Name: Devanandh A B

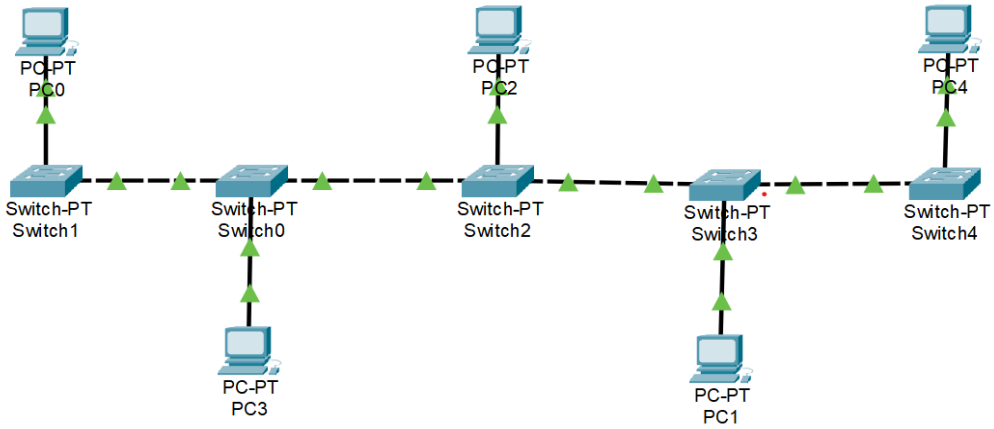
Roll no: AM.EN.U4ECE22014

Date:28/4/25

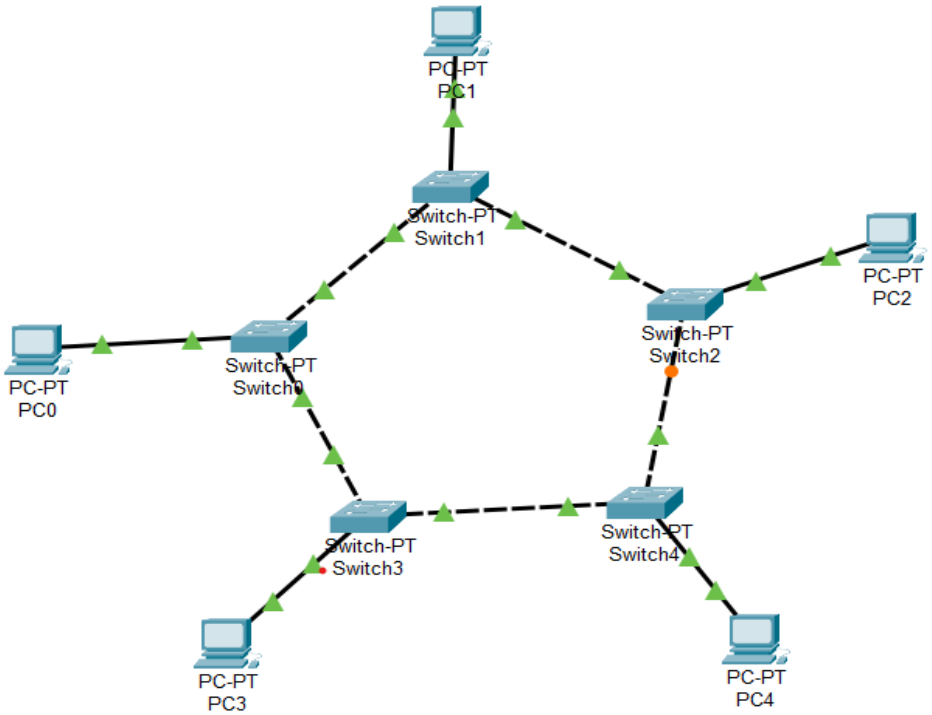
