CMPUT 274 - Tangible Computing
Morning Problem: 10 Types of People

Description

There are 10 types of people in this world: those who understand binary and those who don't. As a hard-working student in CMPUT 274, we certainly hope you fall into the first category.

In this problem, you will be given sequence of n 0s and 1s (i.e. *bits*). You want to answer a series of very simple questions: given a pair of values $1 \leq s \leq e \leq n$, are all bits lying between index s and index e the same or not? This includes the bits at index s and e. Here, we are viewing the bits as being indexed from 1 to n.

Input

The first line of input consists of two integers n and m. Here, $1 \leq n \leq 1000$ is the number of bits in the sequence and $1 \leq m \leq 1000$ is the number of journeys you have to process.

The next line contains a sequence of size n of 1s and 0s (no spaces).

Finally, m lines follow. Each consists of two integers $1 \leq s \leq e \leq n$ separated by a single space. These represent the start and end positions of the queries.

Output

Output consists of m lines, one for each query. For each query s, e, you should output one line with the following message:

- `zero` if all bits at indices i with $s \leq i \leq e$ are 0
- `one` if all bits at indices i with $s \leq i \leq e$ are 1
- `both` otherwise

Sample Input 1

```
4 2
1101
1 4
1 1
```

Sample Output 1

```
both
one
```

Explanation: The first query is spanning all bits in the sequence: some are ones and some are zeros. The second query only spans a single bit, which is a 1.

Sample Input 2

```
10 5
1110100000
1 4
1 3
4 10
5 10
6 10
```

Sample Output 2

```
both
one
both
both
zero
```

Sample Input 3

```
1 5
0
1 1
1 1
1 1
1 1
1 1
```

Sample Output 3

```
zero
zero
zero
zero
zero
```