Problem A. Disconnected Graph

Input file:	`disconnected.in`
Output file:	`disconnected.out`
Time limit:	2 seconds
Memory limit:	256 megabytes

You are given a connected undirected graph and several *small* sets of its edges. For each set, you need to determine whether the graph stays connected with edges from the set removed.

Remember that a graph is *connected* when for every two distinct vertices there's a path connecting them.

Input

The first line of the input file contains two integers n and m ($1 \leqslant n \leqslant 10\,000$, $1 \leqslant m \leqslant 100\,000$), denoting the number of vertices and edges in the graph, respectively. Vertices are numbered from 1 to n.

The next m lines contain the description of the edges. Each line contains two integers a and b — the numbers of the vertices connected by this edge. Each pair of vertices is connected by at most one edge. No edge connects a vertex to itself. Edges are numbered from 1 to m in the order they are given in the input.

The next line contains an integer k ($1 \leqslant k \leqslant 100\,000$), denoting the number of small sets to test. The next k lines contain the descriptions of the small sets. Each line starts with an integer c ($1 \leqslant c \leqslant 4$), denoting the number of edges in the set, followed by c numbers of the edges from the set. The numbers of the edges inside one small set will be distinct.

Output

Output k lines, one per each given small set. The i-th line should contain "Connected" (without quotes), if removal of the corresponding small set leaves the graph connected, or "Disconnected" otherwise.

Examples

disconnected.in	disconnected.out
4 5 1 2 2 3 3 4 4 1 2 4 3 1 5 2 2 3 2 1 2	Connected Disconnected Connected

Problem B. Code Geass

Input file:	`code.in`
Output file:	`code.out`
Time limit:	3 seconds
Memory limit:	256 mebibytes

People are not equal!

At last! It happened! Emperor Charles is affected by Geass! Lelouch has achieved his vengeance!

Hovewer, there is something strange in Emperor's head. While using Geass, Lelouch sees the neural network of a human brain. Right now, he sees that there are N neurons in Emperor's brain and M undirected synapses connecting pairs of neurons. Lelouch instantly numbered all neurons with integers from 1 to N. There are Q key pairs of neurons in Emperor's brain. The neurons in the first key pair have numbers A_1 and B_1, and the numbers of neurons in key pairs 2, 3, …, Q can be calculated in the following way:

$$\begin{aligned} A_i &= B_{i-1} \\ B_i &= (13\,579 \cdot A_{i-1} + 97\,531 \cdot B_{i-1}) \bmod N + 1 \end{aligned}$$

A key pair of neurons is safe if there are at least two non-overlapping chains between the neurons of the pair (see definitions below). Lelouch knows that if Geass was used successfully, all key pairs will be safe. On the other hand, if there are too many unsafe key pairs, things may get out of control, and in that case, Lelouch will have only two seconds before Emperor uses his own Geass on Lelouch. Therefore, he must quickly find the number of good key pairs of neurons. Help him find it.

A chain is a sequence of one or more neurons where every two successive neurons are connected by a synapse. Two chains are called non-overlapping if they don't have common neurons except the first one and the last one. Note that by this definition, non-overlapping chains can coincide if they both consist of one or two neurons.

Input

The first line contains two integers N and M, the number of neurons and synapses in Emperor's brain ($1 \leqslant N \leqslant 10^5$, $0 \leqslant M \leqslant 10^5$). Next follow M lines. Each of them describes one synapse and contains two integers U and V, the numbers of neurons connected by the synapse ($1 \leqslant U, V \leqslant N$, $U \neq V$). There is no more than one synapse between each pair of neurons. The last line contains three integers Q, A_1 and B_1 ($1 \leqslant Q \leqslant 25\,000\,000$, $1 \leqslant A_1, B_1 \leqslant N$).

Output

Output the number of safe key pairs of neurons.

Example

code.in	code.out
6 6 1 2 2 3 3 4 4 5 4 6 6 2 8 1 2	6

P.S. Even Lelouch doesn't know how to use pseudo-random dependency between key pairs of neurons.

Problem C. Death Note

Input file:	`death.in`
Output file:	`death.out`
Time limit:	5 seconds
Memory limit:	256 mebibytes

> The human whose name is written in this note will die.
>
> Death Note: How to use it, first rule

Light: L!

L: Kira.

L and Light: *(in unison)* No matter what, I will find you and do away with you!

Light: I am...

L: I am...

L and Light: *(in unison)* Justice!

Criminals around the world are being mysteriously murdered by a serial killer, nicknamed Kira. The police has analyzed the time of murders, and it turned out that 68% of all deaths took place on weekdays between 4 PM and midnight. Using these data, detective L concluded that Kira is a schoolboy. In order to falsify his assuming, Light (who is actually Kira) decided to kill people in random moments of time.

After L got Kira's message "Shinigami eat only apples", he decrypted it and understood that Kira will kill criminals according to the following pattern: one will be killed at moment T_1, another one at moment T_2, and the rest at moments $T_i = (T_{i-1} \cdot T_{i-2}) \bmod 10\,007$ for consecutive integers $i = 3, 4, \ldots, k$. Each of these numbers is the time of day at which a murder will happen. However, Kira did not reveal the numbers T_1 and T_2; as for the number k, it is only guaranteed that $k \geq 2$. The order of the murders is also not specified.

After that, L got the data from the police: the actual moments at which the criminals died. L is certain that this data contains all criminals which were killed by Kira according to the pattern, but it can contain some irrelevant murders as well. Now he needs to find out how much of them could have been killed by Kira.

Input

The first line contains an integer N, the number of criminals killed ($2 \leqslant N \leqslant 10^4$). The second line contains N integers a_i, the moments of time in which deaths of criminals took place ($0 \leqslant a_i < 10\,007$). Bear in mind that any number of people can be killed (by Kira or otherwise) at the same time of day.

Output

Output the maximum amount of criminals who could have been killed by Kira.

Example

death.in	death.out
8 1 2 3 4 5 6 7 8	3

Kira can be responsible for three deaths if, for example, $T_1 = 3$, $T_2 = 2$ and $k = 3$ (so that $T_3 = 6$).