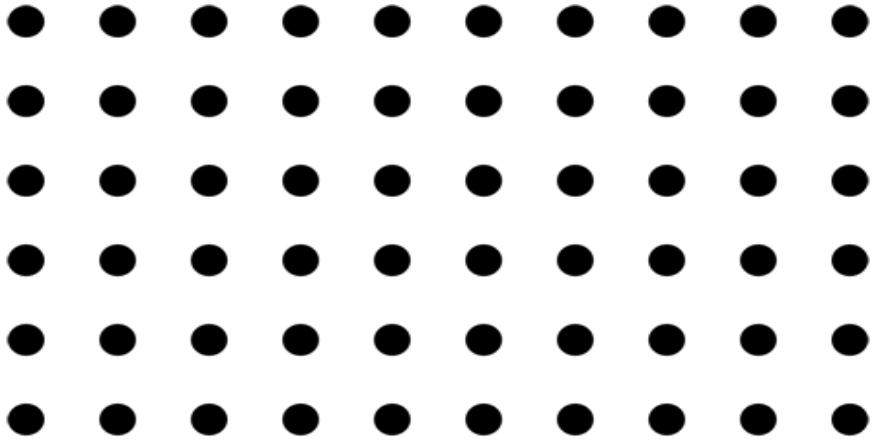
**Test tasks**

**1. Work with procedural geometry**

Procedurally create a model of a rectangular flag canvas with a given grid resolution. An example of grid vertices is shown in the figure:



The number of vertices horizontally and vertically must be specified by a variable. The flag model should consist of triangles. Create your own shader that will impose an arbitrary texture on the entire surface of the flag.

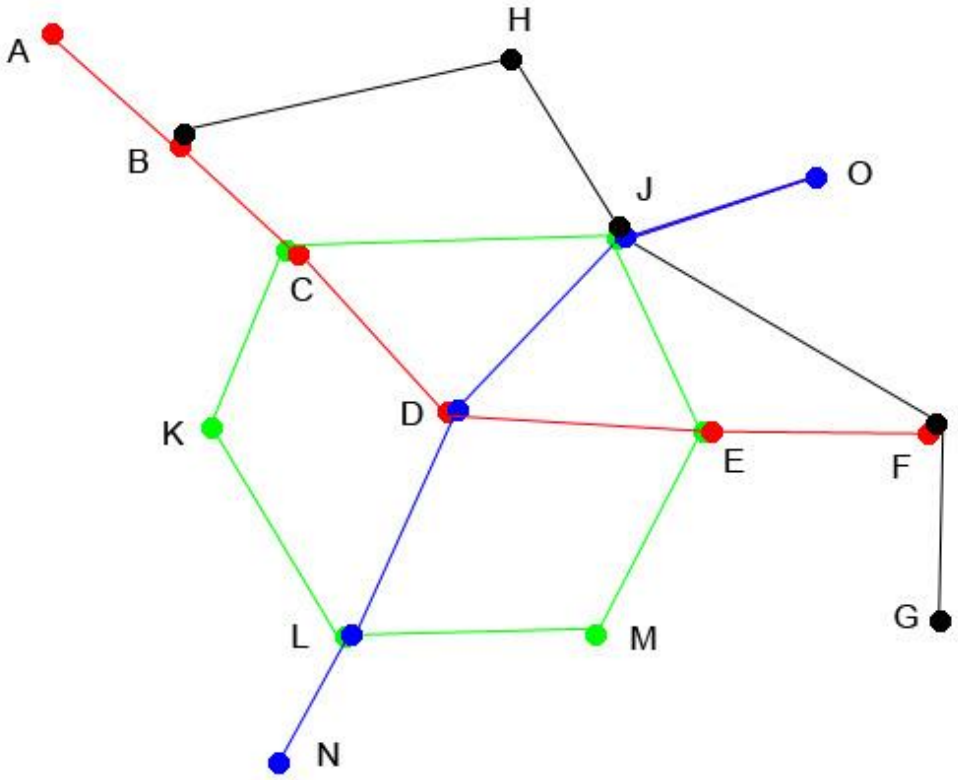
Using the resulting model:

a. Perform canvas animation in the form of waves.
b. Implement horizontal animation of flag texture scrolling.

Both must be implemented:

1. In the script inside the unit (CPU implementation)
2. In the pixel and vertex shader (GPU implementation)

**2. Work with algorithms and data structures.**




The figure shows the metro scheme of the virtual city.

a. Develop a data structure that will store this view of metro routes.
b. Based on the developed structure, create an algorithm that searches for the shortest path from an arbitrary station to any other. The shortest route is the route with the least number of stations.
c. For each path found it is necessary to indicate the number of transfers when moving along the route.

Transfers stations from route to route considered one station.

**3. OOP and architectural design**

We have a spaceship. It consists of various modules that improve the characteristics of the ship. The ship has basic HP and a shield, the shield is restored over time.
You need to make a simple prototype, where there will be two ships on the screen, you can select the modules for both ships and start the battle. The criterion for victory is the death of one of the ships.

What will be evaluated**:**

- Design and architecture

- Code quality

- Solution efficiency

**Data:**

Ship A:

HP 100

Shield 80, recovery rate 1 per second

2  weapon slots

2 module slots

Ship B:

HP 60

Shield 120, recovery rate 1 per second

2  weapon slots

3 module slots

**Modules:**

Gun A – 3 seconds shot, 5 damage

Gun B – 2 seconds shot, 4 damage

Gun C – 5 seconds shot, 20 damage

Module A - +50 to shield

Module B - +50  to HP

Module C - -20% reload

Module D - +20% shield recovery