# Graph Theory Assignment

## Problem Statement:

1. Represent the University Campus as Graph.
2. Identify shortest path between any 5 locations.
3. Identify the minimum spanning tree.
4. Find out the types of Graph patterns.

Name      :      Bibrata Barman
Reg. no  :      19352011
Class     :       M.C.A (1$^{st}$ Semister)
Year      :       2019

# 1. **University Campus as Graph.**



1.0 PONDICHERRY UNIVERSITY CAMPUS GRAPH :

• Weight in minute

G-II    G-I

BIBRATA BARMAN
MCA (Ist)    2019
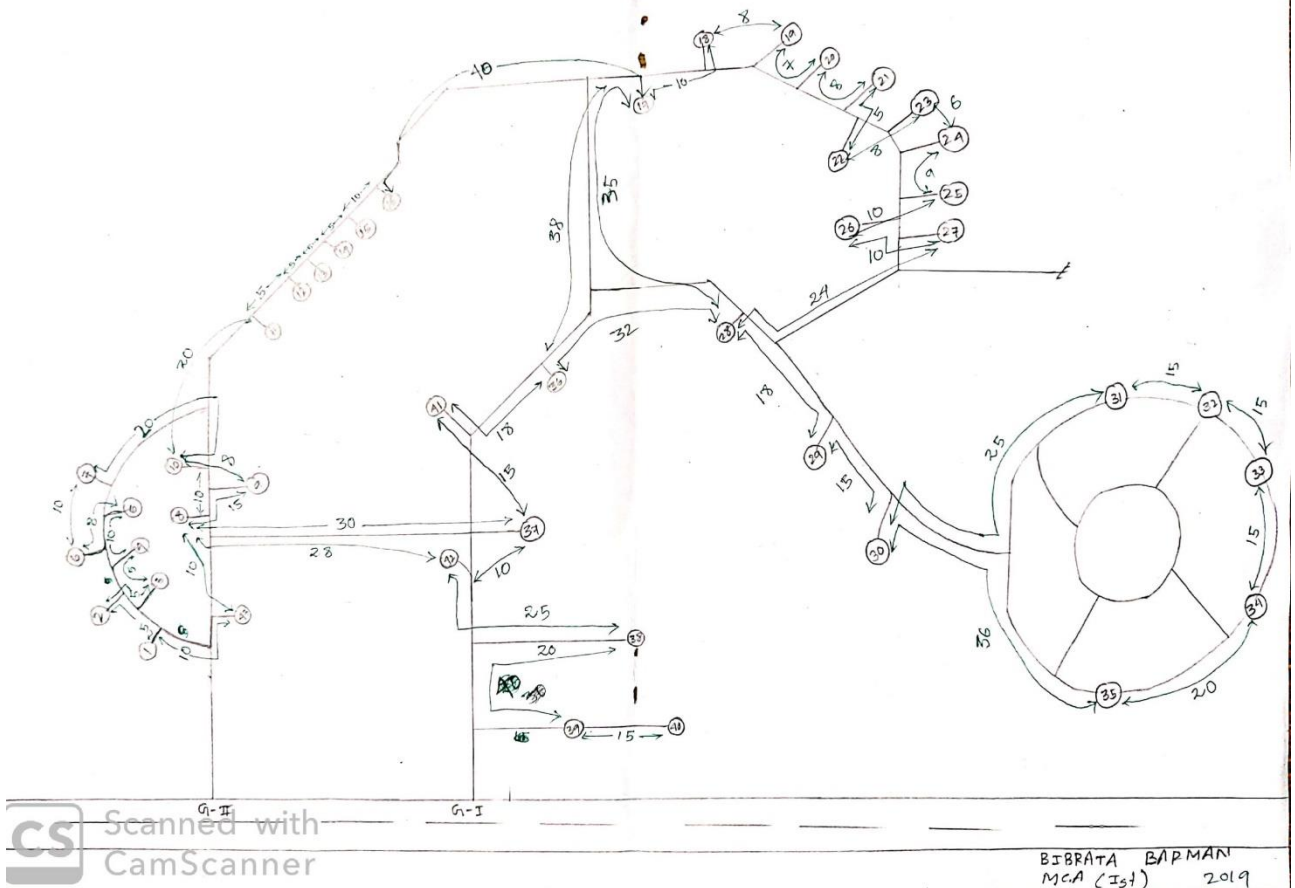
2.② find the shortest Path:

1) <u>vertex 21 to 2 :</u>

$$\begin{array}{r} 192 \\ 123 \\ \underline{181} \end{array}$$

㉑ ⟶ ⑳ ⟶ ⑲ ⟶ ⑱ ⟶ 17

$$\left( 21 \to 20 \to 19 \to 18 \to 17 \to 36 \to 41 \to 37 \to 8 \atop \qquad\qquad 169 \leftarrow 2 \leftarrow 1 \leftarrow 43 \right)$$

∴ Total weight = 169

2) <u>35 to 42 :</u>

$$144$$

$$35 \to 30 \to 29 \to 28 \to 36 \to 41 \to 37 \to 42$$

∴ Total weight = 144

3) <u>1 to 28 :</u>

$$\left( 1 \to 43 \to 8 \to 37 \to 41 \to 36 \to 28 \right) \to 115$$

∴ Total min weight = 115

4) <u>16 to 37 :</u>

$$\left( 16 \to 15 \to 14 \to 13 \to 12 \to 11 \to 10 \to 8 \to 37 \right) \to 90$$

∴ Total min weight = 90

5) <u>2 to 37 :</u>

$$\left( 2 \to 1 \to 43 \to 8 \to 37 \right) \to 55$$

∴ Total min weight = 55.

3. ☑ Minimum Spaning Tree:

• Total weight for minimum spaning Tree = 511

G—Ⅱ          GⅠ
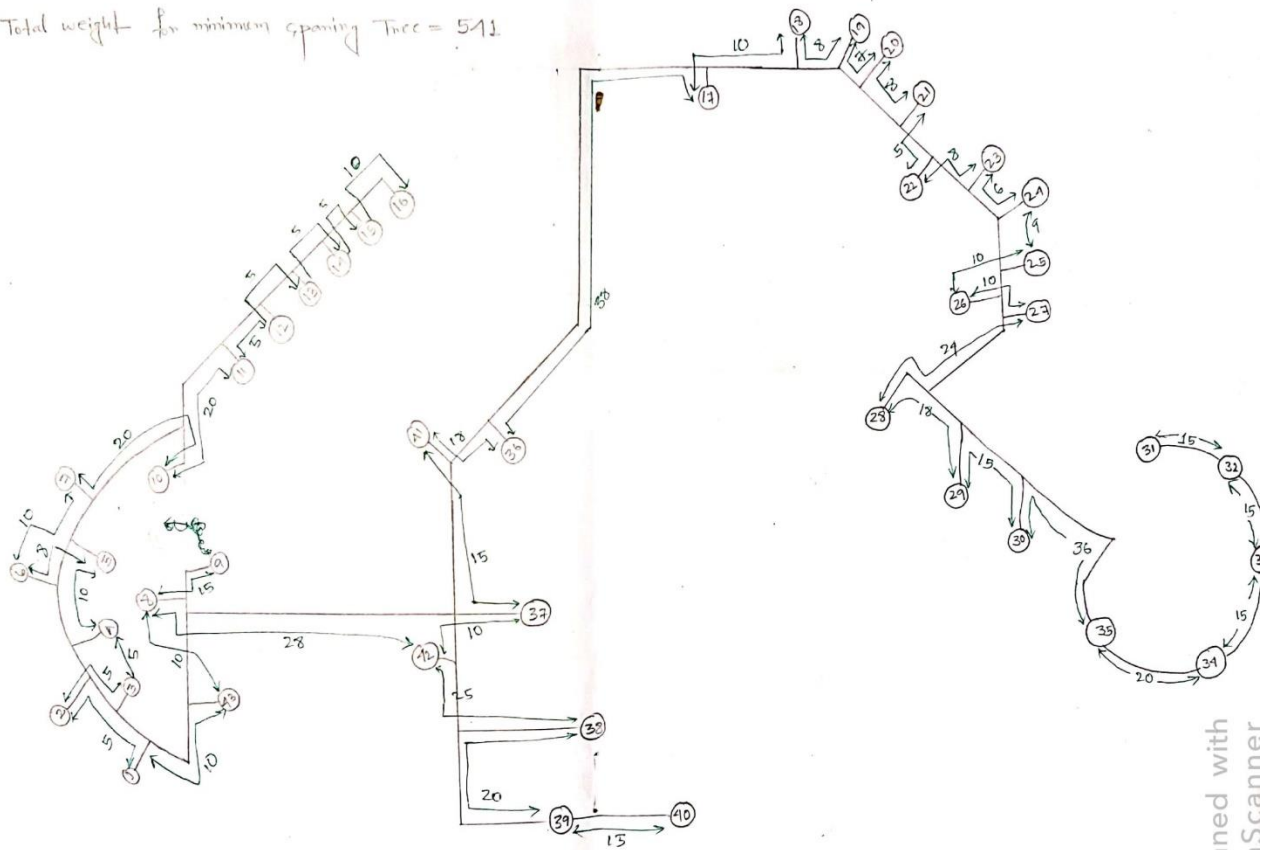
BIBRATA BARMAN
MCA (ISI) 2019

