

# USA Computing Olympiad

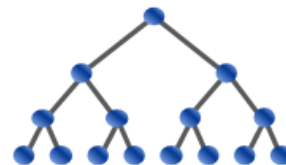
OVERVIEW

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## USACO 2025 JANUARY CONTEST, GOLD PROBLEM 2. REACHABLE PAIRS

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Contest has ended.

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English (en) ▾

Consider an undirected graph with  $N$  nodes labeled  $1 \dots N$  and  $M$  edges ( $1 \leq N \leq 2 \cdot 10^5, 0 \leq M \leq 4 \cdot 10^5$ ). You're given a binary string  $s_1 s_2 \dots s_N$ . At time  $t$  for each  $t \in [1, N]$ ,

- If  $s_t = 0$ , node  $t$  is removed from the graph.
- If  $s_t = 1$ , node  $t$  is removed from the graph, and edges are added between every pair of neighbors that node  $t$  had just before removal.

Note that in both cases, when a node is removed from the graph all of its incident edges are removed as well.

Count the number of pairs of nodes that can reach each other via some sequence of edges just before each of timesteps  $1 \dots N$ .

### INPUT FORMAT (input arrives from the terminal / stdin):

The first line contains  $N$  and  $M$ .

The second line contains the bit string  $s$  of length  $N$ .

The next  $M$  lines each contain two integers denoting an edge of the graph.

### OUTPUT FORMAT (print output to the terminal / stdout):

$N$  lines, the number of pairs before each timestep.

#### SAMPLE INPUT:

```
3 2
111
1 2
1 3
```

#### SAMPLE OUTPUT:

```
3
1
0
```

Before any removals, all pairs of nodes are reachable from each other. After node 1 is removed, an edge is added between 2 and 3, so they can still reach each other.

#### SAMPLE INPUT:

```
3 2
000
1 2
1 3
```

#### SAMPLE OUTPUT:

```
3
0
0
```

Before any removals, all pairs of nodes are reachable from each other. After node 1 is removed, 2 and 3 can no longer reach each other.

#### SAMPLE INPUT:

```
7 8
1101101
6 2
1 2
```

```
2 3
6 3
1 3
1 7
4 5
2 7
```

**SAMPLE OUTPUT:**

```
11
7
4
2
1
1
0
```

**SCORING:**

- Inputs 4-6:  $N \leq 100$
- Inputs 7-8: All  $s_i$  equal zero.
- Inputs 9-11: All  $s_i$  equal one.
- Inputs 12-23: No additional constraints.

Problem credits: Benjamin Qi

Contest has ended. No further submissions allowed.