問題 5 – 奧林匹克 (Olympics)

## 問題敘述

奧林匹克是國際的重大體育競賽活動，各國都會派出最頂尖的好手來爭取榮耀。今年，「圖靈國」也派出了體育好手準備參賽。

圖靈國由 N 個島嶼組成，分別編號 1 到 N，並且有 N–1 條橋樑連接著這些島嶼，使得任何一個島嶼都可以透過橋樑到達其他所有島嶼，並且任兩座島嶼之間的路線是唯一的。

圖靈國派出了 K 位選手參加奧林匹克，因此圖靈國準備將 K 座島嶼建設為選手村，供每位選手一人一間，並將其他所有島嶼建設為訓練中心，讓選手們可以進行訓練。為了出發前往比賽會場，所有選手必須到 1 號島嶼集合（這個島嶼可以是選手村也可以是訓練中心），每位選手從各自的選手村出發，沿途經過訓練中心就會進行訓練並獲得一點經驗值。圖靈國相信團結力量大，因此希望所有選手到達 1 號島嶼時，他們的經驗值總和越多越好，你可以幫圖靈國規劃每座島嶼的使用方式，使得每位選手的經驗值總和越多越好嗎？
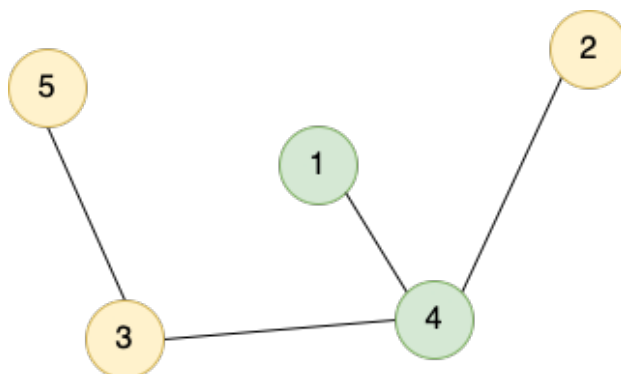
上圖為輸入範例 3 （見下）的情形。三位選手分別從 2、3、5 號島嶼（塗以黃色者）出發前往 1 號島嶼。他們都會經過 1 號與 4 號島嶼上的訓練中心（塗以綠色者）。

輸入格式

第一行有兩個正整數 N 與 K，分別代表總共有幾座島嶼與有幾位選手。每做島嶼分別編號 1 到 N。
接下來的 N–1 行，每一行有兩個正整數 A B，代表有一座橋連接編號為 A 與 B 的島嶼。

輸出格式

輸出一個整數代表經驗值總和的最大值。

資料範圍

- $1 \leq N \leq 10^5$
- $1 \leq K \leq N$
- $1 \leq A, B \leq N$

輸入範例 1
```
3 1
3 1
1 2
```

輸出範例 1
```
1
```

輸入範例 2
```
4 2
3 2
1 4
4 2
```

輸出範例 2
```
4
```

輸入範例 3
```
5 3
2 4
5 3
3 4
1 4
```

輸出範例 3
```
6
```

範例說明

在第一個範例中,選擇將選手村蓋在 2 號或是 3 號島嶼,並且讓 1 號島嶼是訓練中心,那麼選手會在 1 號島嶼獲得一點經驗值。

在第二個範例中,將 2 號與 3 號島嶼建為選手村,那麼這兩位選手都分別會經過 1 號與 4 號島嶼的訓練中心,獲得兩點經驗值,達到總和四點經驗值。

在第三個範例中,將 2,3,5 號島嶼建為選手村,則這三位選手都會經過 1 號與 4 號的訓練中心,獲得兩點經驗值。

Q5: Olympics

Description

The Olympics are international sporting events where the best players from different countries compete for glory.

This year, Turing Nation is participating in the Olympics. Turing Nation is comprised of N islands, numbered 1 to N, and N-1 bridges connecting the island, in a way that each island can follow a unique path to reach every other island in the nation.

Turing nation is planning to build some players villages and training centers for the players. Each island can be turned into either a players village or a training center. There will be k players participating the Olympics, so Turing nation will build k players villages, one for each player, and build training centers on the rest of the islands.

Now, the k players will leave their village and gather at island 1 to leave for the Olympics. For each training center on their way to island 1 (including island 1 if it is a training center), they will do some training there and gain one point of experience. Turing nation wants to arrange the location of the player villages and the training centers such that when all players reach island 1, the total point of experience of the players is maximized. Can you help them find this value?
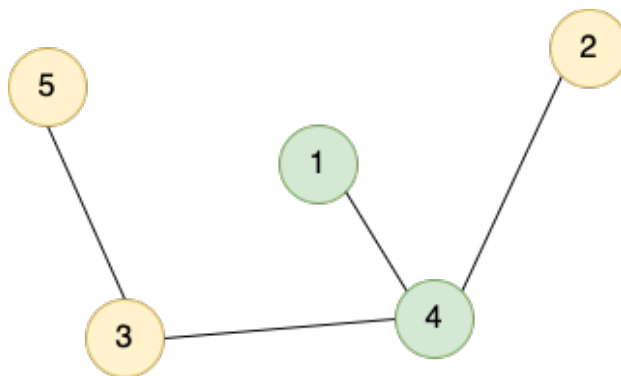
The figure above demonstrates the situation in input example 3 (see below). There are three players located on island 2, 3 and 5, which are colored in yellow. As they move to island 1, they all go through the training centers on island 1 and 4, colored in green.

Input Format

The first line of the input contains two positive integers N and K, indicating the number of islands and the number of players.

Each of the following N-1 line contains two integers A and B, indicating a bridge between island A and island B.

Output Format

The maximum total point of experience the players can get.

Data Range

- $1 \le N \le 10^5$
- $1 \le K \le N$
- $1 \le A, B \le N$

Input Example 1
```
3  1
3  1
1  2
```

Output Example 1
```
1
```

Input Example 2
```
4  2
3  2
1  4
4  2
```

Output Example 2
```
4
```

Input Example 3
```
5  3
2  4
5  3
3  4
1  4
```

Output Example 3
```
6
```

Example Explanation:
In example 1, the players village can be built on island 2 or 3. The player will train at the training center on island 1 and gain one point of experience.

In example 2, the players villages should be built on island 2 and 3. The two players will both have training at the training centers on island 1 and 4, gaining two points of experience each. That results in four points in total.

In example 3, the players villages should be built on island 2, 3 and 5. The three players will have training at the training centers on island 1 and 4, resulting in a total of 6 points of experience.