



SMIT SIKKIM
MANIPAL
UNIVERSITY
SIKKIM MANIPAL INSTITUTE OF TECHNOLOGY

Engineering Mathematics III

Discrete Mathematics

Lecture 13

Introduction to Graphs

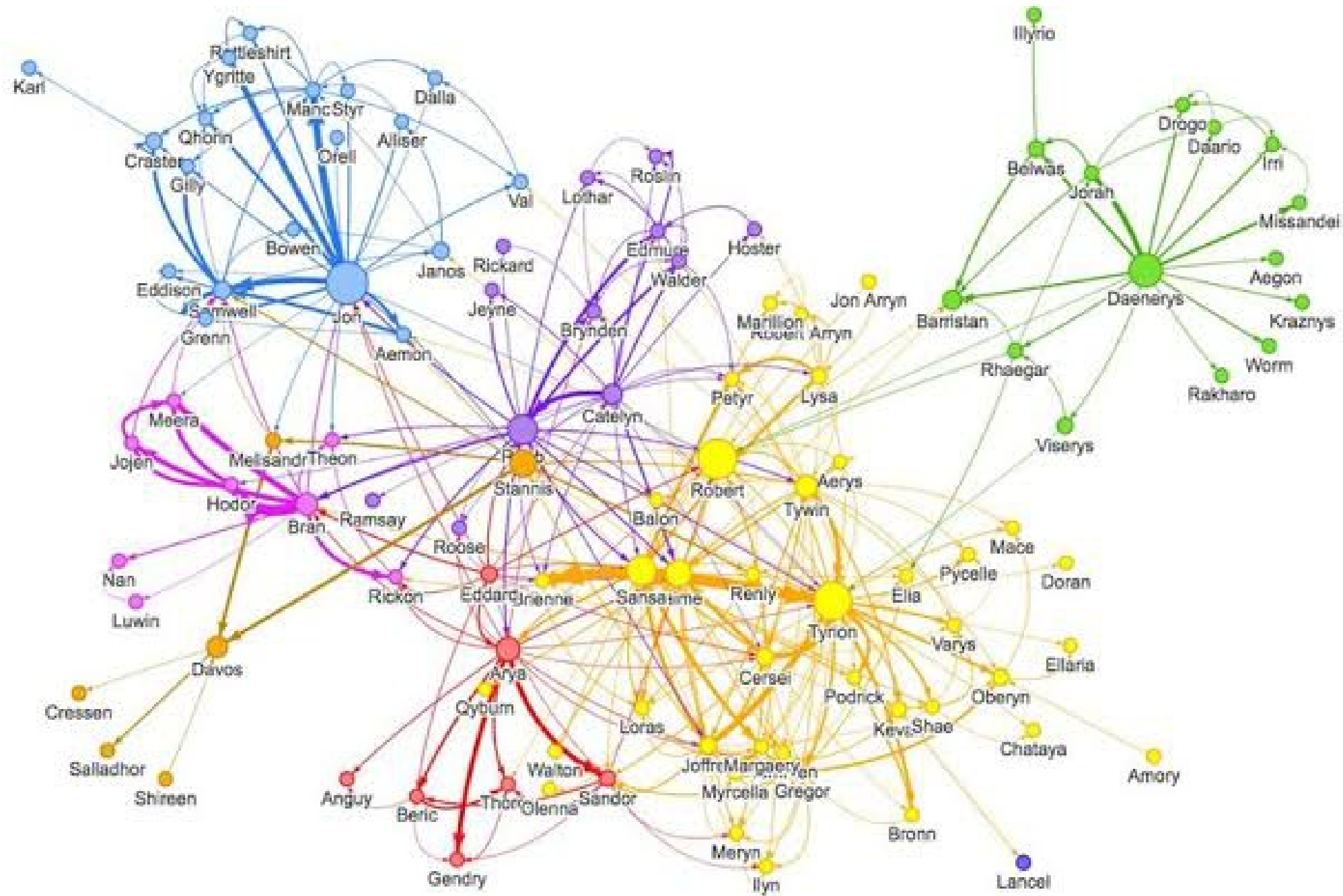
This course is taught to Computer Science Engineering students in SMIT, India during Jun-Dec, 2019.

