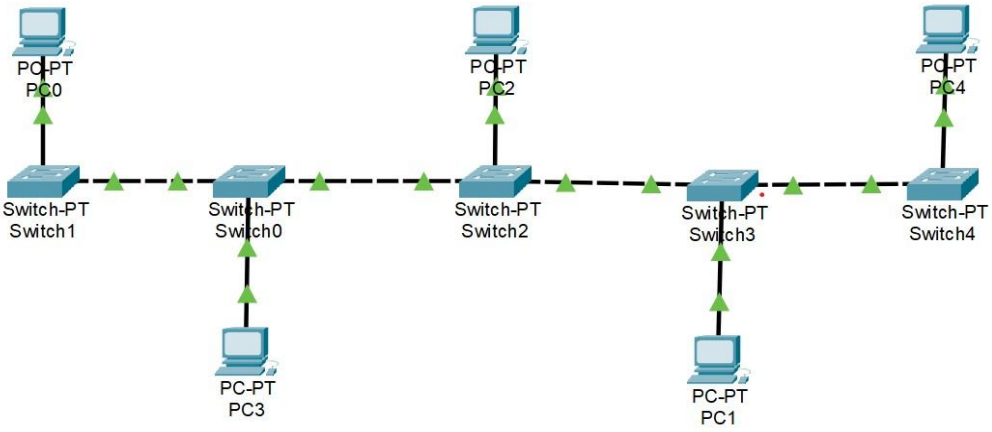
Name: Devanandh A B Date:28/4/25

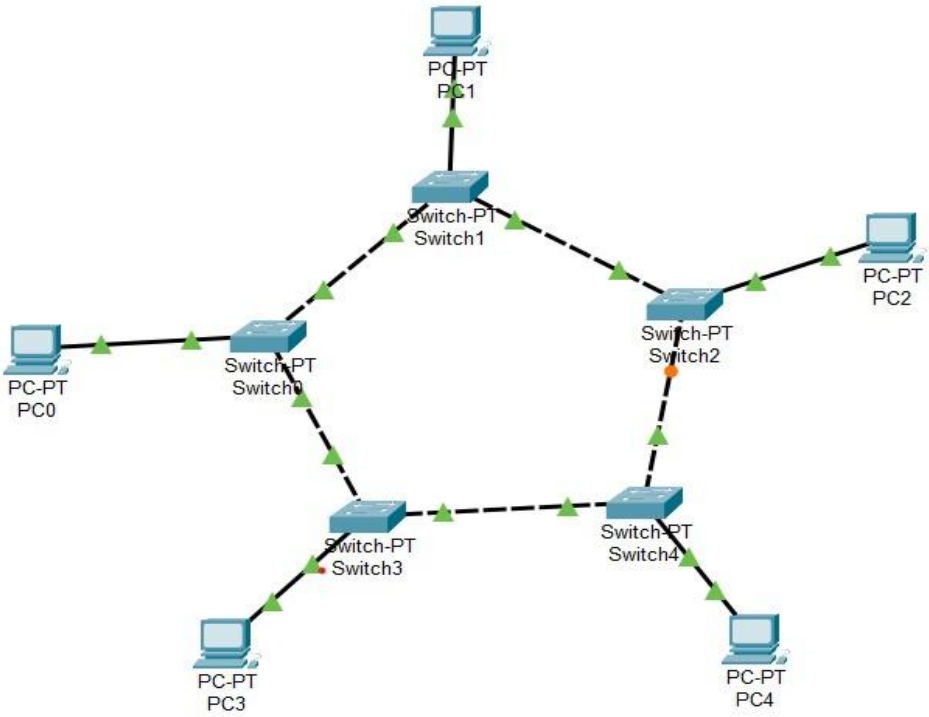
Roll no: AM.EN.U4ECE22014

