Problem G. Graph Problem

Input file:	`standard input`
Output file:	`standard output`
Time limit:	5 seconds
Memory limit:	1024 megabytes

You are given a directed graph with n vertices and m edges. You want to answer q queries.

For each query, you are given $k_1, p_1, p_2, \ldots, p_{k_1}$, $k_2, s_1, t_1, s_2, t_2, \ldots, s_{k_2}, t_{k_2}$. For all i $(1 \le i \le k_2)$, answer whether there is a path from s_i to t_i if $p_1, p_2, \ldots, p_{k_1}$ are deleted. Queries are independent.

Input

In the first line, n, m $(1 \le n \le 500, 0 \le m \le n(n-1))$.

In the following m lines, u, v $(1 \le u, v \le n, u \ne v)$ — a directed edge in the graph. It's guaranteed that there is no parallel edges.

In the next line, q $(1 \le q \le 4 \times 10^5)$. To make sure you answer the queries online, the input is encrypted. The input can be decrypted using the following pseudocode:

```
cnt = 0
for i = 1 ... q
    read(k1)
    for j = 1 ... k1
        read(p'[j])
        p[j] =(p'[j] + cnt - 1) % n + 1
    read(k2)
    for j = 1 ... k2
        read(s', t')
        s = (s' + cnt - 1) % n + 1
        t = (t' + cnt - 1) % n + 1
        cnt += query(s, t)
// if s can reach t, query return 1, otherwise, query return 0
```

In the following $2q$ lines, for each query:

- In the first line, $k_1, p'_1, \ldots, p'_{k_1}$. It's guaranteed that p_i are distinct.
- In the second line, $k_2, s'_1, t'_1, \ldots, s'_{k_2}, t'_{k_2}$. It's guaranteed that all s_i, t_i are different from all p_i.
- It's guaranteed that $1 \le k_1 \le \min(n-2, 6), \sum k_2 \le 4 \times 10^6, 1 \le p'_i, s'_i, t'_i \le n$.

Output

For each query, output a binary string with length k_2 — the answer of query(s, t) in order.

Example

standard input	standard output
5 4 1 2 2 3 3 4 4 5 2 1 4 2 1 5 1 3 3 5 3 4 1 1 2	01 1

Note

It's recommended to use Fast IO.