A

Description

There are n vertices, numbered from 1 to n, and the i-th vertex is connected to the f_i-th vertex.

As we can know, a triangle is a shape with 3 vertices and 3 sides.

Find out if there is any triangle.

Standard Input

The first line contains a single integer $n(2 \le n \le 5000)$ — the number of vertices.

The second line contains n integers $f_1, f_2, \ldots, f_n(1 \le f_i \le n, f_i \ne i)$, meaning that the i-th vertex is connected to the f_i-th vertex.

Standard Output

Output `YES` if there is a triangle. Otherwise, output `NO`.

Sample

Sample Input 1

```
5
2 4 5 1 3
```

Sample Output 1

```
YES
```

Sample Input 2

```
5
5 5 5 5 1
```

Sample Output 2

```
NO
```

B

Description

Two people came to buy melons.

They all want to buy n kinds of melons now, and there are $2n$ fruit shops on the street, the distance between the i-th fruit shop and the $i+1$-the fruit shop is 1, and the type of melon sold by each fruit shop is a_i.

At the same time, they have a quirk, that is to buy melons from the smaller number to the larger number.

Now they want to know, if they start at the shop on the far left, how far would the two have to travel together to get each of them to buy n melons.

Standard Input

The first line of the input contains an integer number n — the number of melons $(1 \leq n \leq 10^5)$.

The second line contains $2n$ integers $a_1, a_2, \ldots, a_{2n}(1 \leq a_i \leq n)$, It is guaranteed that every number from 1 to n occurs in a exactly two times.

Standard Output

Print one number — the minimum distance that the guys have to walk in total to buy both melons.

Sample

Sample Input 1

```
3
1 1 2 2 3 3
```

Sample Output 1

```
9
```

Sample Input 2

```
4
4 1 3 2 2 3 1 4
```

Sample Output 2

```
17
```

C

Description

There are n bear children fighting.

The stamina value of each bear child is a_i.

As a teacher, you know the dangers of fighting very well, so you need to pull the fighting children away.

Now that you see m fighting against the bear children, you can make the fight stop by discouraging some of the bear children.

The cost of discouraging a bear child is his/her stamina value.

Now you want to know the minimum cost you need to pay.

Standard Input

The first line contains two integers n and m $(1 \le n \le 1000; 0 \le m \le 2000)$.

The second line contains n integers: $v_1,\ v_2,\ \ldots,\ v_n (0 \le v_i \le 10^5)$.

Then follow m lines, each line contains two integers x_i and y_i, representing a fighting from child x_i to child y_i $(1 \le x_i, y_i \le n; x_i \ne y_i)$.

Consider all the parts are numbered from 1 to n .

Standard Output

Output the minimum cost.

Sample

Sample Input 1

```
4 3
10 20 30 40
1 4
1 2
2 3
```

Sample Output 1

```
40
```

Sample Input 2

```
7 10
40 10 20 10 20 80 40
1 5
4 7
4 5
5 2
5 7
6 4
1 6
1 3
4 3
1 4
```

Sample Output 2

```
160
```

D

Description

You have an undirected connected graph with n points and n edges, obviously, you know it must be a base ring tree.

So a simple question appeared like this.

Given this graph, you need to find the minimum distance from each point in the graph to the ring.

Standard Input

The first line contains a single integer $n(2 \leq n \leq 5000)$ — the number of vertices.

The next n lines contain two integers u_i, v_i .

Standard Output

A line of n space-separated integers represents the shortest distance from each point to the ring.

if the vertex is on the ring, you should print the number 0.

Sample

Sample Input 1

```
4
1 3
4 3
4 2
1 2
```

Sample Output 1

```
0 0 0 0
```

Sample Input 2

```
6
1 2
3 4
6 4
2 3
1 3
3 5
```

Sample Output 2

```
0 0 0 1 1 2
```

E

Description

You are given an undirected graph with n vertices and m undirected weighted edges.

There are T teams on the graph, and the i-th team is at vertex $x[i]$. **There may be multiple teams at a vertex**.

Please arrange for some teams to move to other vertices so that there is at least one team on at least k vertices.

The time required to move is the edge weight.

What is the minimum time required to meet the requirements?

If the requirement cannot be met, output -1.

Standard Input

The first line contains 4 single integers $n, m, T, k(1 \le n \le 600, 1 \le m \le 20000, 1 \le k \le a \le \min(v, 200))$.

