| **LAB211 Assignment** | **Type:** | **Short Assignment** |
| --- | --- | --- |
| **Code:** | **J1.S.P0007** |
| **LOC:** | **70** |
| **Slot(s):** | **1** |

**Title**

Undirected graphs representation.

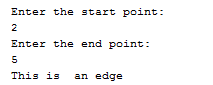
**Background Context**

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:***



**Guidelines**

## Adjacency matrix

Each cell aij 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 sample | Adjacency matrix for the graph |
| --- | --- |
| Graph | Adjacency matrix |

| Edge (2, 5) | Cells for edge (2, 5) |
| --- | --- |
| Edge (2, 5) | Cells for the edge (2, 5) |

| Graph sample | Adjacency matrix for the graph |
| --- | --- |
| Edge (1, 3) | 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.