Ex.No:08a	**Link State Routing**
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Section & slot	S23 & Slot-1

Objective(s):

To design and implement Link state routing using packet tracer

Introduction:

Link State Routing Protocols used to select the path for data packet in an internetwork. Link state routing protocols uses link state routers to share information of connected network devices. This is a learning process. By learning process each router maintain the routing table to select the shortest path for data packet transmission. Each router update the network topology to nearby router only. Link state routing protocols are also known as **shortest path first protocol.**

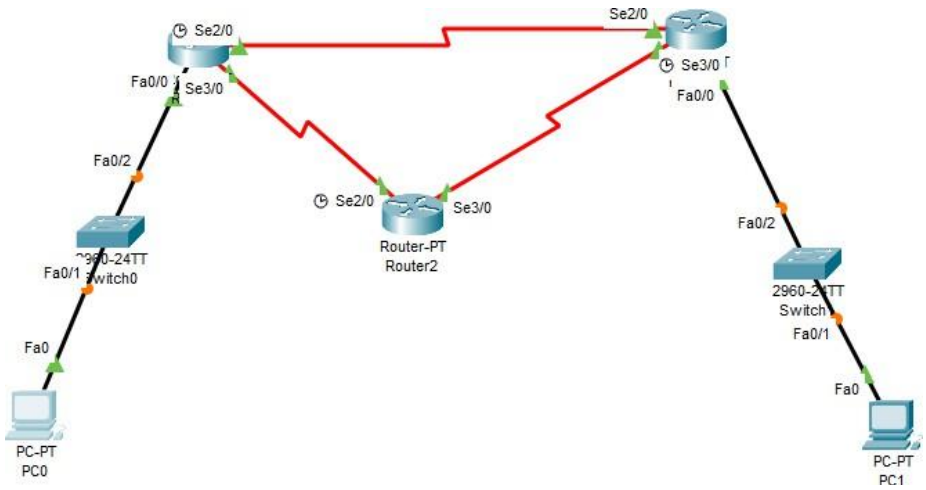
Link state protocols allow routers to share the information about network connected to it. This information passed to neighbour router only. An accurate information of network topology around the router updated in routing table. By help of the routing table better routing path selected by the router.

The information passes by router is known as link state advertisements(LSAs). In distance vector the information message passes in a fix time interval. Link state advertisements shared only when any changes done in the network topology. The bandwidth less consumed by link state routing protocol. The time of convergence is less than in distance vector protocol.