ASSIGNMENT 1

TOPOLOGIES

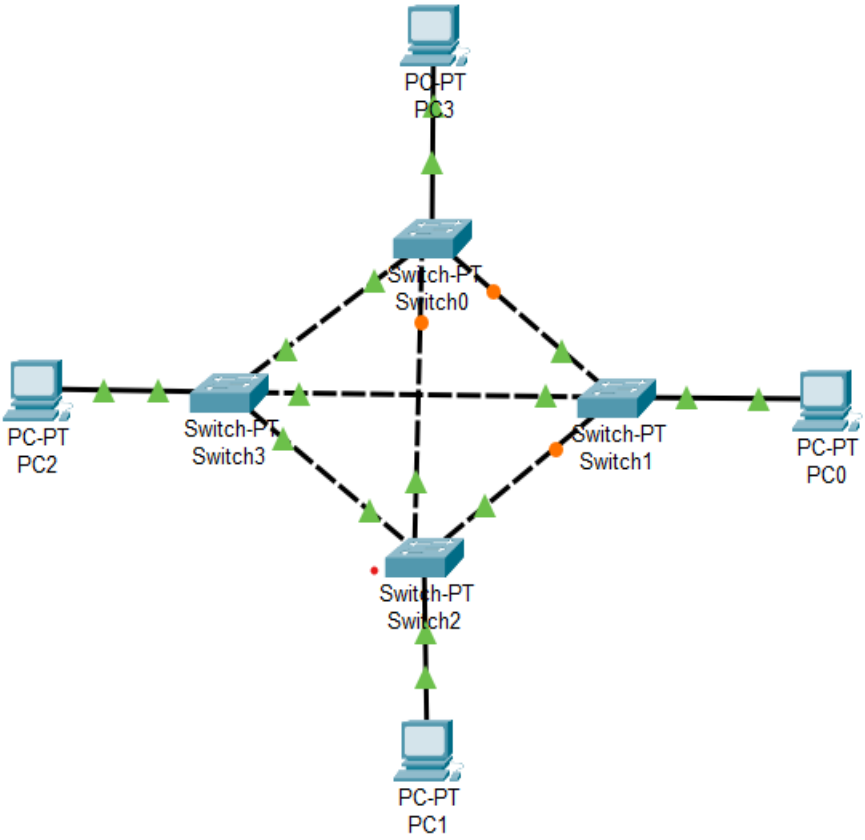
i. Bus Topology:



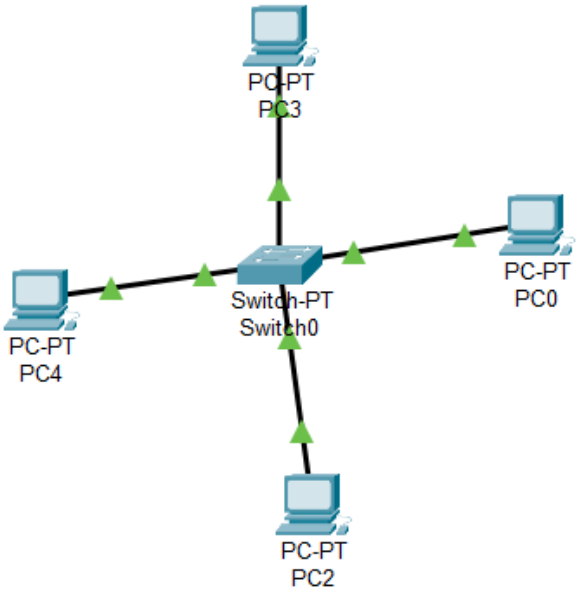
ii. Ring Topology:



