

Problem F

Bike Lane Planning

Time limit: 2 seconds

The NCPC Recreational bike-only park has many bike paths that connects all the interesting places in the park. All bike paths are in parallel, meaning there are two lanes, one for biking in each direction.

As park popularity grows, NCPC decides to introduce electric four-wheel six-passenger wagon bikes for use within the park. However, these wagon bikes are so big that they cannot travel on a single bike lane. Instead, it must travel on both parallel bike lanes. Therefore, all parallel bike lanes must be changed into one-way bike lane. Direction of each road segment (directly connecting two interesting places) can be determined independently.

Due to popular demand, some places must be reachable from some other places. Give this set of must-reachable places, please help determine different ways to turn the parallel bike lanes into one-way wagon bike lane while meeting the must-reachable places conditions.

For example, in the Fig. 1 below (this figure depicts the Sample Input), there are 6 parallel bike lanes connecting 5 interesting places. If the park wants to maintain Place 4 to be reachable from Place 1, and Place 2 to be reachable from Place 5. Then there are 4 possible configurations as shown in Fig 2. It can be seen that only segment 3 and segment 5 must always set to have traffic flow in the same direction regardless of the configuration; while the other segments, may need to be set to different direction depending on the configuration.

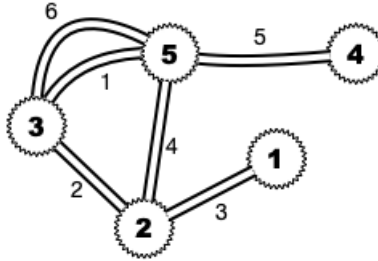


Figure 11: 6 Parallel bike lanes connecting 5 places.

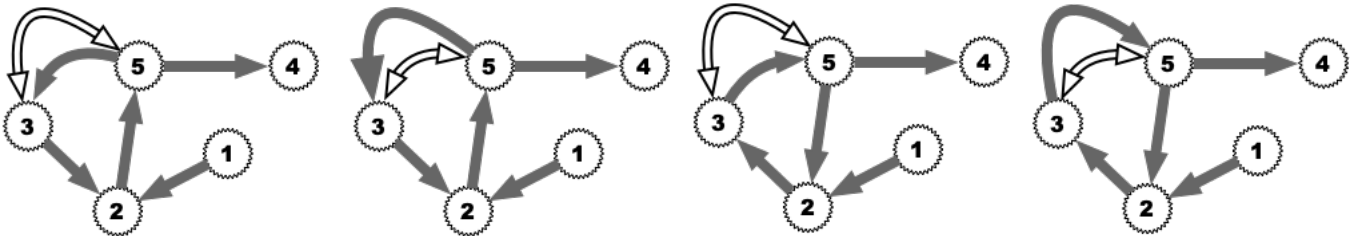


Figure 12: Four possible configurations. Segment 3 direction must be from Place 1 to Place 2 and segment 5 direction must be from Place 5 to Place 4 in all configurations. Segment with double arrows can be set in any direction in that particular configuration.

Input File Format

The first line of input is an integer indicating the number of test cases to follow. For each test case, the first line contains 3 integers, n , m , k , indicating there are $n \leq 100,000$ interesting places in the park (numbered from 1 to n); there are $m \leq 100,000$ road segments (numbered from 1 to m); and there are $k \leq 100$ must-reachable place pairs.

The next m lines each contains two positive integers, $1 \leq i, j \leq n$, indicating there is road segment (parallel bike lanes) connecting Place i and Place j .

The next k lines each contains two positive integers, $1 \leq i, j \leq n$, indicating Place j must be reachable from Place i in the new configuration.

Output Format

Print "0", "L", or "R" for each road segment in the order of the input sequence, all on one line. For a road segment that connects Places i and j (as indicated in the input), if in all valid configurations, the direction is always from i to j , then output "R"; If the direction is always from j to i , then output "L"; otherwise, output "0". For each test case, there should be m consecutive "0", "L", or "R" characters on a single output line.

Sample Input

```
1
5 6 2
5 3
2 3
1 2
2 5
4 5
3 5
1 4
5 2
```

Sample Output for the Sample Input

```
00R0L0
```

Note: Road segment 3 (from place P1 to place P2), the direction should be "R" as in $P1 \rightarrow P2$. For road segment 5 (from place P4 to place P5), the direction must be "L", as in $P4 \leftarrow P5$).