

D. Substring

time limit per test: 3 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

You are given a graph with n nodes and m **directed** edges. One lowercase letter is assigned to each node. We define a path's value as the number of the most frequently occurring letter. For example, if letters on a path are "abaca", then the value of that path is 3. Your task is find a path whose value is the largest.

Input

The first line contains two positive integers n, m ($1 \leq n, m \leq 300\,000$), denoting that the graph has n nodes and m directed edges.

The second line contains a string s with only lowercase English letters. The i -th character is the letter assigned to the i -th node.

Then m lines follow. Each line contains two integers x, y ($1 \leq x, y \leq n$), describing a directed edge from x to y . Note that x can be equal to y and there can be multiple edges between x and y . Also the graph can be not connected.

Output

Output a single line with a single integer denoting the largest value. If the value can be arbitrarily large, output -1 instead.

Examples

input
5 4 abaca 1 2 1 3 3 4 4 5
output
3

input
6 6 xzyabc 1 2 3 1 2 3 5 4 4 3 6 4
output
-1

input
10 14 xzyzyzyzqx 1 2 2 4 3 5 4 5 2 6 6 8

6 5
2 10
3 9
10 9
4 6
1 10
2 8
3 7

output

4

Note

In the first sample, the path with largest value is $1 \rightarrow 3 \rightarrow 4 \rightarrow 5$. The value is 3 because the letter 'a' appears 3 times.