Task: MET
Metro

XXVI OI, Stage III, Day trial. Source file `met.*` Available memory: 256 MB. *9.04.2019*

The street network of Bytown consists of n intersections and $n-1$ bidirectional streets, each one directly linking a pair of intersections in such a way that it is possible to travel between any pair of intersections. To improve traffic, mayor Byteasar wants to construct a metro. Specifically, he wants the metro stations to be located at some of the intersections, and the tunnels laid with tracks for super fast trains to lead underneath some of the streets. The metro network should be connected, i.e., the trains have to be able to travel between any pair of stations, possibly passing through other stations along the way.

Boring the tunnels is expensive, but even more so is constructing the *terminal stations*, i.e., ones with but a single tunnel entering — such stations require additional infrastructure for parking and maintenance of the trains. Due to financial constraints, there can be at most k terminal stations. On the other hand, a sensible metro network requires at least two such stations.

A passenger's *irritation index* is the minimum number of streets they have to walk down from home in order to reach any metro station. The mayor asks for a metro network design that minimizes the maximum irritation index. We assume that at every intersection there lives some passenger.

Input

In the first line of the standard input, there are two integers n and k ($n \geq 3$, $2 \leq k \leq n$), separated by a single space, which specify the number of intersections and the maximum number of terminal stations. The intersections are numbered from 1 to n.

Each of the $n-1$ lines that follow contains two integers a and b ($1 \leq a, b \leq n$, $a \neq b$), separated by a single space, indicating that the intersections no. a and b are directly linked by a street.

Output

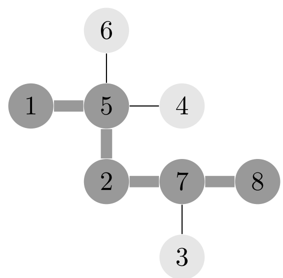
In the first line of the standard output two integers r and s, separated by a single space, should be printed: the minimum possible value of the maximum passenger's irritation index and the number of terminal stations (such that $2 \leq s \leq k$) of the metro network design that attains it, respectively. To the second output line, s distinct integers from the range from 1 to n should be printed, corresponding to the numbers of the intersections where terminal stations are to be located.

Of all network designs, the one with minimum r should be chosen. In case of a tie, the secondary objective is to minimize s. Should more than one network minimizing r and then s exist, any of those can be chosen.

Example

For the following input:

```
8 3
1 5
2 5
2 7
3 7
4 5
5 6
7 8
```



a correct (though not necessarily unique) result is:

```
1 2
8 1
```

Explanation for the example: The street network is depicted in the figure. The optimal metro network design has two terminal stations (at intersections no. 1 and 8). Its associated maximum passenger's irritation index is 1. Notice that there are other optimal metro network designs satisfying $r = 1$ and $s = 2$. There are also networks with $r = 1$ and $s = 3$, but these are not optimal.

Sample grading tests:

1ocen: $n = 30$, $k = 29$, intersections $2, \ldots, n$ are all linked to intersection 1.

2ocen: $n = 5000$, $k = 4000$, intersections $1, 2, \ldots, 2000$ are linked together in sequence, forming a path, intersections $2001, \ldots, 3500$ are all linked to intersection 1, intersections $3501, \ldots, 5000$ are all linked to intersection 2000.

3ocen: $n = 2^{20} - 1$, $k = 1509$, intersections form a full binary tree.

Grading

The set of tests consists of the following subsets. Within each subset, there may be several tests.

Your program will be awarded 50% of the score per test for which only its first output line is correct. Keep in mind that the program still has to properly terminate, exceeding neither the time nor the memory limit.

Time limits for particular subsets are published in SIO.

Subset	Condition	Score
1	$n \leq 5000$	30
2	$n \leq 500\,000$	40
3	$n \leq 3\,000\,000$	30