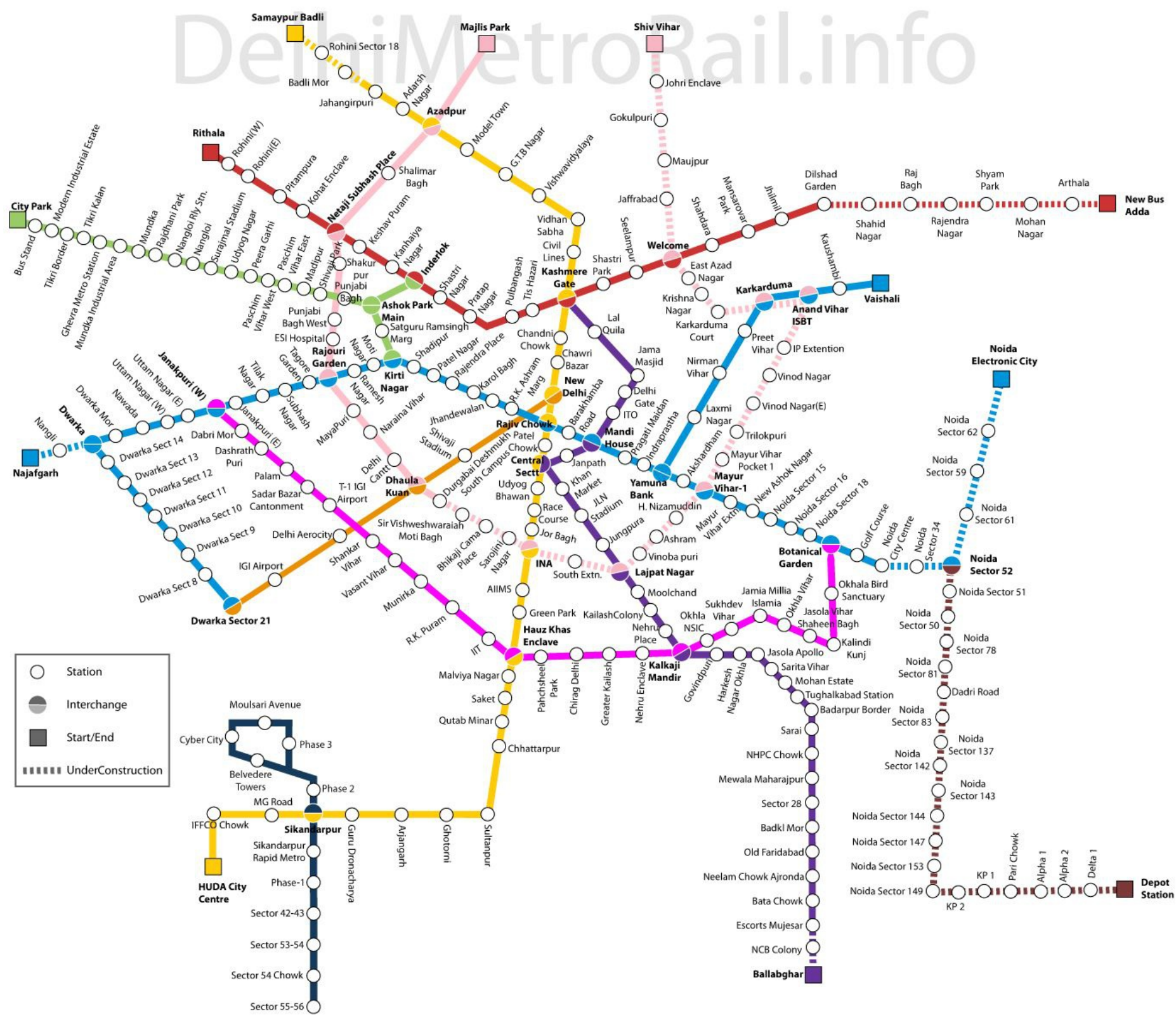
What is a Graph?