ASSIGNMENT 1
TOPOLOGIES

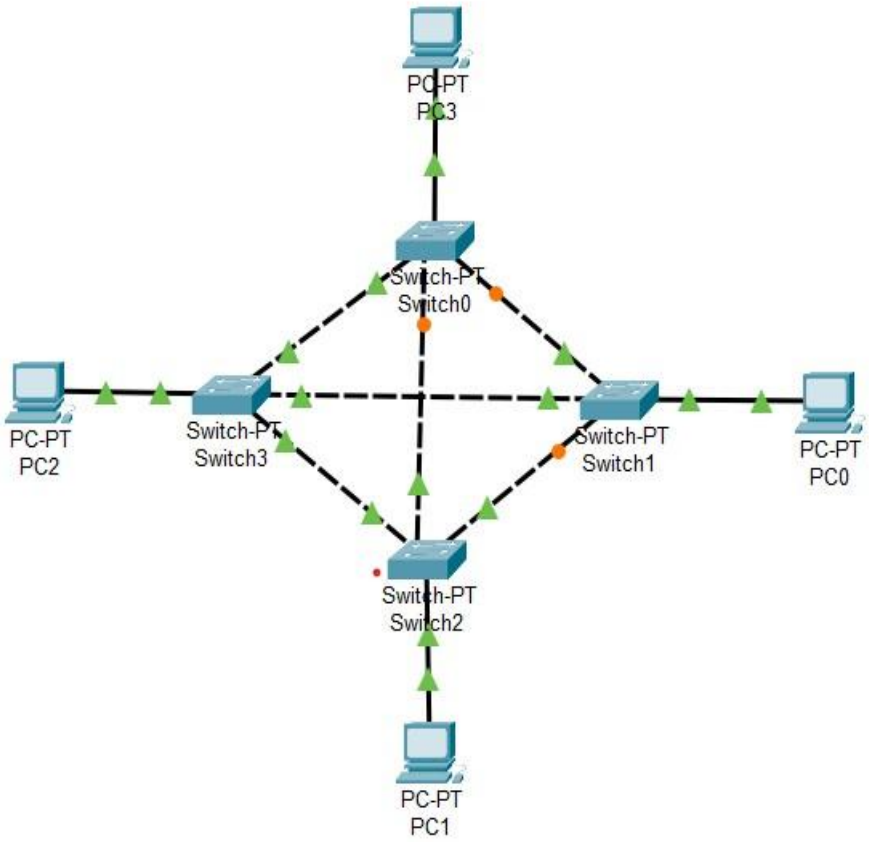
i. Bus Topology:



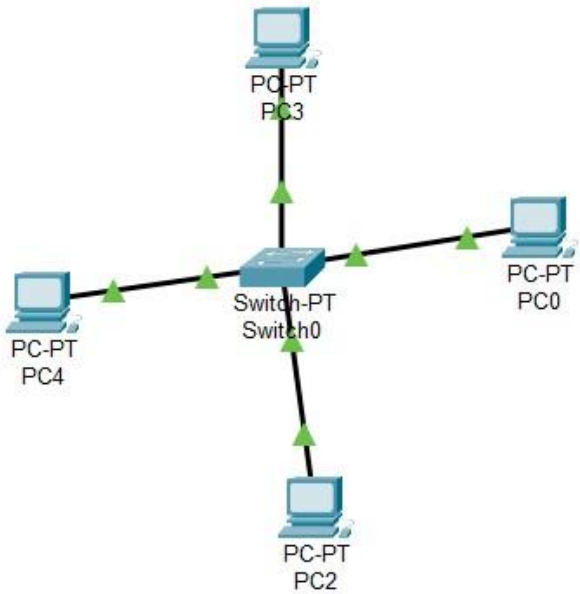
ii. Ring Topology:



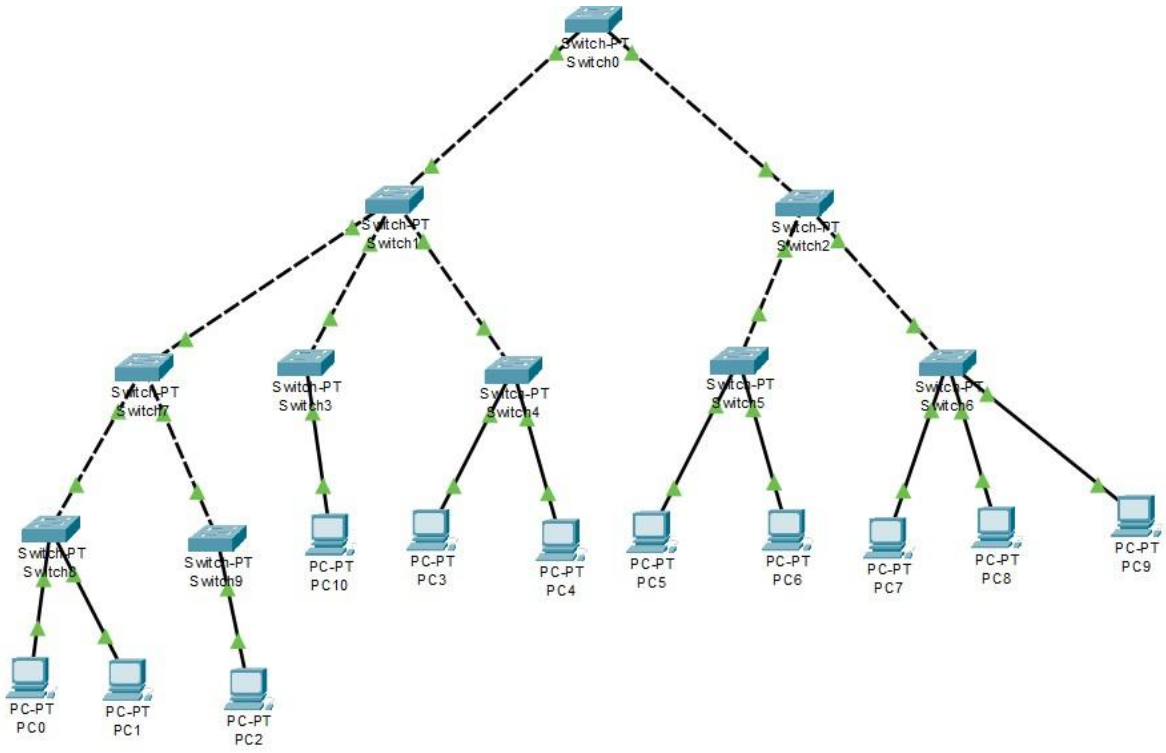
iii.
Mesh Topology:



iv. Star Topology:



v. Tree Topology:



Observation

Each network topology offers distinct characteristics suited to specific networking requirements:

- Bus topology is simple, cost-effective, but limited in scalability and performance with increased devices.
- Ring topology has organized data flow and reduces collisions but is vulnerable to single points of failure without redundancy.
- Star topology provides high reliability, ease of management, and fault isolation, though it depends heavily on a central hub, which can become a bottleneck.
- Tree topology supports scalable expansion suitable for large networks but introduces points of failure at backbone nodes.

The selection of a topology hinges on balancing factors like scalability, fault tolerance, complexity, and cost in relation to organizational priorities.

Inferences

- Bus topology suits small networks with simplicity but suffers from scalability issues.
- Ring topology is organized but needs redundancy for fault tolerance.
- Star topology facilitates management and reliability but poses risk at the central node.
- Tree topology enables large or hierarchical networks but depends on backbone integrity.
- Effective network design involves matching topology characteristics with organizational needs to optimize performance and resilience.

