

Contest Duration: 2025-10-25(Sat) 23:00 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20251025T2100&p1=248>) - 2025-10-26(Sun) 00:40 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20251025T2240&p1=248>) (local time) (100 minutes)

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## E - Hit and Away

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Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 450 points

### Problem Statement

You are given a simple connected undirected graph  $G$  with  $N$  vertices and  $M$  edges.

The vertices and edges of  $G$  are numbered as vertices  $1, 2, \dots, N$  and edges  $1, 2, \dots, M$ , respectively, and edge  $i$  connects vertices  $U_i$  and  $V_i$ .

You can move bidirectionally between vertices connected by an edge in time 1.

Additionally, each vertex is either safe or dangerous, and this state is given by a string  $S$  of length  $N$  consisting of s and d.

Specifically, vertex  $i$  is safe when the  $i$ -th character ( $1 \leq i \leq N$ ) of  $S$  is s, and vertex  $i$  is dangerous when it is d.

It is guaranteed that there are at least two safe vertices and at least one dangerous vertex.

For each dangerous vertex  $v$ , find the following value:

The minimum possible time to start from some safe vertex, pass through  $v$ , and move to a safe vertex **different from the starting vertex**.

### Constraints

- $3 \leq N \leq 2 \times 10^5$
- $N - 1 \leq M \leq 2 \times 10^5$

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- $1 \leq U_i, V_i \leq N$
- $U_i \neq V_i$
- If  $i \neq j$ , then  $\{U_i, V_i\} \neq \{U_j, V_j\}$ .
- $S$  is a string of length  $N$  consisting of s and d.
- $N, M, U_i, V_i$  are all integers.
- $G$  is connected.
- There are at least two safe vertices.
- There is at least one dangerous vertex.

## Input

The input is given from Standard Input in the following format:

```

N M
U1 V1
U2 V2
⋮
UM VM
S

```

## Output

Let  $K$  be the number of dangerous vertices in  $G$ , and print  $K$  lines.

On the  $i$ -th line ( $1 \leq i \leq K$ ), print the answer for the  $i$ -th dangerous vertex when the dangerous vertices are arranged in ascending order of vertex number.

### Sample Input 1

Copy

```

5 5
1 2
1 3
2 3
3 4
4 5
SSDDS

```

Copy

### Sample Output 1

Copy

```

2
3

```

Copy

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The dangerous vertices are (in ascending order of vertex number) vertices 3 and 4.

For vertex 3, moving from vertex 1  $\rightarrow$  vertex 3  $\rightarrow$  vertex 2 (for example) satisfies the condition.

The time required for this movement is 2, and this is the minimum.

Therefore, print 2 on the 1st line.

For vertex 4, moving from vertex 1  $\rightarrow$  vertex 3  $\rightarrow$  vertex 4  $\rightarrow$  vertex 5 (for example) satisfies the condition.

The time required for this movement is 3, and there is no way to move that satisfies the condition with time 2 or less, so this is the minimum.

Therefore, print 3 on the 2nd line.

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## Sample Input 2

Copy

```
3 2
1 2
2 3
SSD
```

Copy

## Sample Output 2

Copy

```
3
```

Copy

The dangerous vertex is vertex 3.

Moving from vertex 1  $\rightarrow$  vertex 2  $\rightarrow$  vertex 3  $\rightarrow$  vertex 2 (for example) satisfies the condition.

The time required for this movement is 3, and this is the minimum.

Note that movements such as vertex 2  $\rightarrow$  vertex 3  $\rightarrow$  vertex 2 do not satisfy the condition that the destination is "different from the starting vertex".

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