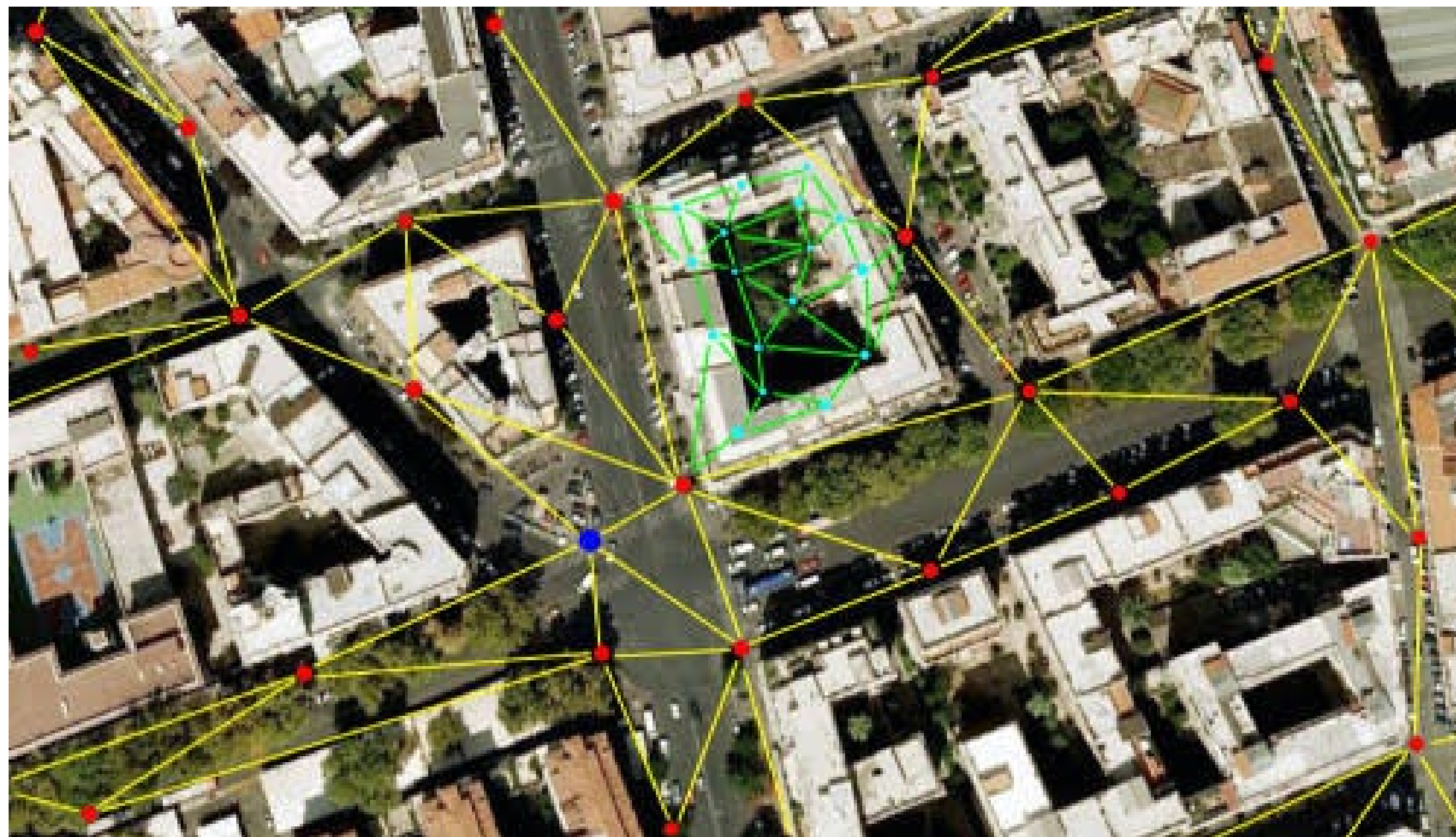
Social Network

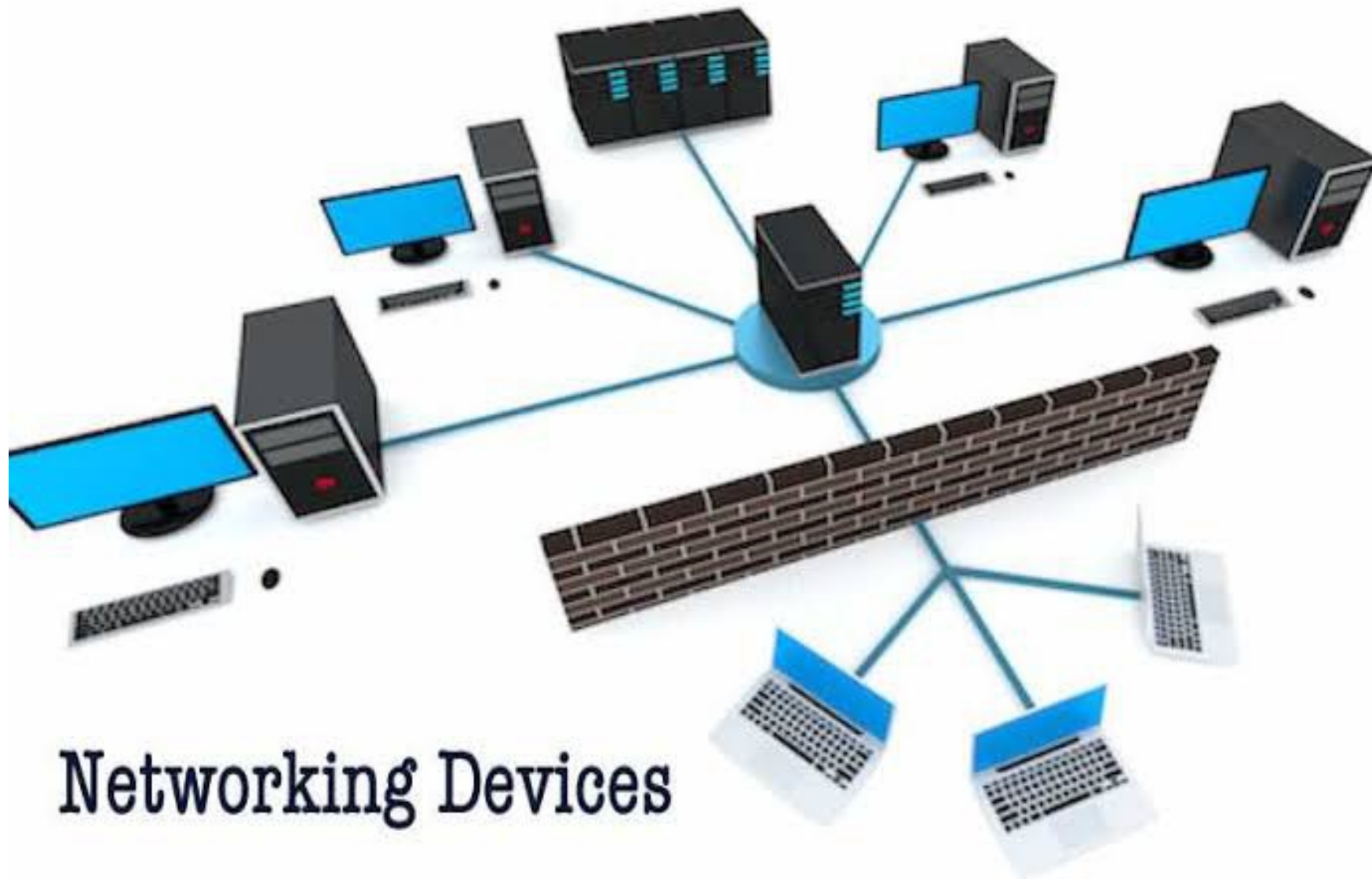






