

## City Z

The city consists of 25 districts, connected by streets with one-way or two-way traffic. On the map, the districts are represented by circles containing the name of the district (letter A – Y) and coefficient  $k$ , proportional to the number of inhabitants of the area. Streets are represented by lines, for each street the time  $t$  to travel on it is indicated near the line. A police patrol, when traveling around the city, at least once passes through each street and least  $k$  times visits each district. The problem is to develop a patrol route passing through the city in a minimum of time.

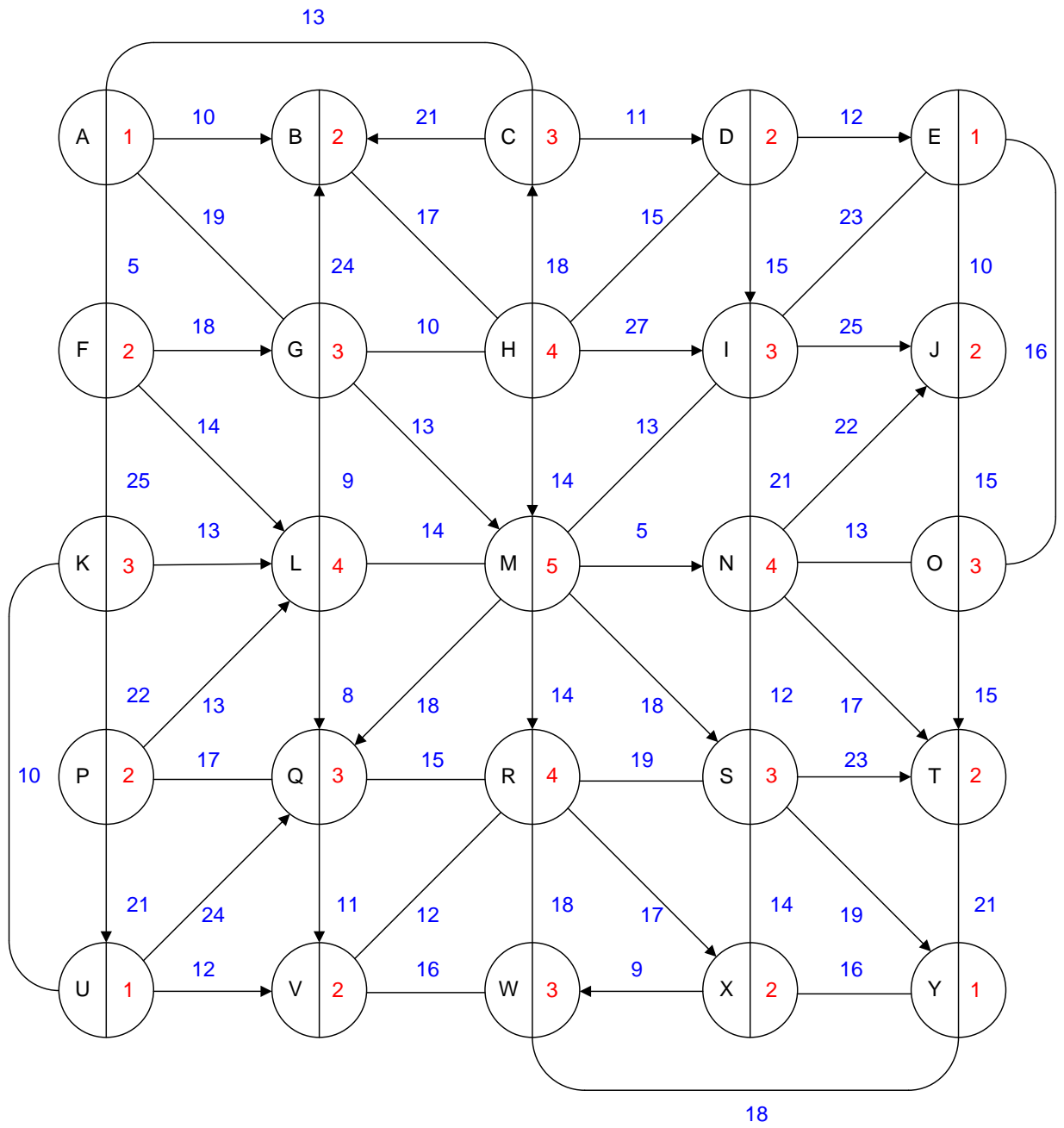
The city map is a mixed graph in which the weights are assigned to the vertices and edges. It is required to find the cycle with the smallest total weight of edges containing all the edges of the graph and passing through each vertex at least  $k$  times.