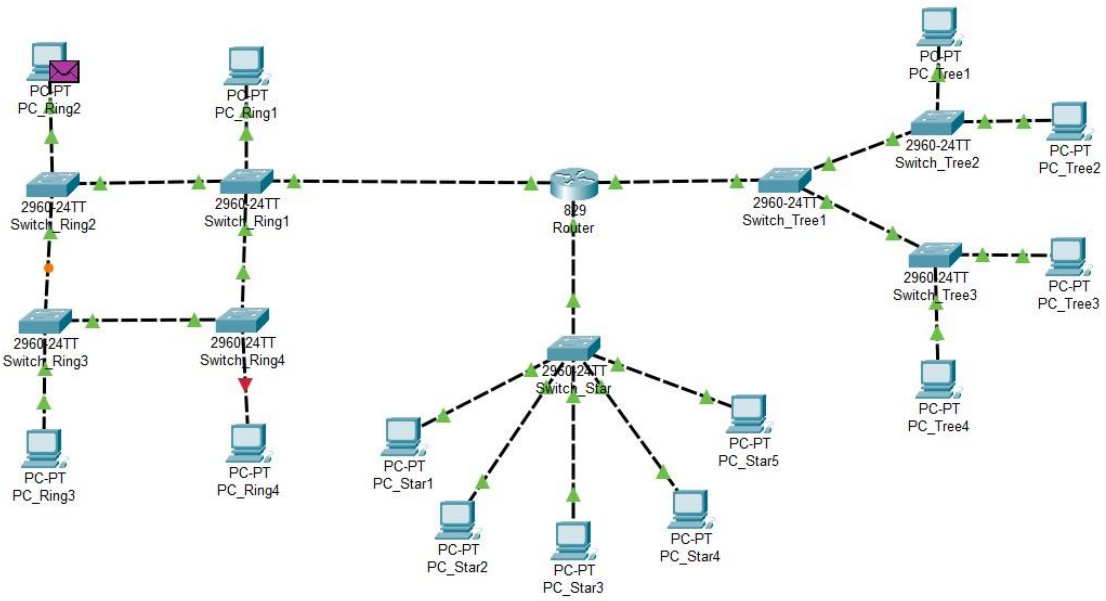
Results:

- Bus topology is suitable for small, uncomplicated networks.
- Ring topology offers organized data flow but vulnerability to failure without redundancy.
- Star topology ensures fault isolation and management ease, though susceptible to central device failure.
- Tree topology supports large-scale expansion but requires backbone reliability.

Overall, choosing an appropriate topology demands considering trade-offs among scalability, fault tolerance, complexity, and cost to meet specific network goals

ASSIGNMENT 2:
TOPOLOGY IMPLEMENTATION

LAN Networks with Tree, Star, and Ring Topologies :



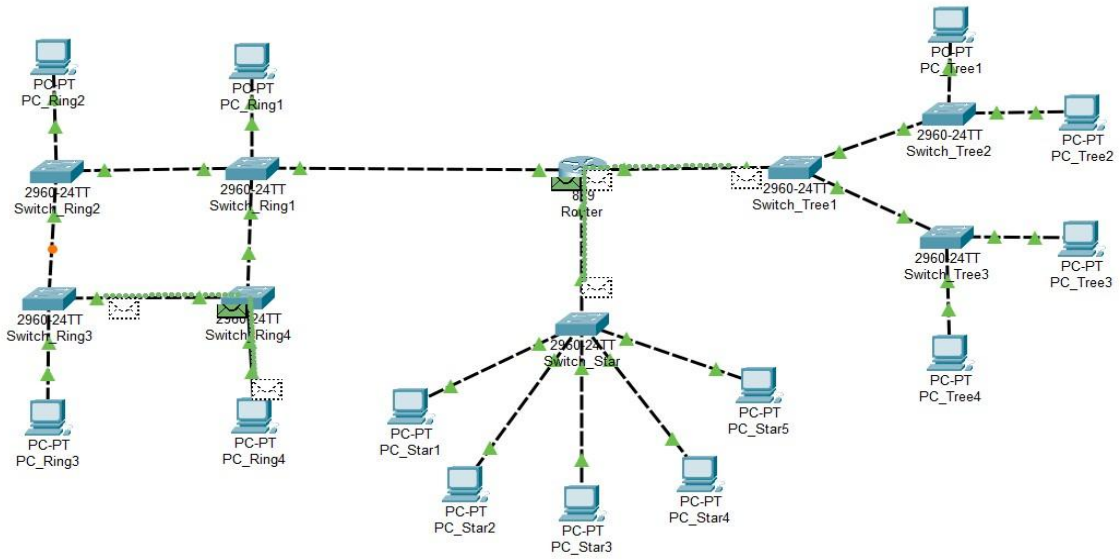
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	In Progress	PC_R...	PC_Tree4	ICMP		0.000	N	0	(edit)	(delete)