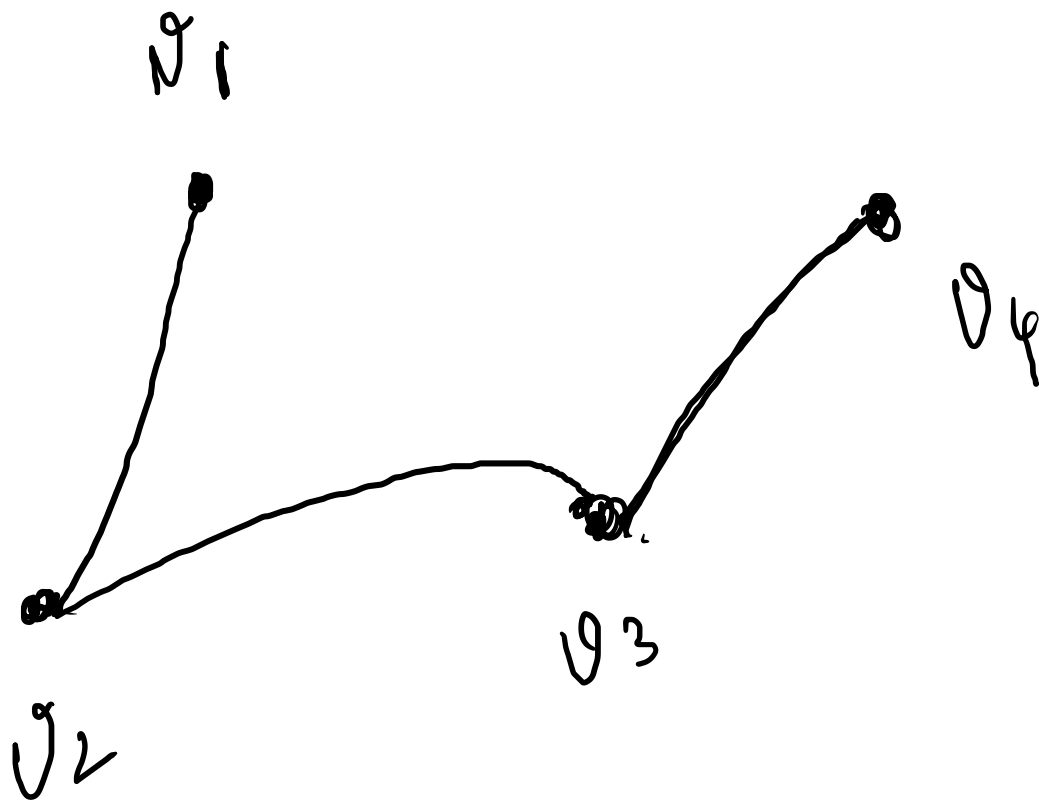






