G - Keyboard

Editorial (/contests/abc434/tasks/abc434_g/editorial)

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Time Limit: 3 sec / Memory Limit: 1024 MiB

Score : 650 points

Problem Statement

For a string A consisting of 1, 2, . . ., 9 and B, define $f(A)$ as the string obtained by the following procedure:

- Initially, there is an empty string C.
- Perform the following operations in the order $i = 1, 2, \ldots, |A|$:
  - If A_i is one of 1, 2, . . ., 9, append A_i to the end of C.
  - If $A_i =$ B, delete the last character of C. However, if C is an empty string, do nothing.
- Let $f(A)$ be C after completing all the above operations.

You are given a string S of length N consisting of 1, 2, . . ., 9, and B.

Process Q queries described below. Each query is of one of the following two types:

- $1\ \ x\ \ c$: Update S_x to c. (Here, c is 1, 2, . . ., 9, or B.)
- $2\ \ l\ \ r$: Let T be the string formed by extracting the l-th through r-th characters of S. Then, let $U = f(T)$. If U is an empty string, output -1; otherwise, output the remainder when the value of U regarded as a decimal integer is divided by 998244353.

Constraints

- $1 \leq N \leq 8 \times 10^6$

- $1 \leq Q \leq 2 \times 10^5$
- S is a string of length N consisting of 1, 2, . . ., 9, and B.
- $1 \leq x \leq N$
- c is 1, 2, . . ., 9, or B.
- $1 \leq l \leq r \leq N$
- N, Q, x, l, r are integers.

Input

The input is given from Standard Input in the following format, where query_i denotes the i-th query.

$$
\begin{aligned}
&N \quad Q \\
&S \\
&\mathrm{query}_1 \\
&\mathrm{query}_2 \\
&\vdots \\
&\mathrm{query}_Q
\end{aligned}
$$

Each query is given in one of the following two formats:

$$1 \quad x \quad c$$

$$2 \quad l \quad r$$

Output

Output the answers to the queries separated by newlines, following the instructions in the problem statement.

Sample Input 1 Copy

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```
10 12
1234567891
2 5 7
2 2 8
2 1 10
1 3 B
1 4 B
2 2 4
2 2 8
2 1 10
1 7 B
2 3 9
1 3 4
2 1 10
```

Sample Output 1 Copy

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```
567
2345678
236323538
-1
5678
567891
589
125891
```

For the first query, $T = U =$ 567. Thus, output 567.

For the third query, $T = U =$ 1234567891. Thus, output $1234567891 \bmod 998244353 = 236323538$.

For the sixth query, $T =$ 2BB and U is an empty string. Thus, output -1.

'#telegram)

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