The assignment includes:

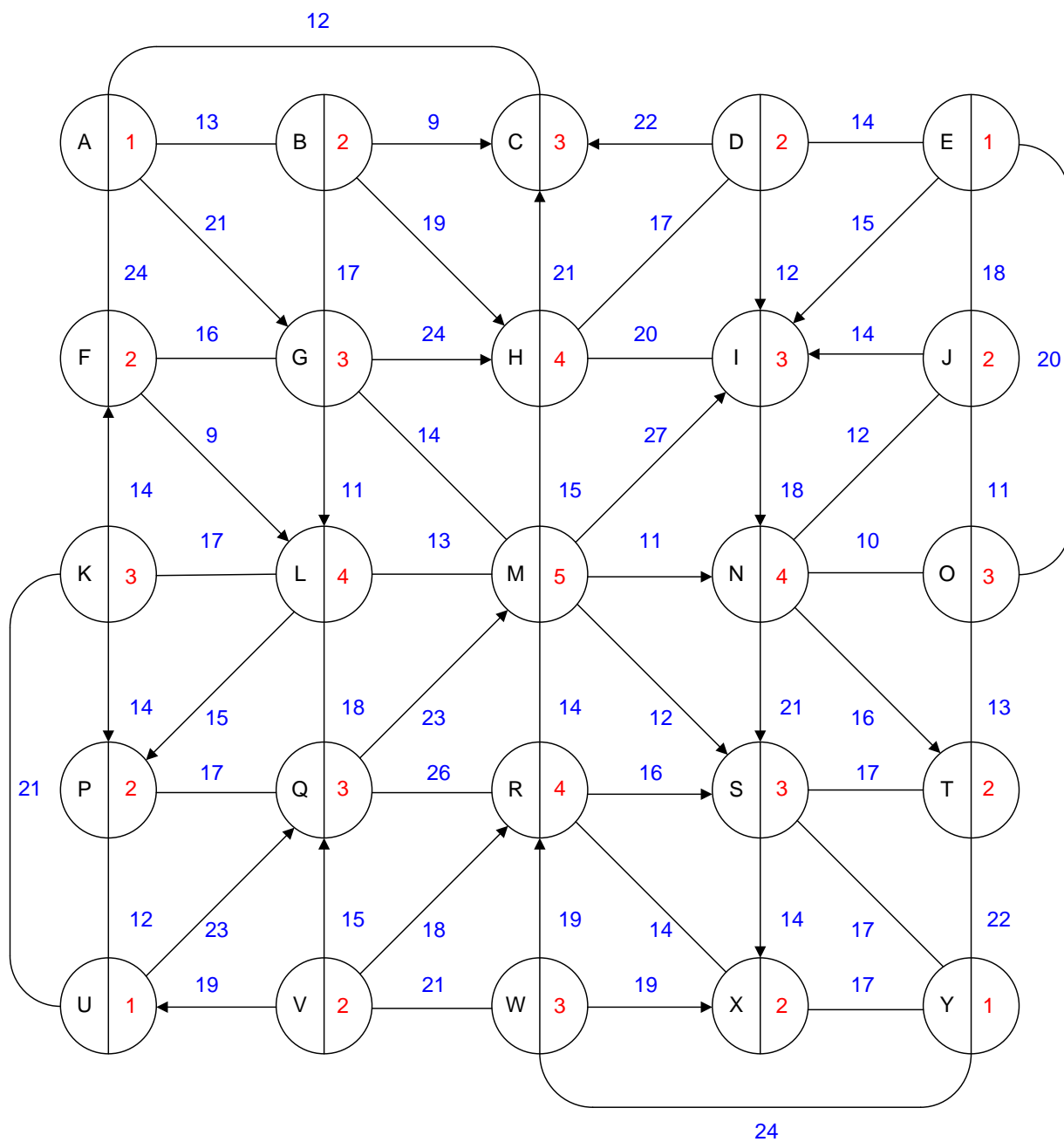
1. Development of the algorithm for solving the problem.
2. Evaluation of its quality and computational complexity.
3. Development a program that implements the algorithm.
4. Testing the algorithm.
5. Presentation of the algorithm.
6. Readiness to test the operation of the program with a control example.