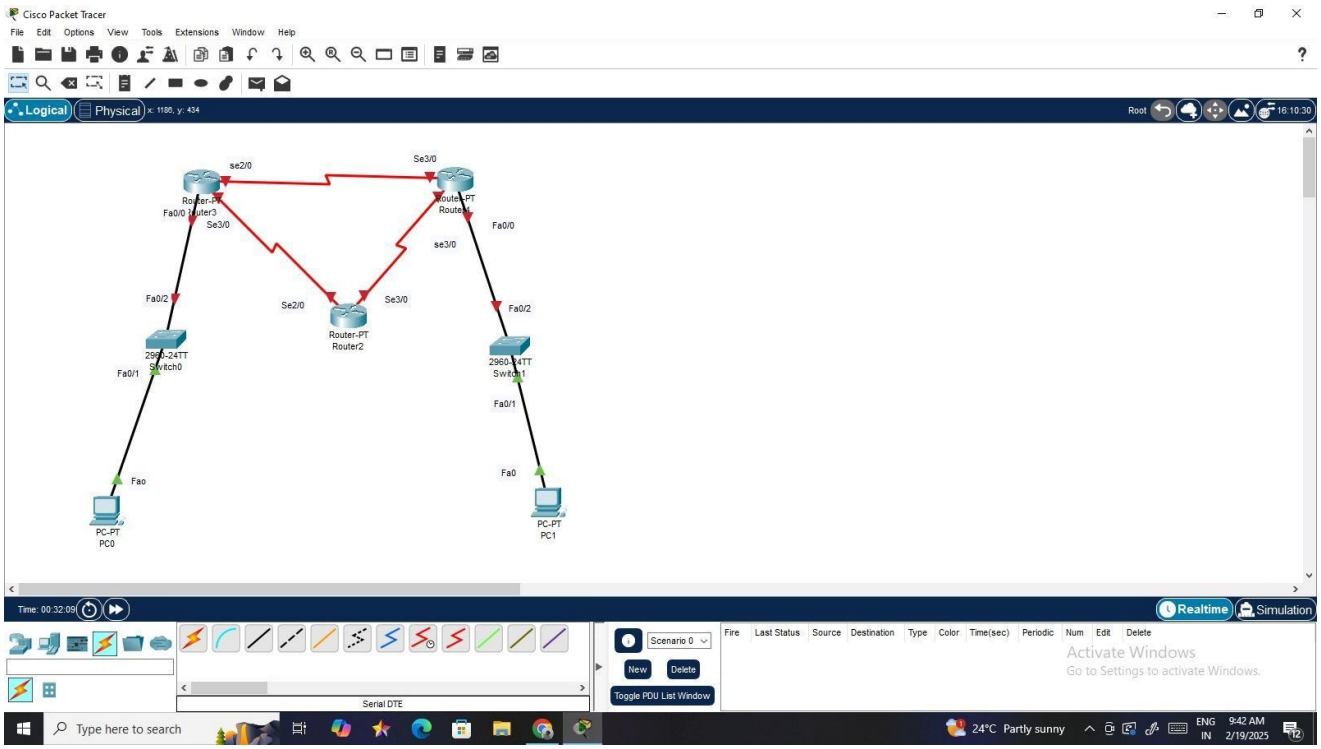
Function of link state routing protocol

Important terms of link state routing protocol are link state packet, database, algorithm, routing table etc. Link state packets contains the routing information and sent to neighbour only when any changes occurs in connected network. Link state packets update the routing table in nearby routers. The information collected by link state packets stored in link state database.

1. **Device Requirements:**
   1. Router -3
   2. Switch -2
   3. PC's
   4. Copper crossover wire
   5. Serial DTE
2. **Network Diagram for your experiment (draw the diagram either hand drawing/ms paint or any other drawing tools)**



