Colorful Graph 2

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	1024 megabytes

Having delved into the complex theory of quantum chromodynamics again, Little Cyan Fish has become fascinated with the concept of color charge. To test your understanding of this theory, he has proposed the following task to you.

Consider a regular polygon (i. e., a polygon with all sides having the same length and all angles having the same value) with vertices numbered in clockwise order by integer numbers from 0 to $n-1$. Let its vertices correspond to vertices of an **undirected** graph. For each i ($0 \le i < n$), there is an edge connecting the vertex i and $(i+1) \bmod n$. Additionally, there are m extra edges in the graph, where the i-th edge connects the vertex u_i and v_i. It is guaranteed that these additional m edges are pairwise distinct, and all the m edges are unique compared to the n edges forming the polygon and that none of the edges intersect at non-vertex points.

Little Cyan Fish would like you to color all the vertices into two colors: black and red. But Little Cyan Fish wants the graph to be colorful – each cycle in the graph must contain two kinds of colors. Formally, he does **not** want to have a sequence of vertices $v_0, v_1, \cdots, v_{t-1}$ ($t \ge 3$) satisfying:

- The color of $v_0, v_1, \cdots, v_{t-1}$ are the same (i.e. all the vertices are black/red).
- For each $0 \le i < t$, there is an edge connecting the vertex v_i and $v_{(i+1) \bmod t}$.

Your task is to show him a possible coloring plan or report that there is no possible solution.

Input

There are multiple test cases in a single test file. The first line of the input contains a single integer T ($1 \le T \le 10^5$), indicating the number of test cases.

For each test case, the first line of the input contains two integers n and m ($3 \le n \le 2\times10^5$, $0 \le m \le n-3$), indicating the number of the vertices of the polygon, and the number of the extra edges.

The following m lines describes the extra edges. The i-th line of these lines contains two integers u_i and v_i ($0 \le u_i, v_i \le n-1$, $u_i \ne v_i$), indicating an extra edge. It is guaranteed that these additional m edges are pairwise distinct, and all the m edges are unique compared to the n edges forming the polygon and that none of the edges intersect at non-vertex points.

It is guaranteed that the sum of n over all test cases does not exceed 10^6.

Output

For each test case:

- If there is a possible plan, output a single line contains a single string of length n, indicating the plan. Each character of the string must be either "`B`" or "`R`", indicating the color of each vertex. If there are multiple possible solutions, you may print any of them.
- Otherwise, print a single line "`Impossible`".

Example

standard input	standard output
3 3 0 4 1 1 3 6 3 0 2 2 4 4 0	BRR BRBR RRBRRB