To complete the assignment, students can be grouped together from one up to four people. For the task, the team receives no more than  $10N$  points, where  $N$  is the number of people in the team. Points are distributed according to the contribution of the team members.

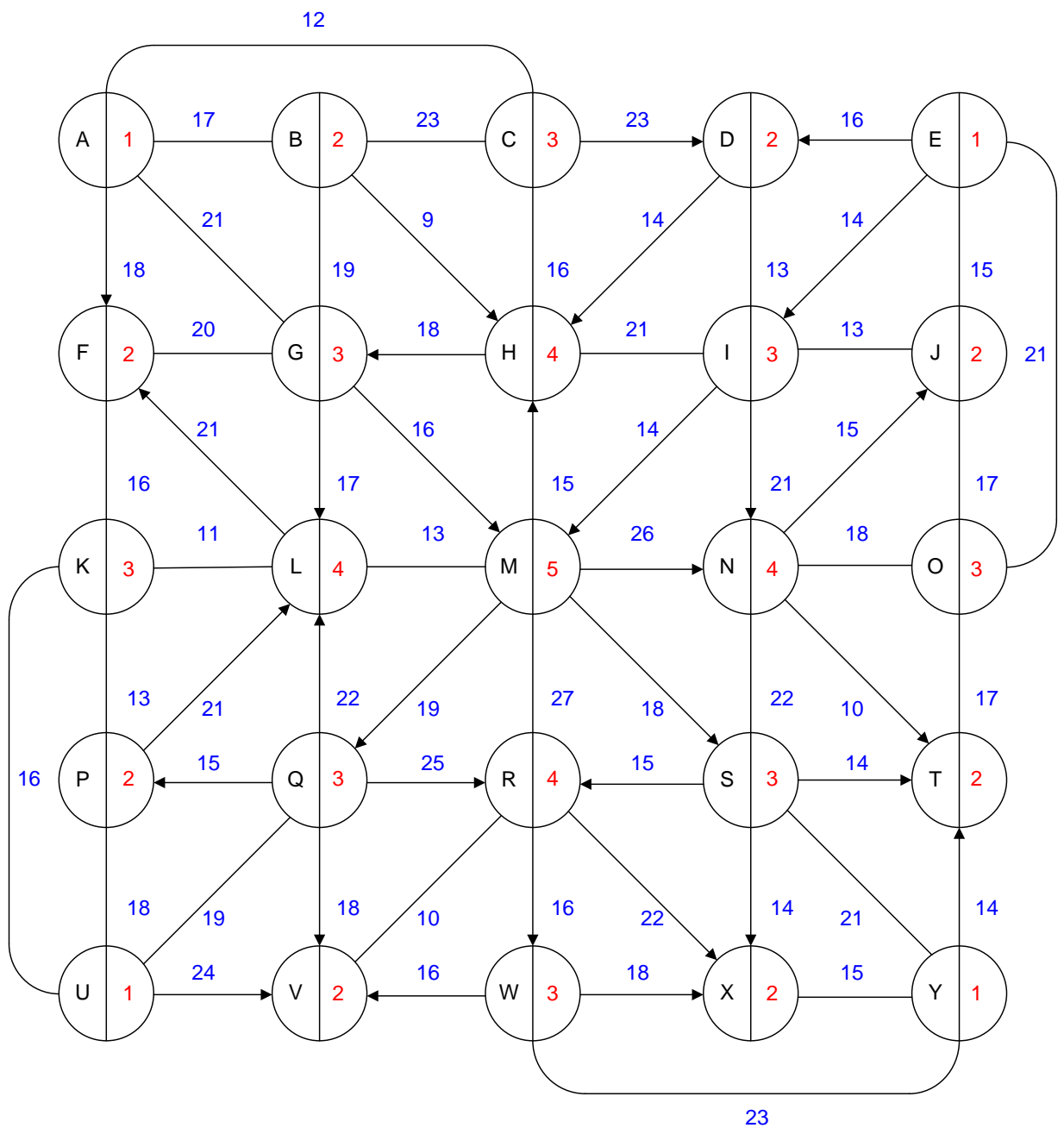
Город Z. Вариант 1.



