# Smart City Journey

120 points

Memory Limit: 32 MB

Time Limit: 1 second

The Mushroom Kingdom has just completed the building of a supersonic rail network connecting each and every city of the country by vacuum tunnels allowing maglev trains to travel at supersonic speeds. The n cities of the Mushroom Kingdom are connected by $n - 1$ bidirectional tunnels and every rail tunnel connects exactly two distinct cities. The network of vacuum tunnels is designed in a way that a passenger can go to any city from any other city using the supersonic rail network system. A passenger is charged exactly one Mushroom per each tunnel he/she passes on the network regardless of the length of the tunnel.

Princess Peach has instructed Mario to deliver secret messages to the governors of certain cities and Mario plans to use the supersonic rail system to carry out the task. However, Mario wants to pay a minimum amount of Mushroom to visit all the m cities assigned to him.

Write a program to help Mario determine the city in which he needs to start the journey in order to visit each and every of the m cities using a minimum amount of Mushroom and find out what the minimum amount of Mushroom required is. Note that he doesn't need to return back to the starting point and his journey ends as soon as all the m cities have been visited. When there are multiple possible starting points for the same minimum cost, Mario prefers to start from a city with the lowest value of the ID of the city.

As an illustration, assume that there are 7 cities connected using 6 tunnels as shown below where ID of each city is numbered from 1 to 7.
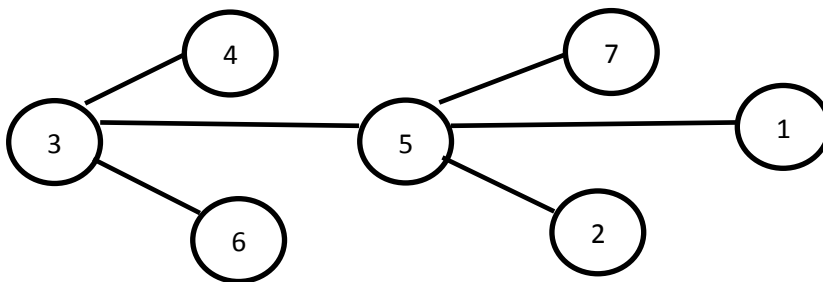
Furthermore, assume that Mario needs to visit two cities numbered 4 and 2. If he starts the journey at City #4, then move on to City #3, then to City #5 and finally to City #2, then he needs to pay 3 Mushrooms all together to visit City #4 and City #2. However, if he starts the journey at City #3, he will have to pay 4 Mushrooms or more, which is not optimal. In fact, for the given situation, 3 Mushrooms is the minimum cost required to visit City #4 and City #2 on a journey and there are two alternative starting points for the journey costing 3 Mushrooms. He could start the journey from City #4 or alternatively from City #2. Since Mario prefers to start at a city with the lowest ID, the starting city in this case is chosen to be City #2.

INPUT

The first line of the input consists of two integers n and m, separated by a white space, representing the total number of cities in the rail network, and the number of cities to be visited, respectively. Assume $1 \leq m \leq n \leq 50000$.

Next $n - 1$ lines describe the rail network. Each of the lines contains two integers separated by a white space representing the IDs of the two cities connected by a tunnel. The IDs of the cities range between 1 and n inclusive.

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The last line of the input contains m distinct integers separated by white spaces representing the IDs of the cities Mario must visit. The m integers are listed in no particular order.

OUTPUT

The first line of the output is an integer representing the minimum cost of the journey required to visit all the required m cities on the supersonic train network. The second line of the output is the integer ID of the city where the journey should start. If there are multiple alternative starting points, print the one with the lowest value of the city ID.

Sample Inputs/Outputs

Input	Output
7 2 3 4 3 5 3 6 5 7 5 1 5 2 4 2	3 2

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

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