Problem J. Junk Problem

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

You are given a grid graph with n rows and m columns. Most edges are directed, which means you can walk from (x, y) to $(x+1, y)$ or $(x, y+1)$. k horizontal edges are bidirectional, which means you can walk from (x, y) to $(x, y+1)$, and $(x, y+1)$ to (x, y) too. It's guaranteed that there is no pair of bidirectional edges that share an endpoint.

You need to find l vertex-disjoint simple paths, where the i-th is from $(1, a_i)$ to (n, b_i). For a set of paths, we call a bidirectional edge *bad* if neither of its endpoints is visited by any of the paths in this set.

Output the number of all l vertex-disjoint simple paths without any bad edges, modulo 998244353.

Input

In the first line, n, m, l, k $(2 \le n, m \le 100, 1 \le l \le 50, 0 \le k \le 50)$.

In the second line, $a_1, a_2, \ldots, a_l$ $(1 \le a_1 < a_2 < \cdots < a_l \le m)$.

In the third line, $b_1, b_2, \ldots, b_l$ $(1 \le b_1 < b_2 < \cdots < b_l \le m)$.

In the following k lines, x_i, y_i $(1 \le x_i \le n, 1 \le y_i < m)$ each line, which denote that the edge (x_i, y_i) to $(x_i, y_i + 1)$ is bidirectional.

It's guaranteed that there is no pair of bidirectional edges that share an endpoint.

Output

One integer — the answer.

Examples

standard input	standard output
2 2 1 2 2 1 1 1 2 1	2
3 4 2 1 1 4 1 4 2 2	0
10 10 3 4 1 2 3 8 9 10 2 3 2 5 4 6 7 8	388035318