

Jack and Daniel are friends. They want to encrypt their conversations so that they can save themselves from interception by a detective agency so they invent a new cipher.

Every message is encoded to its binary representation. Then it is written down k times, shifted by $0, 1, \dots, k - 1$ bits. Each of the columns is XORed together to get the final encoded string.

If $b = 1001011$ and $k = 4$ it looks like so:

```

1001011      shift 0
01001011     shift 1
001001011    shift 2
0001001011   shift 3
-----
1110101001   <- XORed/encoded string s
    
```

Now we have to decode the message. We know that $k = 4$. The first digit in $s = 1$ so our output string is going to start with 1 . The next two digits are also 1 , so they must have been XORed with 0 . We know the first digit of our 4^{th} shifted string is a 1 as well. Since the 4^{th} digit of s is 0 , we XOR that with our 1 and now know there is a 1 in the 4^{th} position of the original string. Continue with that logic until the end.

Then the encoded message s and the key k are sent to Daniel.

Jack is using this encoding algorithm and asks Daniel to implement a decoding algorithm. Can you help Daniel implement this?

Function Description

Complete the `cipher` function in the editor below. It should return the decoded string.

`cipher` has the following parameter(s):

- k : an integer that represents the number of times the string is shifted
- s : an encoded string of binary digits

Input Format

The first line contains two integers n and k , the length of the original decoded string and the number of shifts.

The second line contains the encoded string s consisting of $n + k - 1$ ones and zeros.

Constraints

$$1 \leq n \leq 10^6$$

$$1 \leq k \leq 10^6$$

$$|s| = n + k - 1$$

It is guaranteed that s is valid.

Output Format

Return the decoded message of length n , consisting of ones and zeros.

Sample Input 0

```
7 4
1110100110
```

Sample Output 0

```
1001010
```

Explanation 0

```
1001010
 1001010
   1001010
    1001010
-----
1110100110
```

Sample Input 1

```
6 2
1110001
```

Sample Output 1

```
101111
```

Explanation 1

```
101111
 101111
-----
1110001
```

Sample Input 2

```
10 3
1110011011
```

Sample Output 2

```
10000101
```

Explanation 2

10000101 010000101

0010000101

1110011011