the number of the starting station and the number of the destination station.
Row 3: **N** integers between 1 and **M** indicating for each line **i** from 1 to **N** the number of stations comprised on the corresponding subway line. We note this number **P(i).**
Rows 4 to **N** + 3: for each line, **P(i)** integers between 1 and **M** and separated by spaces representing the stations of the line.

An integer representing the minimum number of lines you will use on your route. In the case where no path would be possible from one station to another, return -1!

Example

Input

```
5 50
9 11
13 17 9 9 12
22 40 15 33 16 29 36 27 39 43 21 17 50
13 5 8 42 49 23 30 50 12 40 20 25 47 44 34 9 41
45 23 6 28 31 18 2 26 29
48 29 4 3 24 26 7 11 32
46 10 35 26 14 37 50 23 38 40 19 1
```

Output

```
3
```

To get to station 11, from station 9, first you take line 2 you change at station 23 (for line 3) . Then you change at station 29 to line 4 and you get station 11. So you used 3 lines (2,3 and 4).