



Road Service

There are N cities in IOI kingdom, numbered from 0 through $N - 1$. There are also $N - 1$ bidirectional roads, numbered from 0 through $N - 2$. The road i connects the city A_i and the city B_i . There exists a path between any pair of cities.

The distance between two cities are defined as the smallest number of roads which connect the two cities. The total distance of IOI kingdom is defined as the sum of the distances between all pairs of different cities.

The king of IOI kingdom plans to construct K additional roads in order to reduce the total distance and improve convenience.

You, as an assistant of the king, help the king by finding a good plan.

Implementation details

This is an output-only task. Given the information of existing roads in IOI kingdom and the number of roads to construct, output a plan for constructing K roads. The less the total distance is, the more points you gain.

Input

There are 6 inputs for this task. Read the following data from each input.

- line 1: $N K W_0$
- line $1 + i$ ($0 \leq i \leq N - 2$): $A_i B_i$

Here W_0 is a parameter for scoring.

Output

- line $1 + j$ ($0 \leq j \leq K - 1$): $X_j Y_j$

Constraints

- $1 \leq N \leq 1\,000$
- $0 \leq A_i < B_i \leq N - 1$ ($0 \leq i \leq N - 2$)
- $(A_i, B_i) \neq (A_k, B_k)$ ($0 \leq i < k \leq N - 2$)
- There is a path between any pair of cities.

Submission

Submit the output for each of the inputs.

Scoring

For each input, your score is calculated as follows:

If your output does not follow the format, your score is zero point. Otherwise, let W be the total distance after constructing the roads according to your plan, and let P be the point for the input. Let us define $S = 1.0 - \frac{W}{W_0}$.

Here, the score you gain for the input is $\min\{P, P \times 20^S\}$.

In the contest system, the score of each input displayed in the submission details page are rounded to two decimal places. The sum of the scores displayed in the submission details page can be slightly different from the score of this task.

The values of N, K, W_0, P on each input are as follows:

Input Data	N	K	W_0	P
1	20	4	512	10
2	1000	100	2650000	18
3	1000	300	1755000	18
4	1000	100	2900000	18
5	1000	100	2690000	18
6	1000	300	1745000	18

Examples

Sample Input 1	Sample Output 1
4 1 8	0 3
0 1	
1 2	
2 3	

In addition to the existing roads, by constructing a road connecting the city 0 and city 3, the total distance becomes 8. Let $P = 10$ for this input. Here, $S = 0$, thus the score is 10 points.

Sample Input 2	Sample Output 2
4 1 8	0 1
0 1	
1 2	
2 3	

In this case, the total distance is 10 after constructing the road. Let $P = 10$ for this input. Here, $S = -0.25$, thus the score is $4.728 \dots$ points.