

LAB211 Assignment

Type:
Code:
LOC:
Slot(s):

Short Assignment
J1.S.P0007
70
1

Title

Undirected graphs representation.

Background Context

Graphs are widely-used structure in computer science and different computer applications. Graphs mean to store and analyze *metadata*, the connections, which present in data. For instance, consider cities in your country. Road network, which connects them, can be represented as a graph and then analyzed.

Program Specifications

Design a program generate a graph as guideline below. The GUI prompts users to input two points and determine this is edge of graph or not. Construct a class Graph using adjacency matrix to present graph follow guideline below.

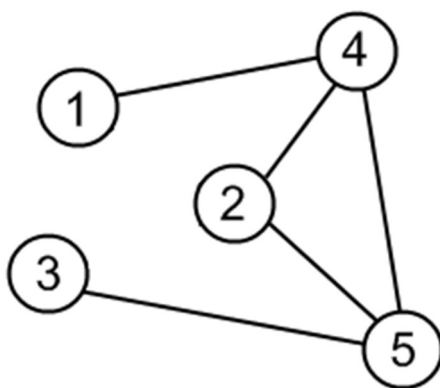
Expectation of User interface:

```
Enter the start point:  
2  
Enter the end point:  
5  
This is an edge
```

Guidelines

Adjacency matrix

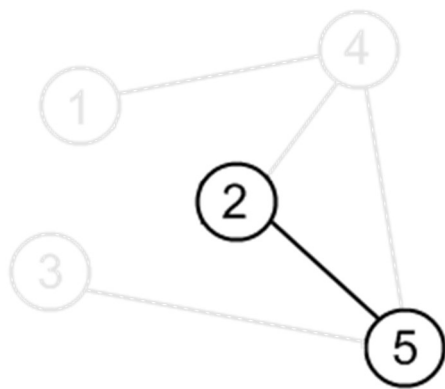
Each cell a_{ij} of an adjacency matrix contains 0, if there is an edge between i-th and j-th vertices, and 1 otherwise. Before discussing the advantages and disadvantages of this kind of representation, let us see an example.



Graph

	1	2	3	4	5
1	0	0	0	1	0
2	0	0	0	1	1
3	0	0	0	0	1
4	1	1	0	0	1
5	0	1	1	1	0

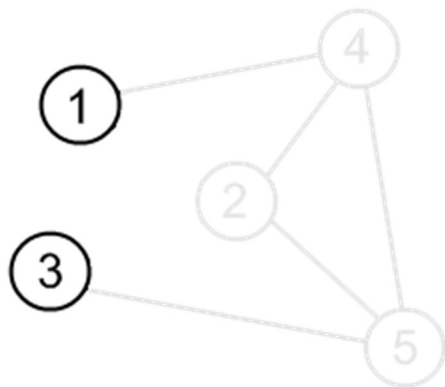
Adjacency matrix



Edge (2, 5)

	1	2	3	4	5
1	0	0	0	1	0
2	0	0	0	1	1
3	0	0	0	0	1
4	1	1	0	0	1
5	0	1	1	1	0

Cells for the edge (2, 5)



Edge (1, 3)

	1	2	3	4	5
1	0	0	0	1	0
2	0	0	0	1	1
3	0	0	0	0	1
4	1	1	0	0	1
5	0	1	1	1	0

Cells for the edge (1, 3)

The graph presented by example is undirected. It means that its adjacency matrix is symmetric. Indeed, in undirected graph, if there is an edge (2, 5) then there is also an edge (5, 2). This is also the reason, why there are two cells for every edge in the sample. Loops, if they are allowed in a graph, correspond to the diagonal elements of an adjacency matrix.