One of the post services companies in a country plans to designate one of its branches as the central office. The company has a branch in each and every city in the country. The cities are so connected by roads that to go from any city to another, there is a unique sequence of roads to take. The central office is in charge of dispatching parcels to all other branches. For this purpose, a car is used that starting from the central office goes through all cities to the last one delivering their parcels. As time is always a top priority in post services, the company's administration wants a designation which minimizes dispatching times. If the car travels the distance between any two adjacent cities in one hour, calculate the minimum total dispatching time T_m, considering the optimal designation.

Input

The first line of input contains an integer $T \leq 100$ denoting the number of test-cases. Each test-case begins with an integer $1 \leq N \leq 10,000$ denoting the number of cities (numbered from 1 to N) of the country, on a separate line. The i-th line of the following N lines starts with the number M_i of the cities adjacent to the i-th city followed by M_i integers, the neighboring city indexes.

Output

For each test-case, output on a single line the minimum dispatching time T_m.

Sample Input

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

Sample Output

```
1
5
```