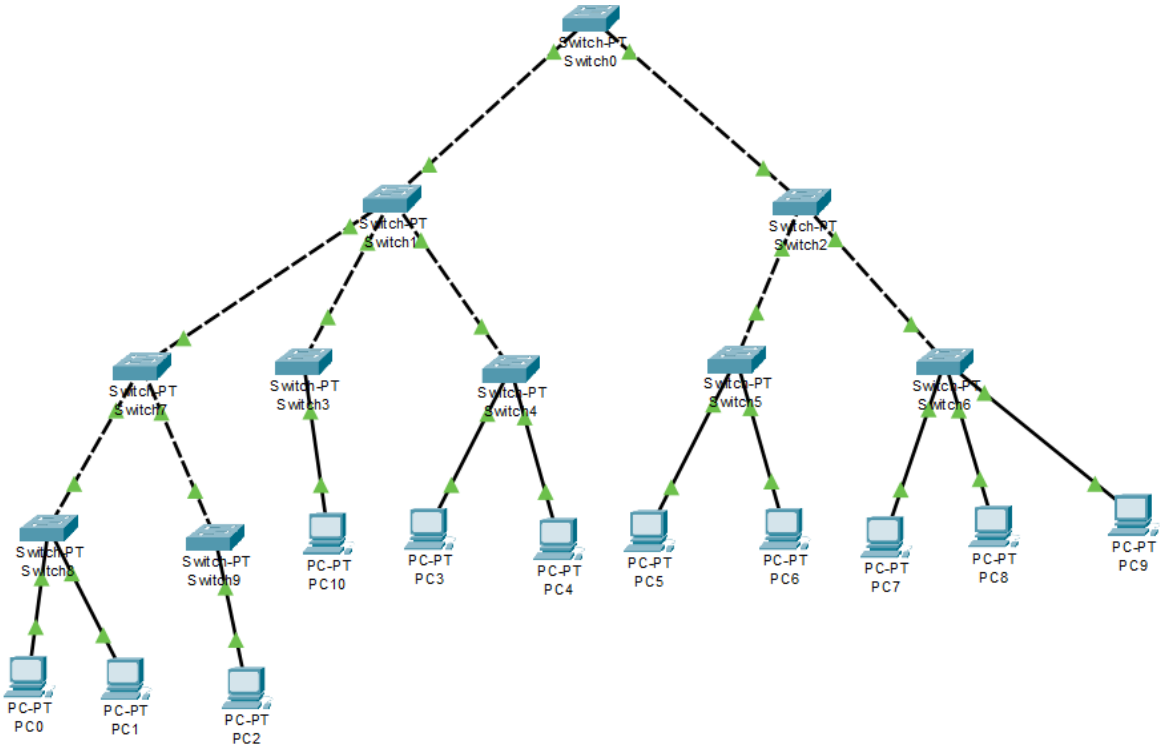
iii. Mesh Topology:



iv. Star Topology:

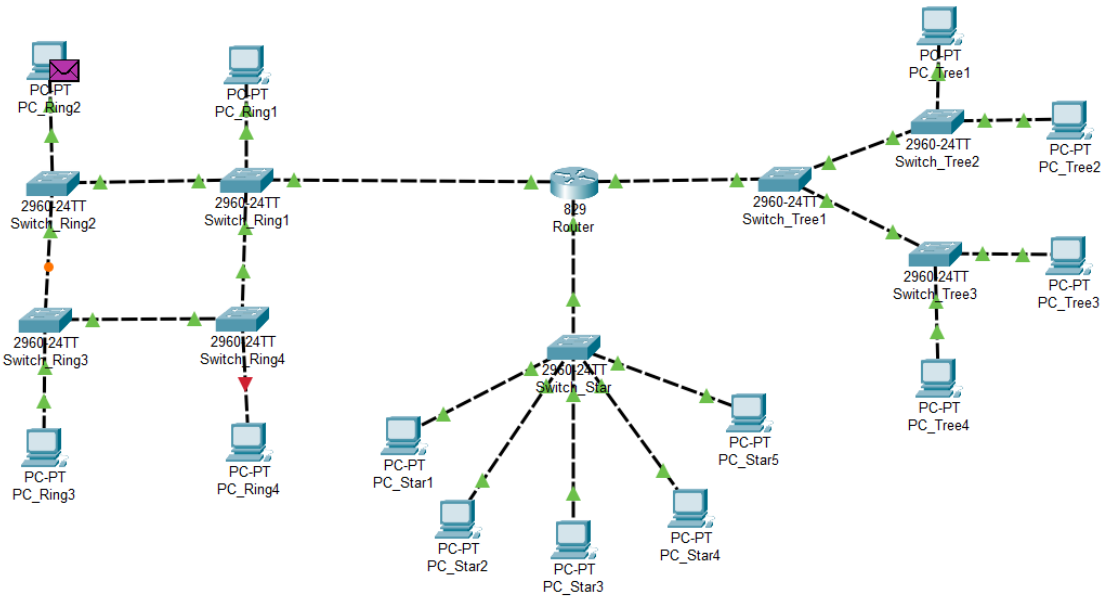


v. Tree Topology:


