Follow the Sequence

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	512 megabytes

In a two-dimensional Cartesian coordinate system, you begin at the origin $(0, 0)$.

You are given a string s of length n, representing a walking sequence. The i-th character s_i belongs to the set $\{\texttt{U}, \texttt{D}, \texttt{L}, \texttt{R}\}$.

An infinitely long string s' is constructed by repeating s indefinitely. Formally, $s'_i = s_{((i-1) \bmod n)+1}$.

Now, you process each character of s' in order, moving according to the following rules:

- If $s'_i = \texttt{U}$, move to $(x, y + 1)$.
- If $s'_i = \texttt{D}$, move to $(x, y - 1)$.
- If $s'_i = \texttt{L}$, move to $(x - 1, y)$.
- If $s'_i = \texttt{R}$, move to $(x + 1, y)$.

This process continues indefinitely. You are also given m key points, where the i-th key point has coordinates (p_i, q_i). Your task is to determine the number of **distinct** key points that are visited during the infinite walking process.

Note that multiple key points may coincide, in which case they are still considered distinct key points.

Input

The input consists of multiple test cases. The first line contains an integer t ($1 \le t \le 5 \cdot 10^5$), the number of test cases. For each test case:

- The first line contains two integers n and m ($1 \le n, m \le 5 \cdot 10^5$), where n is the length of the string s and m is the number of key points.
- The second line contains the string s of length n.
- The next m lines each contain two integers p_i and q_i ($-10^9 \le p_i, q_i \le 10^9$), representing the coordinates of a key point.

It is guaranteed that the sum of n and the sum of m over all test cases do not exceed $5 \cdot 10^5$.

Output

For each test case, output a single line containing a single integer, representing the number of distinct key points visited.

Example

standard input	standard output
3 6 3 DUDUDU 0 0 1 0 0 -1 6 5 DUDULU 0 0 -1 0 0 -1 -1 -1 -1 1 5 5 ULUUL -624531741 651883826 -1 2 -312566309 468849463 -212530129 633866239 672824982 -674189680	2 4 2

Note

In the first test case, only two key points $(0, 0)$ and $(0, -1)$ are visited.

In the second test case, four key points $(0, 0), (0, -1), (-1, 0)$ and $(-1, 1)$ are visited.