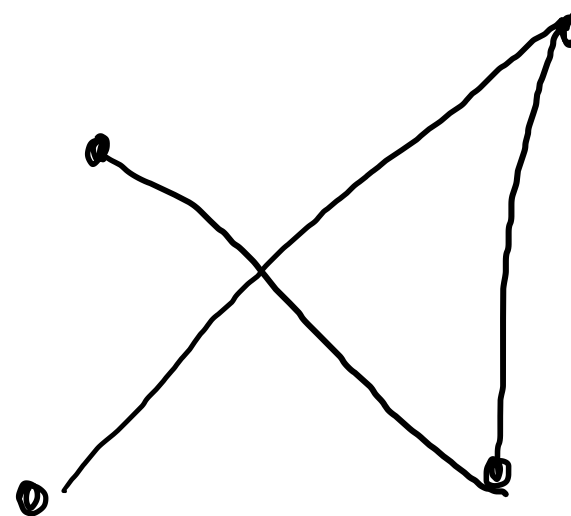
Networking Devices



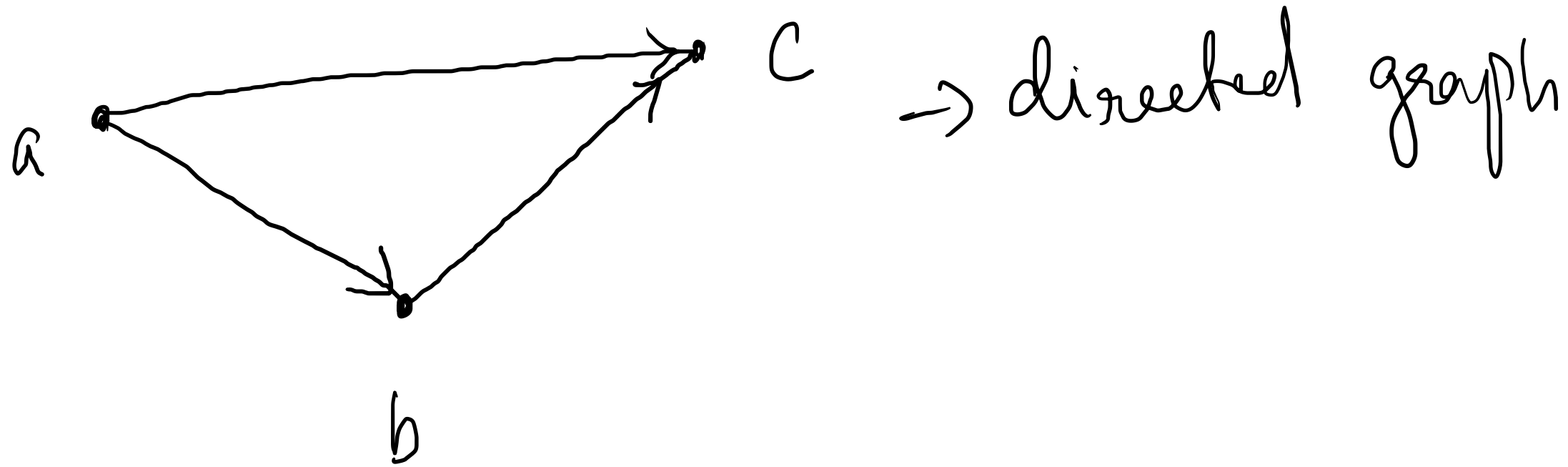