Switch-PT
Switch0
Switch-PT
Switch1
Switch-PT
Switch2
Switch-PT
Switch7
Switch-PT
Switch3
Switch-PT
Switch4
Switch-PT
Switch5
Switch-PT
Switch6
Switch-PT
Switch8
Switch-PT
Switch9
PC-PT
PC10
PC-PT
PC3
PC-PT
PC4
PC-PT
PC5
PC-PT
PC6
PC-PT
PC7
PC-PT
PC8
PC-PT
PC9
PC-PT
PC0
PC-PT
PC1
PC-PT
PC2

ASSIGNMENT 2:
TOPOLOGY IMPLEMENTATION

LAN Networks with Tree, Star, and Ring Topologies :



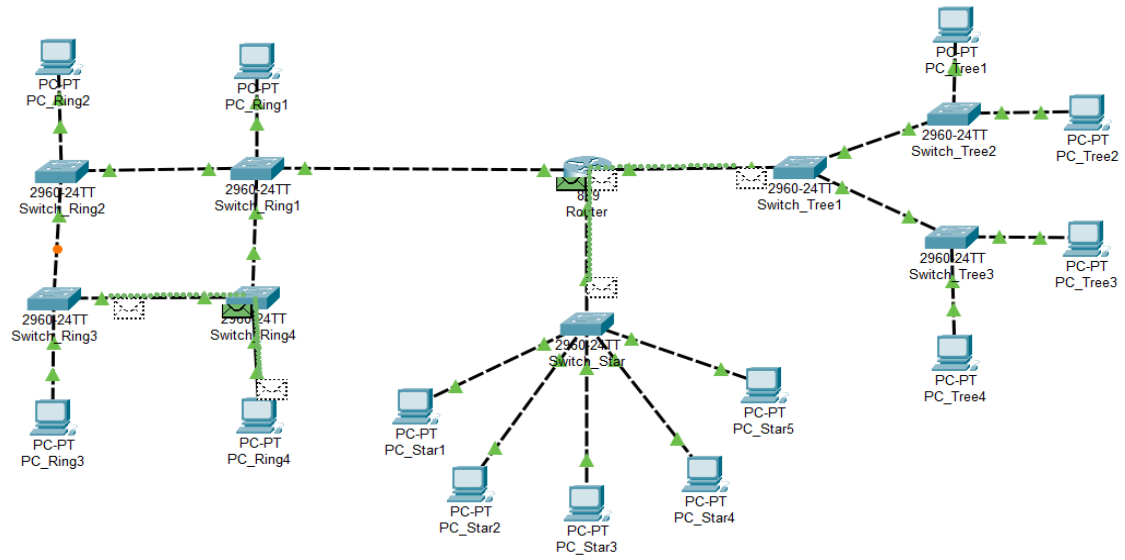
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	In Progress	PC_R...	PC_Tree4	ICMP		0.000	N	0	(edit)	(delete)

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)

Inferences :

Each topology is suited to different networking needs, with trade-offs between complexity, cost, scalability, and fault tolerance. For example, bus topology is simple but limited in scalability, making it suitable only for small networks. Ring topology provides organized data flow but requires redundancy to prevent failure, whereas star topology offers ease of management and high reliability but depends heavily on the central device. Tree topology supports large network expansion but introduces potential points of failure at backbone nodes. Overall, the choice of topology must align with organizational priorities such as growth potential, reliability, and budget constraints to optimize network performance and resilience.

Results:

The analysis of various network topologies reveals that each configuration offers distinct advantages and limitations based on specific network requirements. The bus topology, while simple and cost-effective for small networks, suffers from scalability issues and significant performance degradation with increased devices. The ring topology provides orderly data flow and reduced collisions but is vulnerable to single points of failure unless redundancy measures are implemented. The star topology ensures easy management and fault isolation, making it suitable for modern LANs, though it relies heavily on the central hub, which can become a bottleneck or single point of failure. The tree topology facilitates scalable and hierarchical network expansion, ideal for large organizational structures, but its dependency on backbone nodes can compromise overall network resilience. Overall, selecting the appropriate topology depends on balancing factors such as scalability, fault tolerance, complexity, and cost, to meet specific network performance and reliability goals.