3. Network Diagram (Packet tracer diagram before configuration):



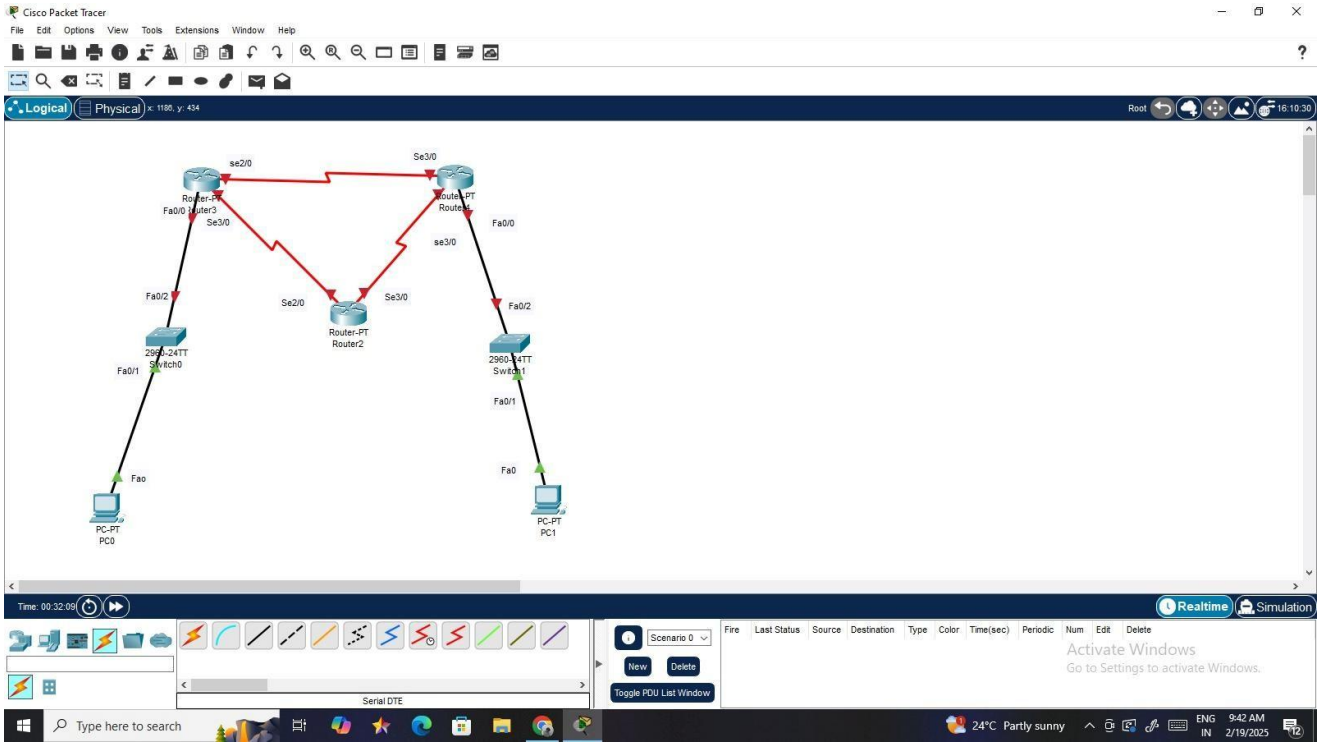
4. Configuration details:

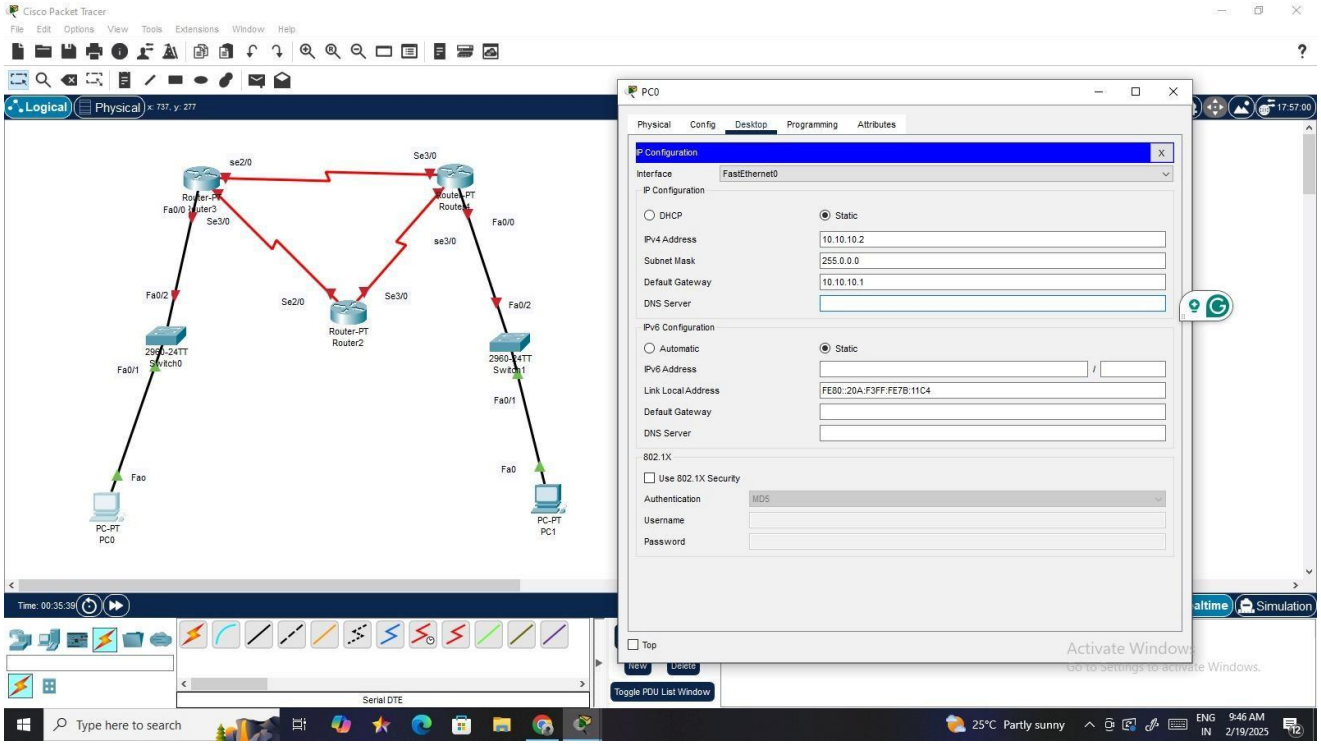
Device Name	Interface Name	IP Address	Subnet mask	Default Gateway
R1	Gig0/0	192.168.1.1	255.255.255.0	255.255.255.0
R1	Se0/0	10.0.0.1	255.255.255.252	255.255.255.252
R2	Se0/0	10.0.0.2	255.255.255.252	255.255.255.252
R2	Se0/1	10.0.0.5	255.255.255.252	255.255.255.252
R3	Gig0/0	192.168.1.2	255.255.255.0	255.255.255.0
R3	Se0/1	10.0.0.6	255.255.255.252	255.255.255.252
R3	Gig0/0	192.168.1.3	255.255.255.0	255.255.255.0
PC0	Fa0	192.168.1.10	255.255.255.0	255.255.255.0
PC1	Fa0	192.168.2.10	255.255.255.0	255.255.255.0