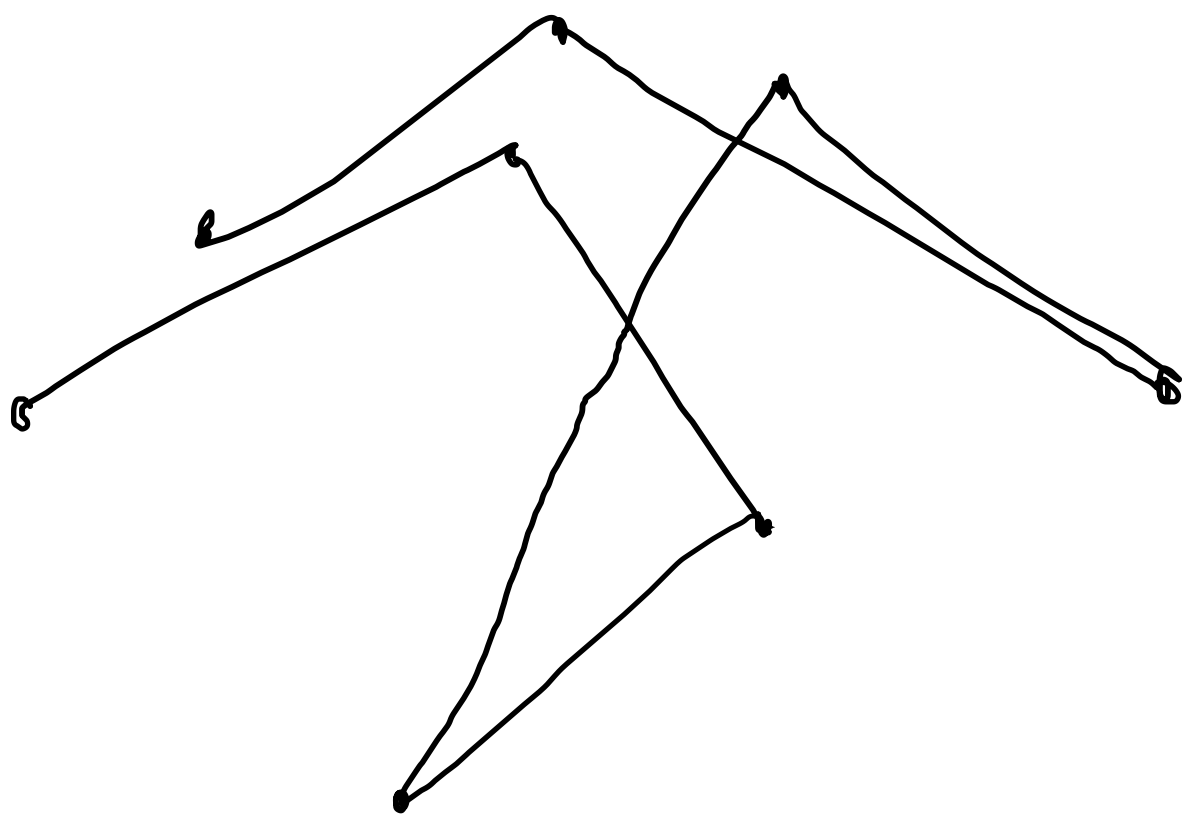
→ Graph.

undirected
graphs.

