Problem K
Addition Robot

Adding two numbers several times is a time-consuming task, so you want to build a robot. The robot should have a string $S = S_1 S_2 \ldots S_N$ of N characters on its memory that represents addition instructions. Each character of the string, S_i, is either '`A`' or '`B`'.

You want to be able to give Q commands to the robot, each command is either of the following types:

- `1` L R. The robot should toggle all the characters of S_i where $L \leq i \leq R$. Toggling a character means changing it to '`A`' if it was previously '`B`', or changing it to '`B`' if it was previously '`A`'.
- `2` L R A B. The robot should call $f(L, R, A, B)$ and return two integers as defined in the following pseudocode:

```
function f(L, R, A, B):
  FOR i from L to R
    if S[i] = 'A'
      A = A + B
    else
      B = A + B
  return (A, B)
```

You want to implement the robot's expected behavior.

Input

Input begins with a line containing two integers: N Q ($1 \leq N, Q \leq 100\,000$) representing the number of characters in the robot's memory and the number of commands, respectively. The next line contains a string S containing N characters (each either '`A`' or '`B`') representing the initial string in the robot's memory. The next Q lines each contains a command of the following types.

- `1` L R ($1 \leq L \leq R \leq N$)
- `2` L R A B ($1 \leq L \leq R \leq N$; $0 \leq A, B \leq 10^9$)

There is at least one command of the second type.

Output

For each command of the second type in the same order as input, output in a line two integers (separated by a single space), the value of A and B returned by $f(L, R, A, B)$, respectively. As this output can be large, you need to modulo the output by $1\,000\,000\,007$.

Sample Input #1

```
5 3
ABAAA
2 1 5 1 1
1 3 5
2 2 5 0 1000000000
```

Sample Output #1

```
11 3
0 1000000000
```

Explanation for the sample input/output #1

For the first command, calling $f(L, R, A, B)$ causes the following:

- Initially, $A = 1$ and $B = 1$.
- At the end of $i = 1$, $A = 2$ and $B = 1$.
- At the end of $i = 2$, $A = 2$ and $B = 3$.
- At the end of $i = 3$, $A = 5$ and $B = 3$.
- At the end of $i = 4$, $A = 8$ and $B = 3$.
- At the end of $i = 5$, $A = 11$ and $B = 3$.

Therefore, $f(L, R, A, B)$ will return $(11, 3)$.

For the second command, string S will be updated to "ABBBB".

For the third command, the value of A will always be 0 and the value of B will always be $1\,000\,000\,000$. Therefore, $f(L, R, A, B)$ will return $(0, 1\,000\,000\,000)$.