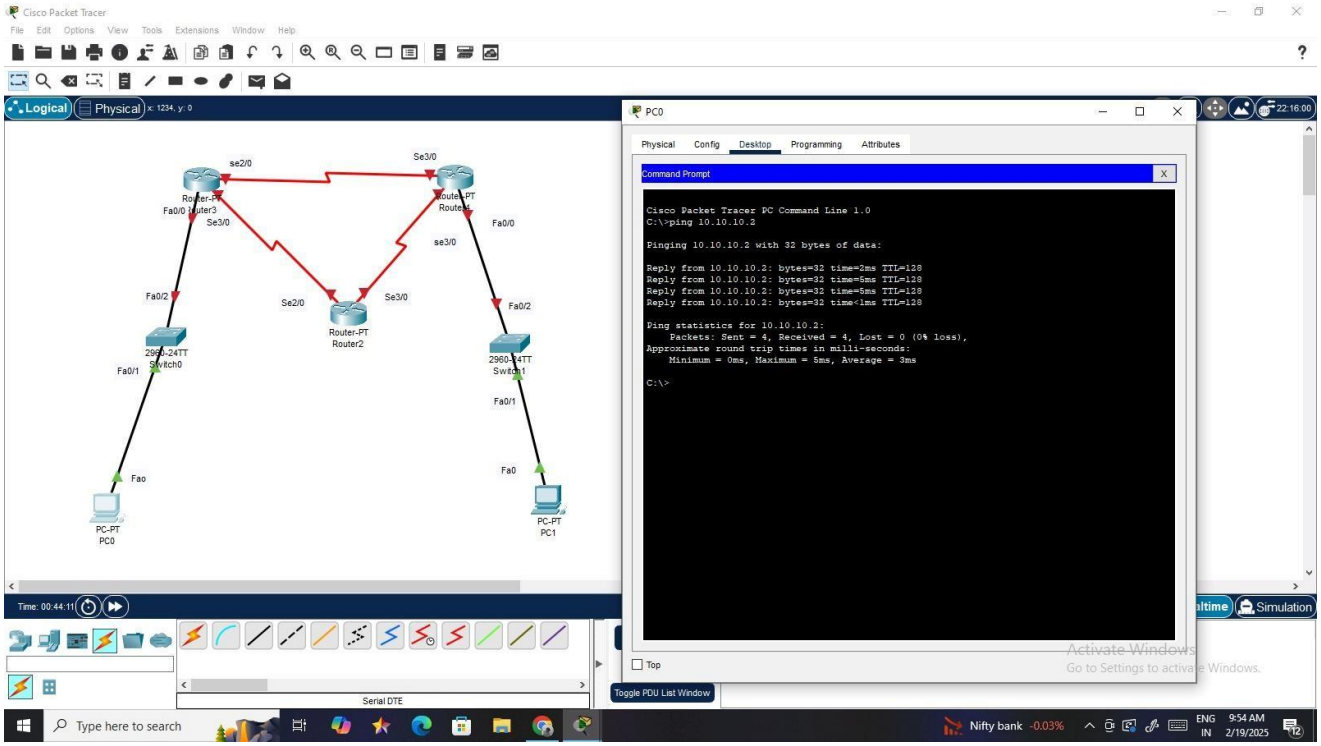
5. Describe step by step configuration steps properly (you may copy the commands used in the configuration tab and paste it)

