# Problem 1 : Angels and Demons

Problem

Angels and Demons are playing a game on a directed graph. Each node of the graph either belongs to an angel or to a demon. The game proceeds as follows: A token is initially placed on any one of the nodes of the graph. If the token is on a node which belongs to an angel, then the angel moves the token along an outgoing edge to another node, and if the token is on a node which belongs to a demon, then the demon moves the token along an outgoing edge to another node. In this way, the game continues for infinitely many moves. The angels win if they are able to visit any one of the nodes in a given subset of nodes infinitely many times. This subset is also called the set of winning nodes for the angels.

The angels need help from you. In this problem, you are to write a program which, for a given game graph, finds all those nodes, from where if the game starts the angels can win. You have to assume that the angels and demons are sufficiently intelligent - that is both of them play according the best possible strategy.
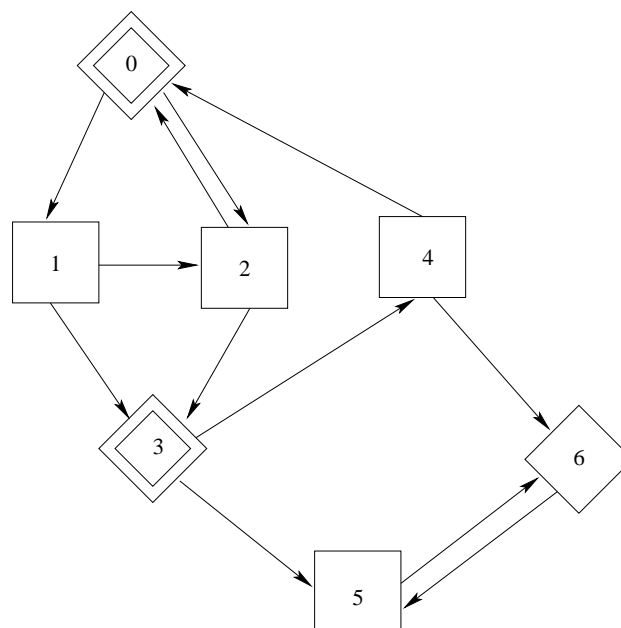
For example, consider the game graph given above. The nodes of the angels are denoted using square, and the nodes of demons are denoted by a diamond. Nodes 0 and 3 are the nodes in winning set for angels - that is, player angel has to visit either 0 or 3 infinitely often in the game. For this graph, angels can win the game if the token is initially placed on node 0, 1, 2 or 4. It cannot win the game if the token is initially placed on any other node. However, if node 5 is also included in the winning set of angels, then the angels can always win the game irrespective of where the token is initially placed.

Input

The first line of the input is n, the number of nodes in the graph. The nodes of the graph are labelled from 0 to $n-1$. The next line has n characters, each of which is either E or O. If the ith character is E, it means that the ith node in the graph belongs to an angel, and of the ith character is O, the ith node belongs to a demon. The next line gives k, the number of nodes in the winning set of angels. The next line contains k numbers, which are the nodes in the winning set of angels. Next line contains e, the number of edges in the graph. Each of the next e lines has two numbers a and b, which means that there is an edge from node a to node b. The graph may have upto a thousand nodes.

Output

Print the nodes from where if the game starts, angels can win the game. Output the nodes in ascending order, with each node appearing on a single line.

Sample Input

```
7
OEEOEEO
2
0 3
12
0 1
0 2
1 2
1 3
2 0
2 3
3 4
3 5
4 0
4 6
5 6
6 5
```

Sample Output

```
0
1
2
4
```