UNIVERSITY OF CHITTAGONG

Department of Computer Science and Engineering

Program: **B.Sc (Engineering)**

Session: 2022-2023

5th Semester

Assignment - 1

Topic: **Network Topologies Analysis**

Course Title: Data Communication Lab

Course Code: CSE - 514

Group - D

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Date of submission: November 17, 2025

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Basic Topologies:

Bus Toplogy:

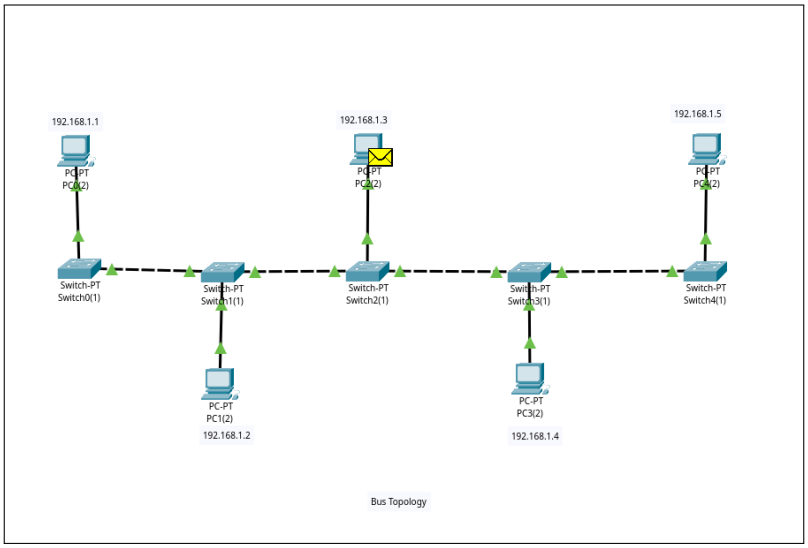

Figure 1: Bus Network Topology

PC Name	IP Address	Connected Network Device
PC0	192.168.1.1	Switch0
PC1	192.168.1.2	Switch1
PC2	192.168.1.3	Switch2
PC3	192.168.1.4	Switch3
PC4	192.168.1.5	Switch4

Outcome: In this bus topology it uses a single shared communication line or backbone cable. Often leads to collisions. If the backbone cable fails then the full network will be destroyed.

Star Toplogy:

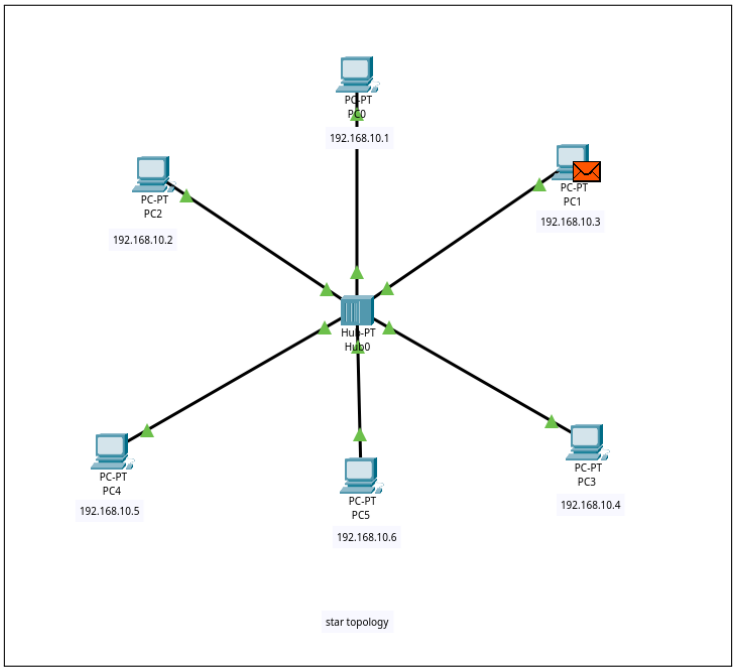

Figure 2: Star Network Topology

PC Name	IP Address	Connected Network Device
PC0	192.168.10.1	Hub0
PC1	192.168.10.3	Hub0
PC2	192.168.10.2	Hub0
PC3	192.168.10.4	Hub0
PC4	192.168.10.5	Hub0
PC5	192.168.10.6	Hub0

Outcome: In this star topology all devices are connected to a central device which is hub. It is easy to manage and troubleshoot, but if the central device fails, the entire network stops working.