The second line contains T integers $x[i]$.

The next m lines contain 3 integers $u, v, w(1 \le u, v \le n, 1 \le w \le 1000)$, meaning that i-th undirected weighted edges.

Standard Output

Output minimum time.

Sample

Sample Input

```
6 7 5 4
5 5 2 2 5
1 3 3
1 5 2
1 6 5
2 5 4
2 6 7
3 4 11
3 5 3
```

Sample Output

```
3
```

F

Description

This is another rooted tree with point 1 as the root node that grows elders.

But unfortunately, only leaf nodes grow elders, and each leaf node grows only one elder.

For each edge in the tree, it has an inconvenience w_i .

One day, the elders want to hold a meeting. The place of the meeting is the root node, so each elder wants to reach the root node from his own node.

We define the total tiredness of consumption as the path edge inconvenience and, obviously, for an edge that is traversed multiple times, the tiredness needs to be recalculated.

Now the elders don't want to be too tired, so they want to make the total tiredness less than a given S value through the membrane method.

We define an operation as, selecting an edge on the tree, and using the cost of c_i to make the inconvenience of this edge from w_i to $\lfloor \frac{w_i}{2} \rfloor$

Seek minimum cost to meet the needs of the elderly.

Standard Input

The first line of the test case contains two integers n and $S(2 \leq n \leq 10^5; 1 \leq S \leq 10^{16})$.

The next $n-1$ lines describe the edges of the tree.

The edge i is described as four integers $u_i, v_i, w_i, c_i(1 \leq v_i, u_i \leq n; 1 \leq w_i \leq 10^6; 1 \leq c_i \leq 2)$, which is mentioned in the description.

Standard Output

the minimum total cost required to make the sum of weights paths from the root to each leaf at most S .

Sample

Sample Input 1

```
4 18
2 1 9 2
3 2 4 1
4 1 1 2
```

Sample Output 1

```
0
```

Sample Input 2

```
5 50
1 3 100 1
1 5 10 2
2 3 123 2
5 4 55 1
```

Sample Output 2

```
11
```

G

Description

Kazuhime finds a tree on the ground and she wants to give it to Wang Jiro.

But the tree looks too drab, so Kazuhime decides to paint every edge of the tree a color.

In particular, Kazuhime hopes that for each point, the colors of all the connected edges are different from each other, because this may be more in line with Wang Jiro's aesthetic.

The cost of coloring an edge with color i is i , Kazuhime wants to know the minimum cost.

Standard Input

The first line is a positive integer n $(n \leq 150)$, representing the number of points in the tree.

The next $n-1$ lines each have two positive integers s, t, representing an edge connecting the point numbered s to the point numbered t.

Standard Output

Output a number for the minimum cost.

Sample

Sample Input

```
5
1 2
1 3
2 4
2 5
```

Sample Output

```
7
```

H

Description

Ljj came to A city.

There are n key points in city A, and there are two important materials B and C that need to be transported between these n key points to ensure the normal operation of city A.

Ljj found that these two materials were transported by two different transportation systems in city A.

Each transportation system is composed of $n-1$ roads, each of which connects two key points in the city, and these two key points can transport corresponding types of materials through this road.

City A can function normally because each transportation system ensures that materials can be transported from any city to any city via several roads.

Sometimes the transportation system of city A to transport material B may fail, resulting in a road not being able to transport material B, but only material C. At this time, it is necessary to urgently mobilize the existing resources, and find a road from the transportation system that transports the C material, so that it can transport the B material but not the C material, and enable the normal operation of the A city.

Ljj would like to know, for each road in the transportation system that transports goods from B, how many mobilization options are there to keep city A functioning if it fails.

Standard Input

The first line contains a number $n(n \leq 10^6)$, which represents the total number of cities.

In the next $n-1$ lines, the i-th line has two numbers x_i, y_i, indicating that the i-th road in the first transportation system connects the two key points x_i, y_i.

In the next $n-1$ lines, the i-th line has two numbers x'_i, y'_i, indicating that the i-th road in the second transportation system connects the two key points x'_i, y'_i.

Standard Output

Output a line with n numbers, where the i-th number represents the number of mobilization plans that can make city A operate normally after the failure of the i-th edge of the first transportation system.

Sample

Sample Input

```
6
3 2
1 3
6 3
2 5
6 4
6 5
1 5
3 5
5 4
1 2
```

Sample Output

```
3 1 1 1 1
```