1. OSPF neighbour
2. Router OSPF
3. Ping

6. Output Diagram (Minimum 3 screenshot):




Cisco Packet Tracer
PC0
Physical
Config
Desktop
Programming
Attributes
IP Configuration
Interface
FastEthernet0
DHCP
Static
IPv4 Address
10.10.10.2
Subnet Mask
255.0.0.0
Default Gateway
10.10.10.1
DNS Server
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address
FE80::20A:F3FF:FE7B:11C4
802.1X
Use 802.1X Security
Authentication
Username
Password
Router-PT Router2
2960-24TT Switch0
2960-24TT Switch1
PC-PT PC0
PC-PT PC1
Toggle PDU List Window
Type here to search
25°C Partly sunny
ENG IN 9:46 AM 2/19/2025


Cisco Packet Tracer
PC0
Physical
Config
Desktop
Programming
Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.10.10.2
Pinging 10.10.10.2 with 32 bytes of data:
Reply from 10.10.10.2: bytes=32 time=2ms TTL=128
Reply from 10.10.10.2: bytes=32 time=5ms TTL=128
Reply from 10.10.10.2: bytes=32 time=5ms TTL=128
Reply from 10.10.10.2: bytes=32 time<1ms TTL=128
Ping statistics for 10.10.10.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 5ms, Average = 3ms
C:\>
Router-PT Router2
2960-24TT Switch0
2960-24TT Switch1
PC-PT PC0
PC-PT PC1
Toggle PDU List Window
Type here to search
Nifty bank -0.03%
ENG IN 9:54 AM 2/19/2025

Rubrics for Experiment Assessment:

Rubrics	Good	Normal	Poor	Marks
Creation of Topology (4)	Created the topology, Identify the proper devices and making the connections **(4)**	Created the topology, Identify the proper devices, making the connections But missing some features **(3)**	Created wrong topology, Failed to Identify the proper devices and making connections **(1)**	
Verify the connectivity (4)	Verified the connectivity in all the levels **(4)**	Verified the connectivity at some levels (only some nodes) **(2)**	Verified the connectivity is not done. **(1)**	
Timely Completion (2)	Completed the lab before the allotted time **(2)**	Completed the lab after the deadline **(1)**	Did not submitted before grading **(0)**	
			Total	

Google Drive link of the packet tracer file (give view permission):

Link: https://drive.google.com/file/d/1m_CT32277ue_aSJgOn1uiZvAMtlBhfym/view?usp=drivesdk

CONCLUSION (provide conclusion about this experiment):

We have successfully configured link state routing (OSPF) using cisco packet tracer. The network dynamically updates router and ensure efficient communication between devices.