Город Z. Вариант 2.

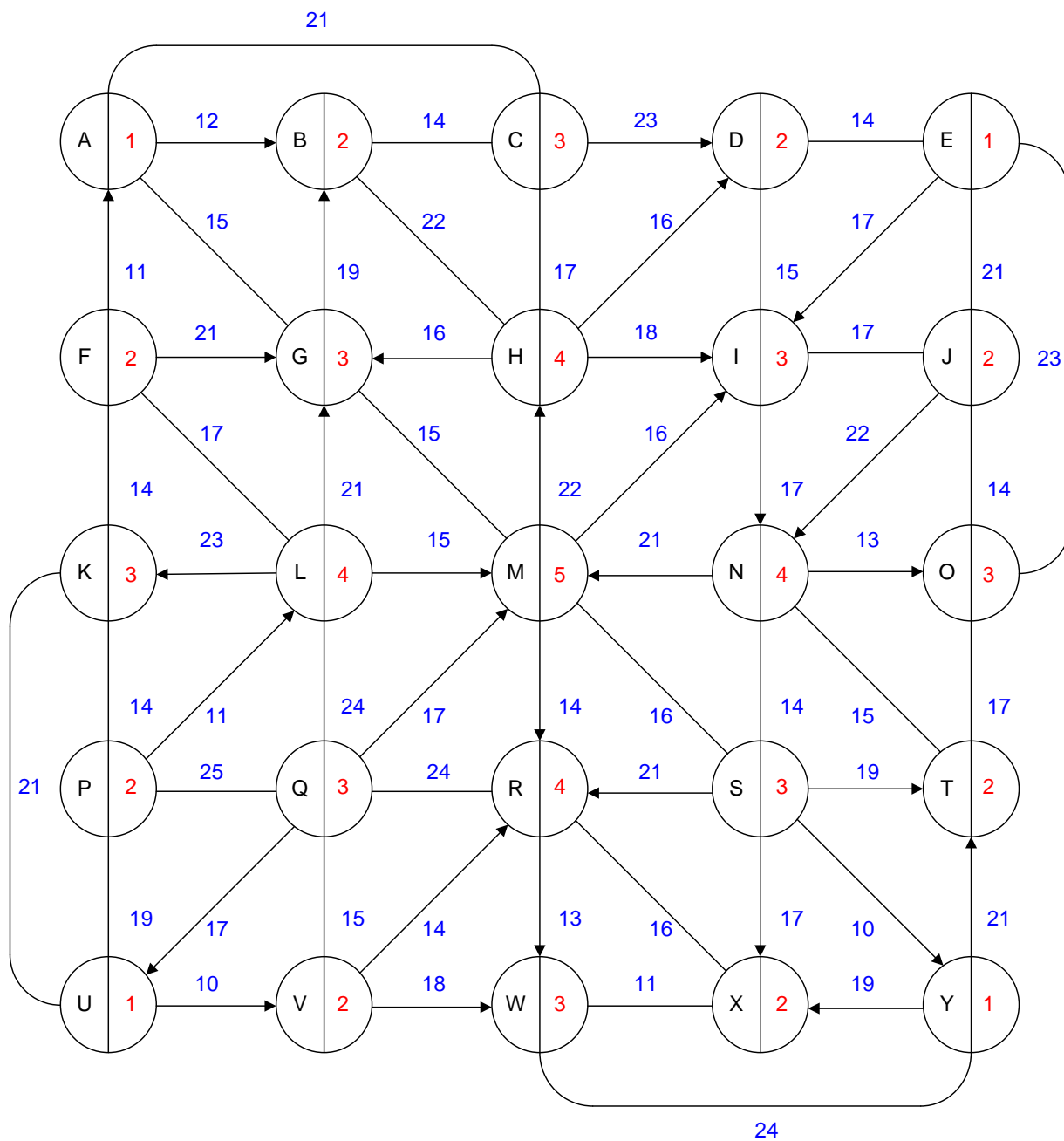


Город Z. Вариант 3.