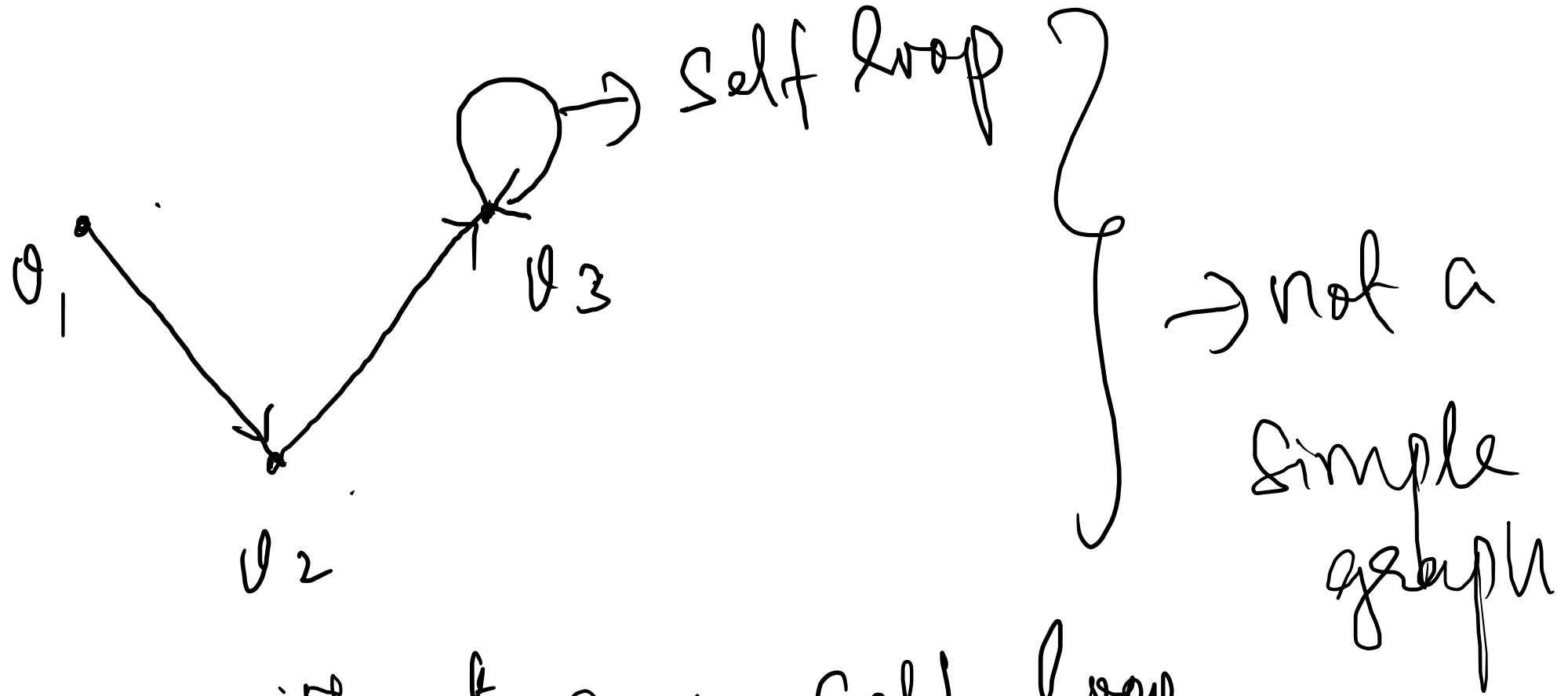


$$R = \{ (a, b), (a, c), (b, c) \} \quad X = \{ a, b, c \}$$





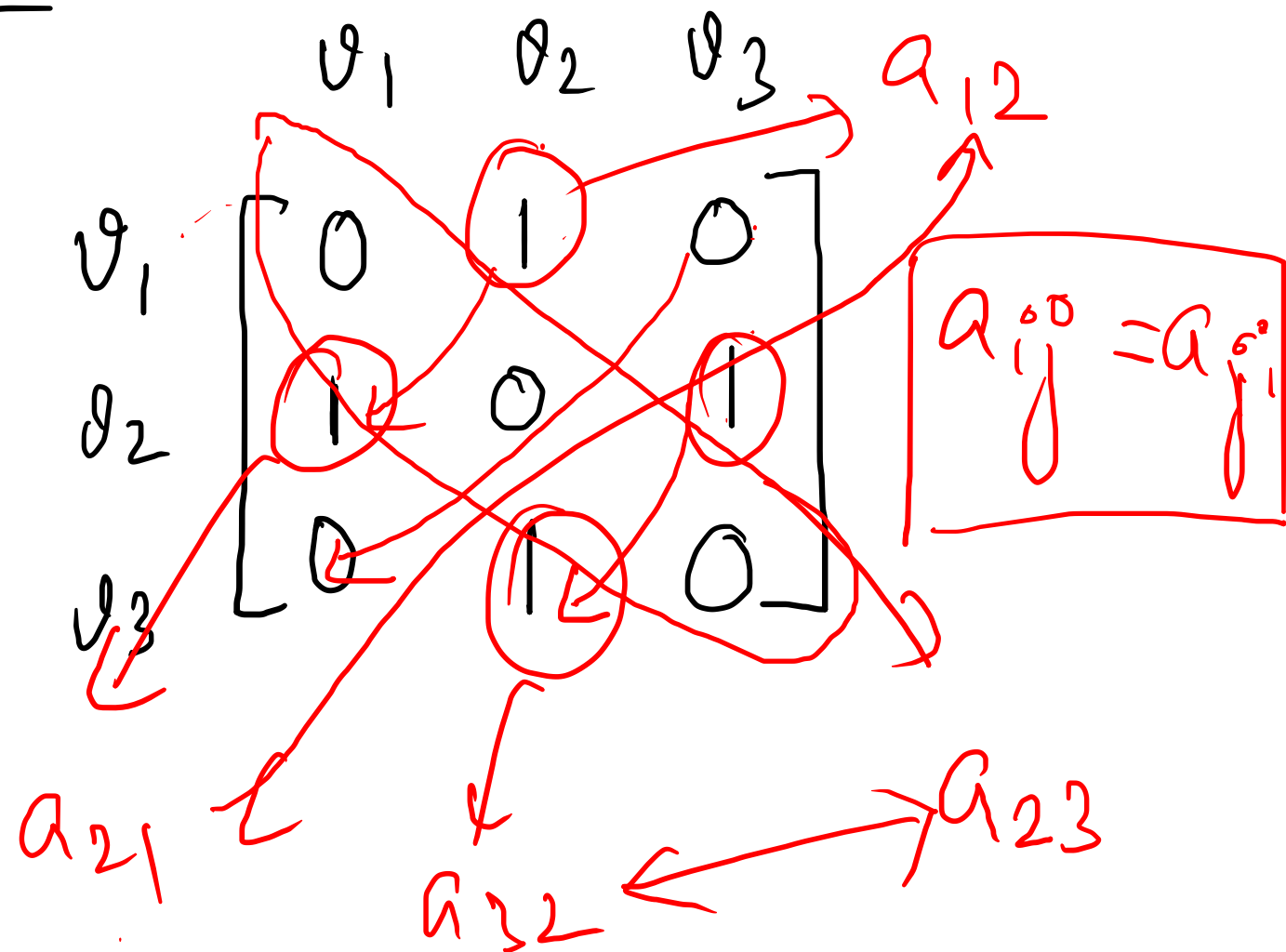
Simple graph:

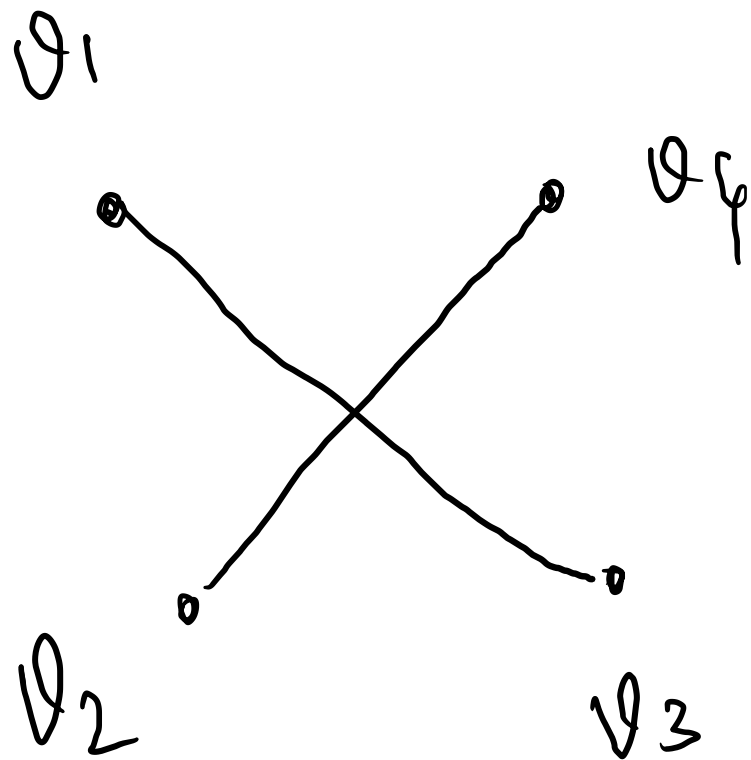


A graph without any self loop.
is called as simple graph.

Matrix Representation of a graph:-

Adjacency matrix:





$$\begin{matrix} & v_1 & v_2 & v_3 & v_4 \\ \begin{matrix} v_1 \\ v_2 \\ v_3 \\ v_4 \end{matrix} & \begin{bmatrix} 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \end{bmatrix} \end{matrix}$$