

Max Conference

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

Those who have solved Conference* may naturally come up with this problem.

You are given a string S of length N . Each character of S is one of A, B, C, or ?. In particular, the first and the last characters of S are A.

For a string of length N consisting only of A, B, and C, define its **score** as the number of integers i ($1 \leq i \leq N - 1$) such that the i -th character and the $(i + 1)$ -th character are different.

You are given Q queries. The i -th query is as follows.

Non-negative integers X_i, Y_i, Z_i are given, where $X_i + Y_i + Z_i$ is equal to the number of ? characters in S . Among all strings obtained by replacing X_i of the ? characters in S with A, Y_i of them with B, and Z_i of them with C, output the maximum possible score.

Input

The input is given in the following format:

```
N
S
Q
X1 Y1 Z1
X2 Y2 Z2
⋮
XQ YQ ZQ
```

- N, Q, X_i, Y_i, Z_i are integers.
- $2 \leq N \leq 3 \times 10^5$
- S is a string of length N consisting of A, B, C, and ?.
- The first and the last characters of S are A.
- $1 \leq Q \leq 2 \times 10^5$
- $0 \leq X_i$
- $0 \leq Y_i$
- $0 \leq Z_i$
- $X_i + Y_i + Z_i$ is equal to the number of ? characters in S .

Output

Output Q lines. On the i -th line, output the answer to the i -th query.

*<https://www2.ioi-jp.org/camp/2025/2025-sp-tasks/contest3/conference-en.pdf>

Examples

standard input	standard output
9 A??B??C?A 3 1 3 1 4 1 0 0 0 5	8 6 4
12 A???A?B????A 4 0 8 0 2 6 0 7 1 0 3 5 0	4 8 4 10
28 ACB??B??BCB??B????B?AAA?BBA 26 6 1 6 4 5 4 2 3 8 9 2 2 11 0 2 8 4 1 11 0 2 2 0 11 0 1 12 12 1 0 10 3 0 1 4 8 3 7 3 2 8 3 1 3 9 11 1 1 7 0 6 6 4 3 8 4 1 0 10 3 13 0 0 11 1 1 0 6 7 2 8 3 9 0 4 0 0 13	24 21 23 21 19 20 19 21 19 17 19 22 19 17 22 19 23 22 20 13 15 19 20 17 21 17

Note

In the first example, for the first query, replacing the characters as ABCBABCBA yields a score of 8, which is the maximum possible. For the second query, replacing the characters as ABABAACAA yields a score of 6. For the third query, replacing the characters as ACCBCCCCA yields a score of 4.