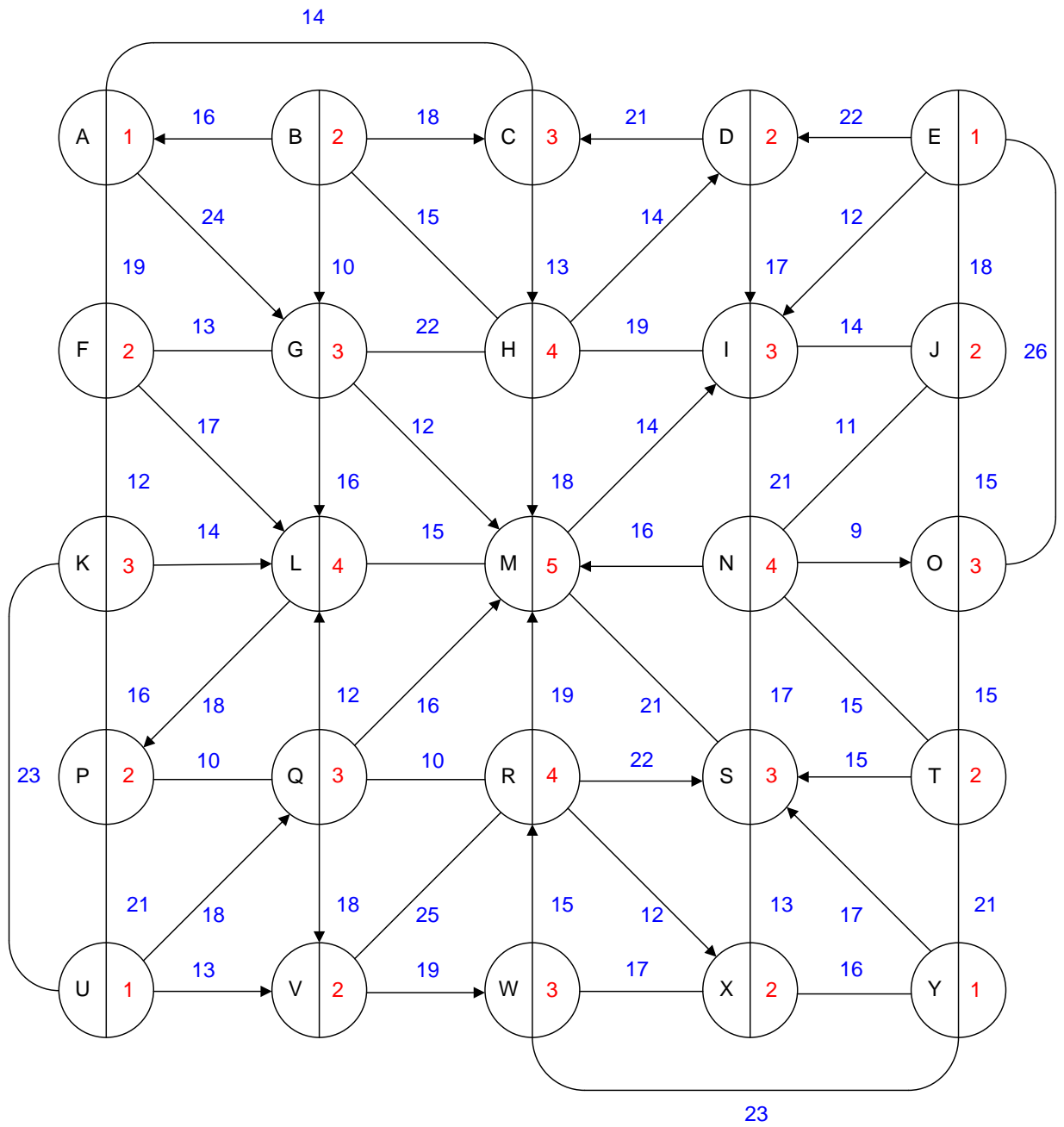




Город Z. Вариант 4.



Город Z. Вариант 5.







Город Z. Вариант 6.

