Task 5. Algorithms on graphs. Introduction to graphs and basic algorithms on graphs

Goal

The use of different representations of graphs and basic algorithms on graphs (Depth-first search and Breadth-first search)

Problems and methods

I. *Generate a random adjacency matrix for a simple undirected unweighted graph with 100 vertices and 200 edges (note that the matrix should be symmetric and contain only 0s and 1s as elements). Transfer the matrix into an adjacency list. Visualize the graph and print several rows of the adjacency matrix and the adjacency list. Which purposes is each representation more convenient for?*

II. *Use Depth-first search to find connected components of the graph and Breadth-first search to find a shortest path between two random vertices. Analyse the results obtained.*

III. *Describe the data structures and design techniques used within the algorithms.*