Ring Toplogy:

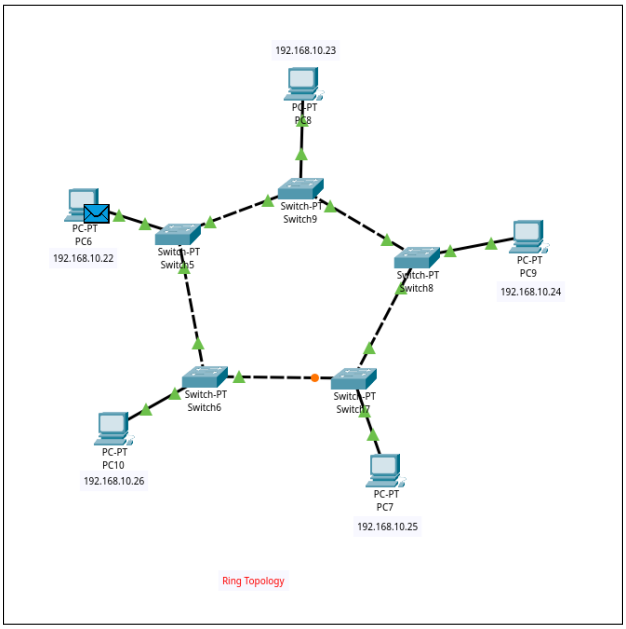

Figure 3: Ring Network Topology

PC Name	IP Address	Connected Network Device
PC6	192.168.10.22	Switch5
PC8	192.168.10.23	Switch9
PC9	192.168.10.24	Switch8
PC7	192.168.10.25	Switch7
PC10	192.168.10.26	Switch6

Outcome: In this topology, each devices is connected to two other devices which makes ring data path. If any single device or cable fails, the full network can be disrupted.

Mesh Toplogy:

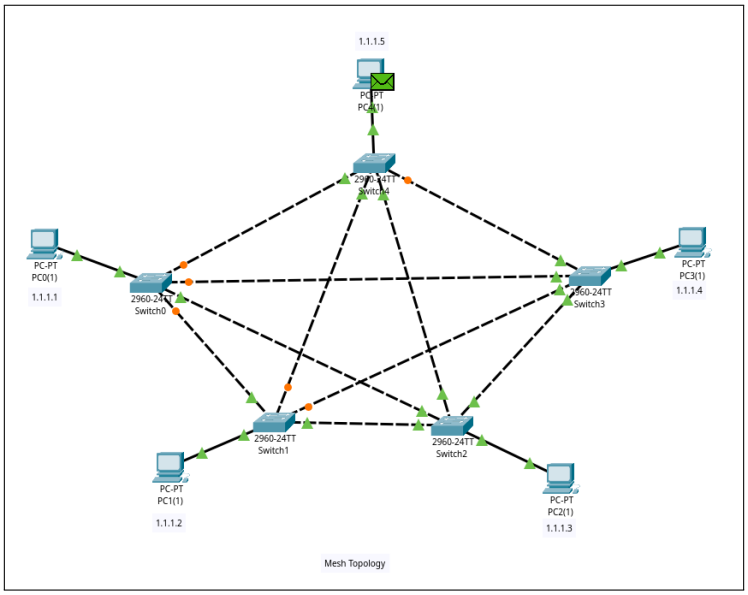

Figure 4: Mesh Network Topology

PC Name	IP Address	Connected Network Device
PC0	1.1.1.1	Switch0
PC1	1.1.1.2	Switch1
PC2	1.1.1.3	Switch2
PC3	1.1.1.4	Switch3
PC4	1.1.1.5	Switch4

Outcome: In this mesh topology, every device is connected to every other device. It provides very high reliability and supports continuoues data transmission even if any cable or device fails.

