



Problem N: Lanterns on the Perfume River

Time limit: 1s; Memory limit: 256 MB

During the Hue Festival, a row of n slots is prepared along the bank of the Perfume River. The slots are numbered 1 through n from left to right. Each slot either holds one lantern or is empty, described by a string s of length n : the i -th character of s is 1 if slot i holds a lantern, and 0 if slot i is empty.

The current pushes a lantern by exactly two slots at a time. One move takes a lantern from slot i to slot j , where $j = i - 2$ or $j = i + 2$. The move is allowed only when slot j belongs to the row, that is $1 \leq j \leq n$, and when slot j and the slot strictly between i and j are both empty.

All lanterns look the same, so an arrangement is determined only by which slots are occupied. Any number of moves may be performed, in any order.

The organisers inspect q parts of the row. For a part described by two integers l and r , consider the slots $l, l + 1, \dots, r$ together with the lanterns that those slots hold at the beginning, and treat them as a row of their own: during the inspection of this part, lanterns may move only between slots l and r , and the rest of the river is ignored.

For each part, determine how many different arrangements of that part can be obtained. The arrangement that the part starts with is counted as well. Since the answer may be large, print it modulo 998,244,353.

Input

The first line contains two integers n and q ($1 \leq n \leq 2 \times 10^5$, $1 \leq q \leq 2 \times 10^5$) — the number of slots and the number of parts to inspect.

The second line contains the string s of length n , consisting of the characters 0 and 1.

Each of the next q lines contains two integers l and r ($1 \leq l \leq r \leq n$), describing one part of the row.

Output

Print q lines. The i -th of them must contain the number of different arrangements that can be obtained in the i -th part of the row, taken modulo 998,244,353.

Sample

Sample Input	Sample Output
7 6 1001010 1 7 2 7 2 4 4 6 3 3 2 5	4 3 2 1 1 2



Explanation of the Sample

- In the second part, the slots 2 through 7 start as 001010, and exactly three arrangements can be obtained: 001010, 100010 and 101000.
- In the third part, the slots 2 through 4 start as 001, and the lantern may slide two slots to the left, giving 001 and 100. That lantern sits in slot 4 of the river but in the third slot of this part, and it is the position inside the part that decides where it can go.
- In the fourth part, the slots 4 through 6 start as 101 and no move is possible, because each lantern is blocked by the other.
- In the fifth part, slot 3 holds no lantern, so the empty arrangement is the only one.