

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
```

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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 → vertex 3 → 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 → vertex 3 → vertex 4 → 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.

Sample Input 2

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

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Sample Output 2

[Copy](#)

```
3
```

[Copy](#)

The dangerous vertex is vertex 3.

Moving from vertex 1 → vertex 2 → vertex 3 → 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 → vertex 3 → vertex 2 do not satisfy the condition that the destination is "different from the starting vertex".

```
'#telegram)
```

```
'url=https%3A%2F%2Fatcoder.jp%2Fcontests%2Fabc429%2Ftasks%2Fabc429_e%3Flang%3Den&title=E%20-
```

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