F. GIFT

Tuan gives his son an unweighted directed graph as a birthday gift. The graph contains n vertices, the vertices are numbered from 1 to n. There are also m directed edges in the graph, numbered from 1 to m.

Tuan wants to test his son's IQ by playing a game. The game consists of Q rounds, in each round Tuan will ask his son to do solve of the two following questions:

- 1. Delete one edge from the graph
- 2. Find the length of the shortest path from vertex 1 to a vertex v

Tuan wants his son to answer each question of the second type immediately, without knowing any of the future questions.

Notes:

- A path of length t of the graph is a sequence of vertices $v_1, v_2, ..., v_t, v_{t+1}$ where there is an edge from v_i to v_{i+1} for every $1 \le i \le t$.
- A path of length *t* is the shortest path from *a* to *b* if there does not exist another path from *a* to *b* of length smaller than *t*.

INPUT

The first line in the input contains two integers n and m, the number of vertices and edges of the graph $(1 \le n \le 3500, 1 \le m \le 35000)$.

The *i*-th of the following *m* lines contains two integers u_i and v_i where there is an directed edge from u_i to v_i .

The next line contains a single integer Q, the number of questions ($1 \le Q \le 5 \times 10^{5}$).

The remaining Q lines describe the Q questions, each will be in either of the 2 following forms:

- 1 x delete edge $id = (x + last) \mod m + 1$, assuming *last* is the previous type 2 question answer. For the first question of type 2, *last* = 0. And if there is no path from 1 to the queried vertex, *last* = -1. It is guaranteed that each edge is deleted at most once
- 2v ask the length of shortest path from vertex 1 to vertex v.

OUTPUT

For each question of the second type, print the answer in a single line. If there is no path from 1 to v in the question, print -1.

Sample Input	Sample Output
46	
14	
13	
4 2	
12	2
2 3	2
3 4	3
7	2
11	-1
2 3	
11	
2 3	
2 2	
10	

	2 3	
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The real edges deleted are 2, 4, and then 3 sequentially