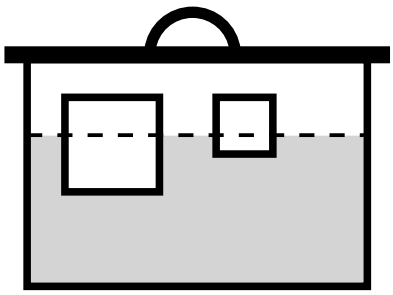
Barrel

Some amount of water is poured into a barrel, then a number of cubes of different size and density are put into water. Finally, a lid is put onto the barrel and pushed down until it touches the edges of the barrel.



Write a program to compute the resulting water level in the barrel.

It can be assumed that:

- the density of water is 1.0,
- the influence of air can be neglected,
- the cubes fit completely into the barrel,
- the cubes do not rotate and do not touch each other.

Input. The first line of the input file `BARREL.IN` contains three real numbers — the bottom area of the barrel, S ($0 < S \leq 1000$), the height of the barrel, H ($0 < H \leq 1000$), and the volume of water, V ($0 < V \leq S \cdot H$). The next line contains the number of cubes, N ($0 < N \leq 1000$). It is followed by N lines, each containing two real numbers describing a cube — the length of a side of the cube, L ($0 < L \leq 1000$), and the density of the cube, D ($0 < D \leq 10$).

Output. The first and only line of the output file `BARREL.OUT` must contain one real number — the resulting water level. The output must not differ from the correct value by more than 10^{-4}.

Sample.

BARREL.IN	BARREL.OUT
100 10 500 1 1 0.5	5.0050

Gems

The Gem-Toys Company asked you to solve the following problem.

You are given a connected acyclic graph, i.e. a set of vertices connected by edges in such a way that from each vertex you can reach all the other vertices by traversing the edges, and it does not contain a loop.

The Gem-Toys Company is going to produce jewelry models of such graphs. Vertices will be made of gems and edges will be made of gold string. It is required that adjacent vertices are made of different kinds of gems. For each positive integer p there is exactly one kind of gems with the price p.

Your task is to write a program computing the minimal total price of the gems needed to make the model.

Input. The first line of the input file `GEMS.IN` contains one positive integer N ($1 \leq N \leq 10\,000$), the number of vertices. The vertices are numbered from 1 to N. The following $N-1$ lines describe the edges, one per line. Each of these lines contains a pair of integers A and B separated by a space ($1 \leq A, B \leq N$, $A \neq B$). Such a pair represents an edge connecting vertices A and B.

Output. The first and only line of the output file `GEMS.OUT` must contain one integer: the minimal total price of the gems needed to make the model.

Sample.

`GEMS.IN`
```
8
1 2
3 1
1 4
5 6
1 5
5 7
5 8
```

`GEMS.OUT`
```
11
```

Table (task with open input)

For the given integer M, build a square table with N rows and N columns ($2 \leq N \leq 10$), filled with decimal digits, with the following restriction: the N-digit numbers formed by the digits in each table row (from left to right), each table column (from top to bottom) and each main diagonal (from top to bottom) must be multiples of M, must not start with the digit 0 and must be unique within the table.

For example, a valid table for $M = 2$ is

2	3	4
5	6	6
8	2	0

The following tables are not valid for $M = 2$:

4

because $N < 2$;

2	0
4	8

because the numbers in the last column and on one of the main diagonals start with the digit 0;

2	3	4
5	8	8
2	0	2

because the number 482 is present twice in the table.

It is not always possible to solve this task. For example, the task is unsolvable for $M = 10$.

Input. You are given ten test files `TABLE`x`.IN` ($1 \leq x \leq 10$), each containing one value of M.

Output. You must find a valid table for each test case and write it into the corresponding output file `TABLE`x`.OUT` ($1 \leq x \leq 10$). The first line of a file must contain N, the number of rows and columns in the table. The $i+1$-st line of the file ($1 \leq i \leq N$) must contain the elements of the i-th row of the table as N digits, separated by spaces.

Sample.

`TABLE.IN`
```
2
```

`TABLE.OUT`
```
3
2 3 4
5 6 6
8 2 0
```

Remark. It is known that there will be at least one solution for each given test input.

Grading. You will score 0 points for a test case if there is no output file for this test case or if any of the conditions given above are not met.

Otherwise your score for the test case is calculated from the formula

$$\textit{maximum points for the test case} \cdot \frac{N_{\textit{least among contestants}}}{N_{\textit{yours}}},$$

rounded down to the nearest integer value. Therefore, you should try to find a valid table with the least possible size, within the conditions given above.