Kingdom and Reforms

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	512 megabytes

In the kingdom of Berland there are n cities and m bidirectional roads connecting some pairs of cities. The government did not care for the road system for the long time, hence there was no rhyme or reason to how the roads were constructed. It is possible, for instance, for multiple roads to connect the same pair of cities, or even for a city to have an adjacent road leading to the same city (or multiple such roads even). Furthermore, it may be possible that the country is not connected at all, that is, for a pair of cities there may not be a way to reach one from the other using the roads. Needless to say, all roads are in a very sorry state and desperately need repairs.

A new transportation minister was assigned recently, tasked with renovation of the road system. The minister does not really want to create new roads nor to destroy any of the old ones, since the citizens grew accustomed to the existing road system, however poor it may be. The renovation the minister has in mind will consist of converting each existing road into either a modern automobile highway or a high-speed train track. To avoid anti-monopoly investigations, the minister has to ensure that each city has at least one adjacent highway and at least one adjacent train track. Help the minister choose the new type for each road so that this condition is satisfied, or determine that doing this is impossible.

Input

The first line contains two integers n and m ($1 \le n \le 300\,000$, $0 \le m \le 300\,000$), the number of cities and roads respectively.

The following m lines describe the roads. The i-th of these lines contains two integers u_i, v_i ($1 \le u_i, v_i \le n$), indices of the cities connected by the i-th road.

Note that multiple roads and roads connecting a city to itself are allowed, and it is not guaranteed that all the cities are connected by the road network.

Output

If there is a suitable assignment of road types, print a string of m characters. The i-th of these characters should be "`H`" if the i-th road should be converted into a highway, or "`T`" if it should be made into a train track. If there are many possible assignments, print any of them.

If there is no suitable assignment, print the only string "`Impossible`".

Examples

standard input	standard output
3 4 1 2 1 3 2 3 2 3	HTHT
3 1 1 2	Impossible
3 4 1 1 1 1 2 3 3 2	HTHT