Tree Toplogy:

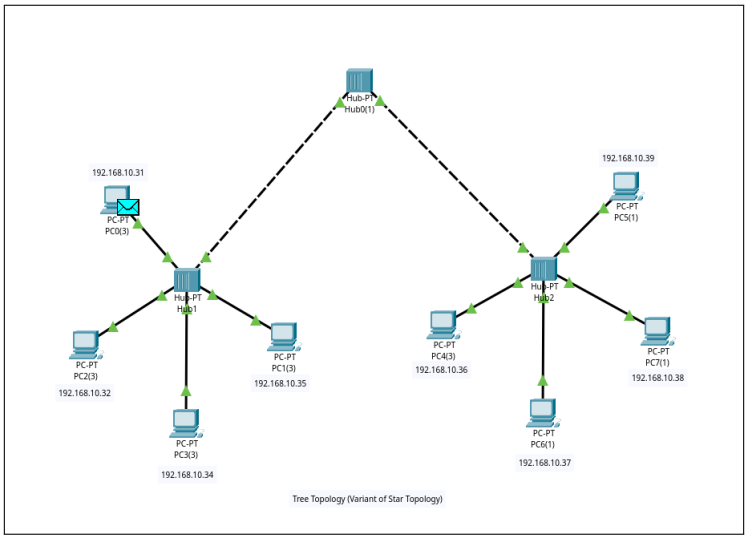

Figure 5: Tree Network Topology

PC Name	IP Address	Connected Network Device
PC0	192.168.10.31	Hub1
PC1	192.168.10.35	Hub1
PC2	192.168.10.32	Hub1
PC3	192.168.10.34	Hub1
PC4	192.168.10.36	Hub2
PC5	192.168.10.39	Hub2
PC6	192.168.10.37	Hub2
PC7	192.168.10.38	Hub2

Outcome: In this tree topology, devices are connected in a hierarchical structure with a root node. It is a variant of star topology.

Hybrid Topology:

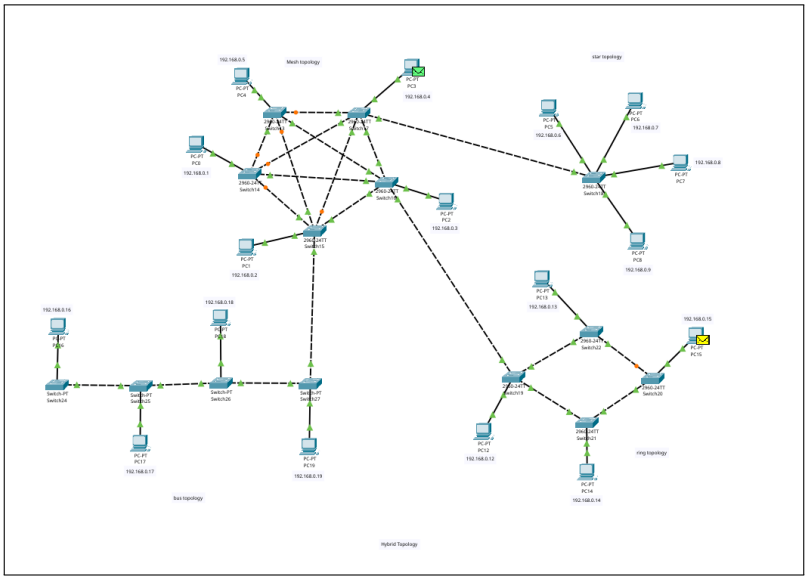

Figure 6: Hybrid Network Topology

PC Name	IP Address	Connected Network Device
PC0	192.168.0.1	Switch14
PC1	192.168.0.2	Switch15
PC2	192.168.0.3	Switch16
PC3	192.168.0.4	Switch17
PC4	192.168.0.5	Switch13
PC5	192.168.0.6	Switch18
PC6	192.168.0.7	Switch18
PC7	192.168.0.8	Switch18
PC8	192.168.0.9	Switch18
PC12	192.168.0.12	Switch19
PC13	192.168.0.13	Switch22
PC14	192.168.0.14	Switch21
PC15	192.168.0.15	Switch20
PC16	192.168.0.16	Switch24
PC17	192.168.0.17	Switch25
PC18	192.168.0.18	Switch26
PC19	192.168.0.19	Switch27

Outcome: In a hybrid topology, different types of topologies such a bus, ring, star, mesh are connected to form a larger network.

What we learned:

1. In a ring topology, we can change default directional connection to any direction we want, or even make it multidirectional.
2. By using ping command, we can identify connection problem in the network.
3. By setting IP addresses, we can uniquely identify each device in the network.
4. Using a hub instead of a switch caused issues in data trasferring.
5. when we connect two similar devices, we need a cross-over cable and for different devices, we can use a straight-through cable.