Source PC IP adress: 220.14.1.2 (PC_Ring2)
Destination PC IP adress: 220.14.3.4 (PC_Tree4)

Ring topology: IP Addresses → 220.14.1.1 - 220.14.1.4

Star topology: IP Addresses → 220.14.2.1 - 220.14.2.5

Tree topology: IP Addresses → 220.14.3.1 - 220.14.3.4



Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type
	0.000	--	PC_Ring2	ICMP
	0.001	PC_Ring2	Switch_Ring2	ICMP
	0.002	Switch_Ring2	Switch_Ring1	ICMP
	0.002	Switch_Ring2	Switch_Ring3	ICMP
	0.003	Switch_Ring1	PC_Ring1	ICMP
	0.003	Switch_Ring1	Switch_Ring4	ICMP
	0.003	Switch_Ring1	Router	ICMP
	0.004	Switch_Ring4	PC_Ring4	ICMP
	0.004	Switch_Ring4	Switch_Ring3	ICMP
	0.004	Router	Switch_Tree1	ICMP
	0.004	Router	Switch_Star	ICMP
	0.004	Router	Router	ICMP
	0.005	Switch_Ring3	PC_Ring3	ICMP
	0.005	Switch_Tree1	Switch_Tree3	ICMP
	0.005	Switch_Tree1	Switch_Tree2	ICMP
	0.005	Switch_Star	PC_Star5	ICMP
	0.005	Switch_Star	PC_Star4	ICMP
	0.005	Switch_Star	PC_Star1	ICMP

Vis.	Time(sec)	Last Device	At Device	Type
	0.005	Switch_Star	PC_Star2	ICMP
	0.005	Switch_Star	PC_Star3	ICMP
	0.006	Switch_Tree3	PC_Tree4	ICMP
	0.006	Switch_Tree3	PC_Tree3	ICMP
	0.006	Switch_Tree2	PC_Tree2	ICMP
	0.006	Switch_Tree2	PC_Tree1	ICMP
	0.007	PC_Tree4	Switch_Tree3	ICMP
	0.008	Switch_Tree3	Switch_Tree1	ICMP
	0.009	Switch_Tree1	Router	ICMP
	0.010	Router	Switch_Ring1	ICMP
	0.011	Switch_Ring1	Switch_Ring2	ICMP
	0.012	Switch_Ring2	PC_Ring2	ICMP

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC_R...	PC_Tree4	ICMP		0.000	N	0	(edit)	(delete)

Observation:

The implementation demonstrates LAN configurations for three topologies:

- **Ring topology:** IP addresses range from 220.14.1.1 to 220.14.1.4.
- **Star topology:** IP addresses range from 220.14.2.1 to 220.14.2.5.
- **Tree topology:** IP addresses range from 220.14.3.1 to 220.14.3.4.

These IP schemes reflect the organizational structure of each topology, emphasizing logical segmentation, clarity in network management, and suitability for different scalable architectures.

Inferences:

- The IP schemes align with the physical or logical topology, aiding in network organization.
- The structured addresses facilitate identification of devices and troubleshooting.
- Different topologies influence IP planning, showing how infrastructure design impacts configuration complexity.

Results:

- Effective network segmentation according to topology.
- The importance of planning IP addresses alongside topology selection.
- How topology dictates network layout and management strategies, providing a hands-on understanding of LAN deployment.