Queries on A+B

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

There are two nonnegative N-digit base 10 integers A and B. Consider the integer $C = A + B$, which has $N + 1$ digits. Note that the number of digits is fixed, so integers may have leading zeroes.

Process the following Q queries in order. Each query is one of the following:

- `A i d`: Change the i-th least significant digit in A to d.
- `B i d`: Change the i-th least significant digit in B to d.

For each query, recalculate the integer $C = A + B$ and print the number of digits in C that have changed after applying the most recent query. Queries are cumulative.

Input

The first line contains two integers N and Q ($1 \leq N, Q \leq 300\,000$).

The next line contains the N-digit base 10 integer A as a numeric string.

The next line contains the N-digit base 10 integer B as a numeric string.

The next Q lines each contain queries in the described form. For all queries, $1 \leq i \leq N$ and $0 \leq d \leq 9$.

Output

For each query, output the number of digits in C that have changed as a result of applying this query.

Example

standard input	standard output
5 3 09905 80000 B 1 5 A 2 9 B 5 9	2 4 2