## 4. ☑ Types of Graph Patterns:

**① Verticies (Vertex):**

In that following graph consists of all set of node objects are called verticies or vertex. The total no. of vertex of that graph is → 43.

**② Edges:** In that following graph the connection between two verticies or vertex elements are called edges.

The total no. of edge of that graph is → 47.

**③ Simple graph:**

A graph that has neither self-loop nor parallel edges is called simple graph. In that graph has not any self-loop nor any parallel edges so, that graph is also a simple graph. as well as complete graph.
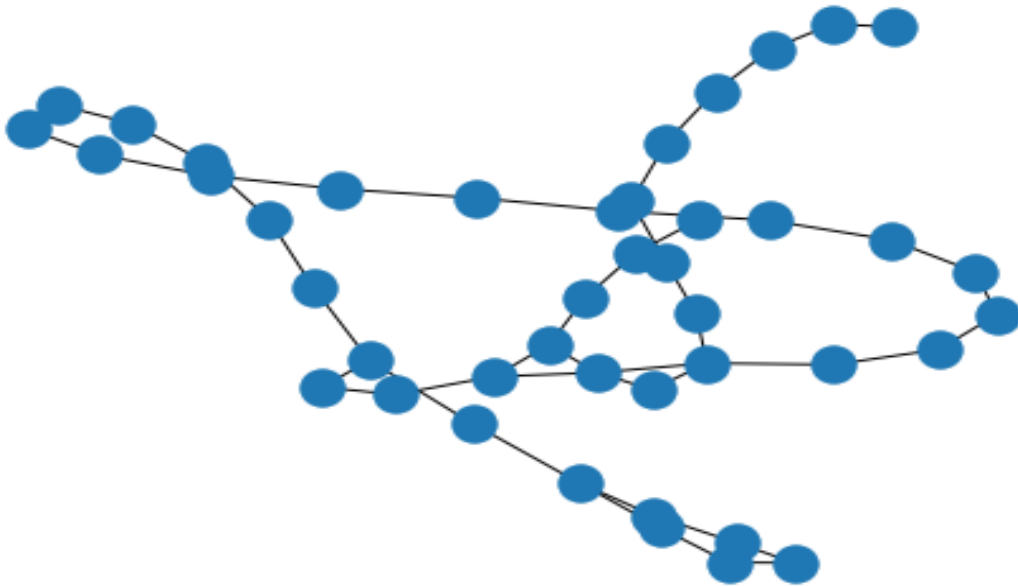
**④ Cycle Graph:**

In that following graph consisting of nodes 30, 31, 32, 33, 34, 35 is a cycle graph and 26 27, 25, 24, 23, 22, 21, 20, 19, 18, 17, 28 is also a cycle graph and 43, 1, 3, 2, 1 6, 5, 7, 10, 9, 8 and is also a cycle graph.

**⑤ Cut-vertex and Cut-edge:**

In that graph vertex 29 and 30 are the cut-vertex and the edge between that two vertex is called cut edge.

## Graph without labeling:



## Graph with labeling: