Experiment No : 09

Aim : To implement Open Shortest Path First (OSPF) in cisco packet tracer

Theory :

In an OSPF network, routers or systems within the same area maintain an identical link-state database that describes the topology of the area. Each router or system in the area generates its link-state database from the link-state advertisements (LSAs) that it receives from all the other routers or systems in the same area and the LSAs that itself generates. An LSA is a packet that contains information about neighbors and path costs. Based on

the link-state database, each router or system calculates a shortest-path spanning tree, with itself as the root, using the SPF algorithm.

OSPF has the following key advantages:

1. Compared with distance-vector routing protocols such as the Routing Information Protocol (RIP), OSPF is more suitable for serving large, heterogeneous internetworks. OSPF can recalculate the routes in a short amount of time when the network topology changes.

2. With OSPF, you can divide an Autonomous System (AS) into areas and keep area topologies separate to decrease the OSPF routing traffic and the size of the link-state database of each area.

3. OSPF provides equal-cost multipath routing. You can add duplicate routes to the TCP stack using different next hops.

Router CLI configuration

For first router

exit

router ospf 1

network 192.168.1.0 0.0.0.255 area 0

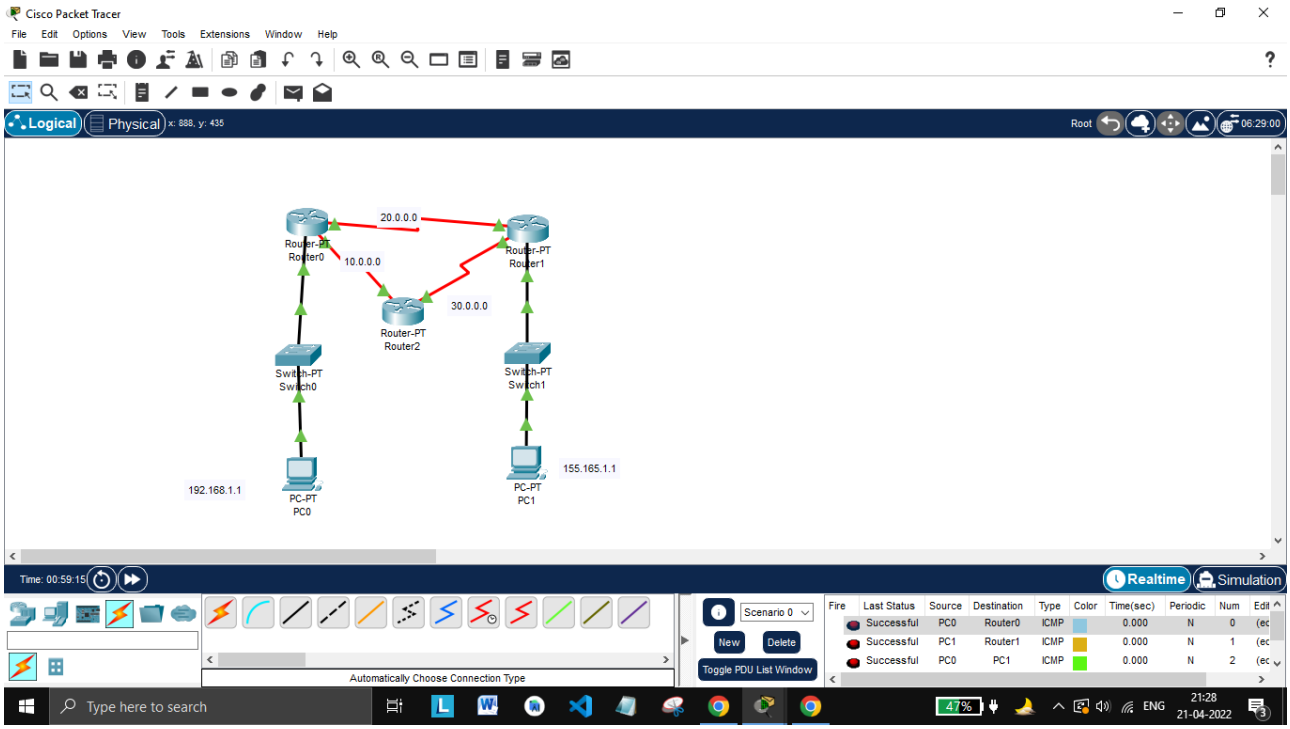
network 10.0 0.0 0.255.255.255 area 0

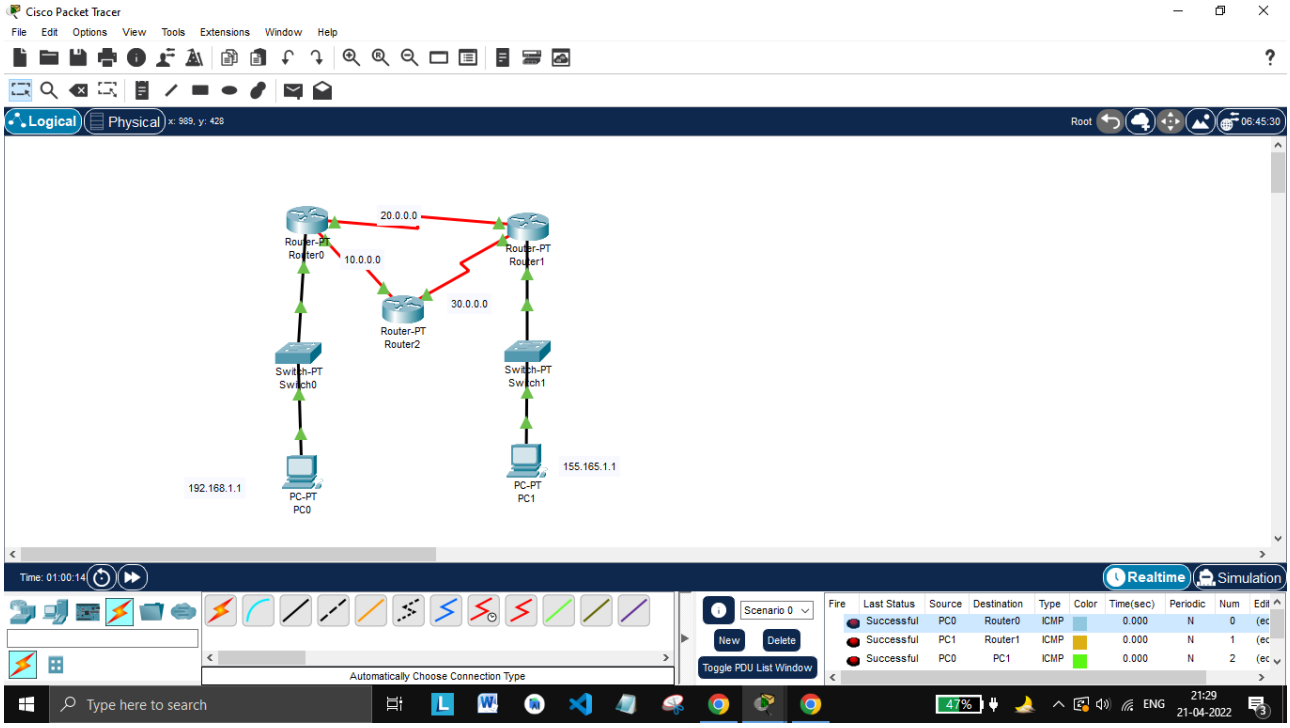
network 20.0 0.0 0.255.255.255 area 0

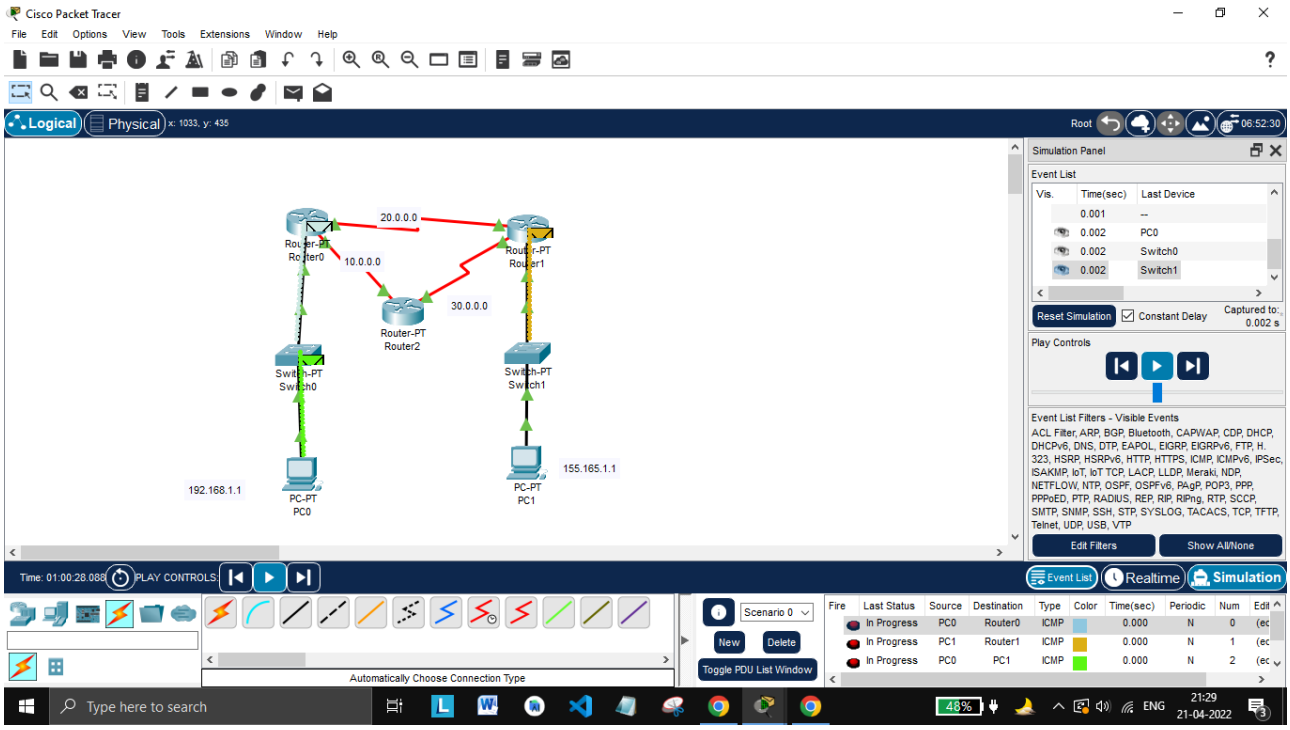
exit

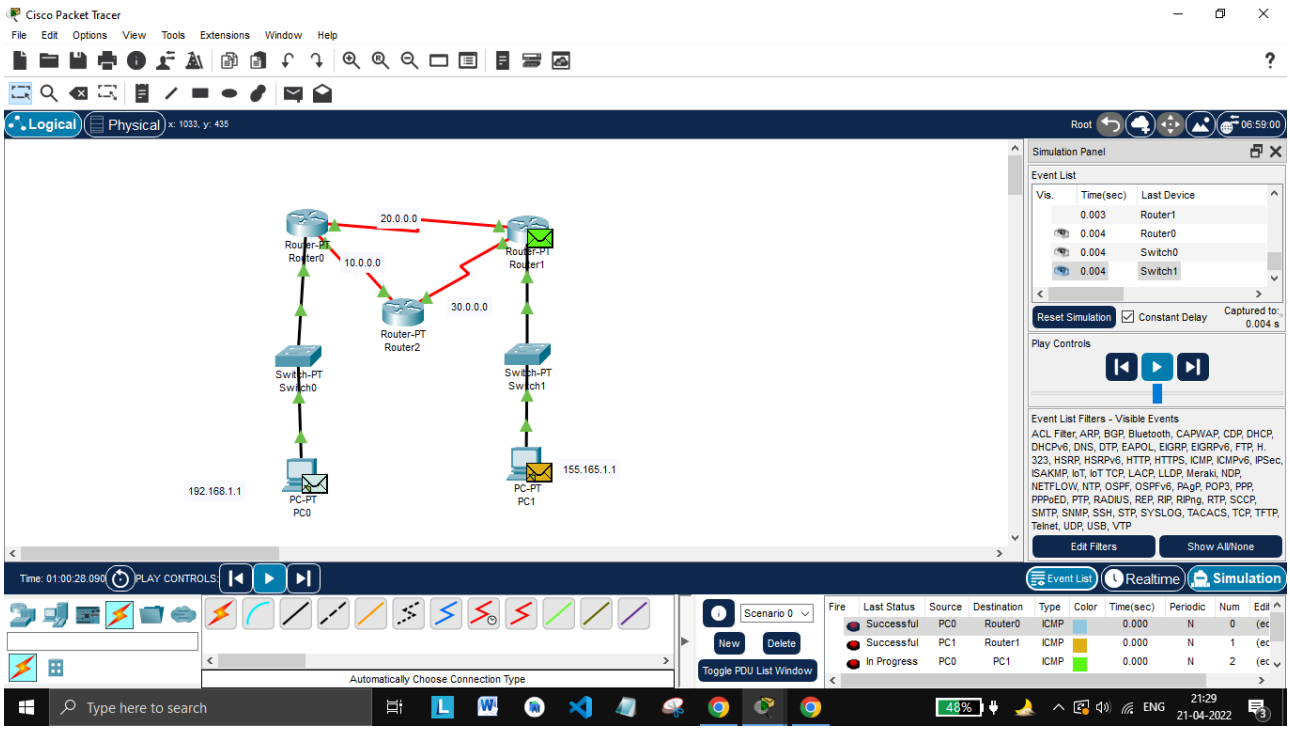
Similarly for all the routers we have to configure in cli .

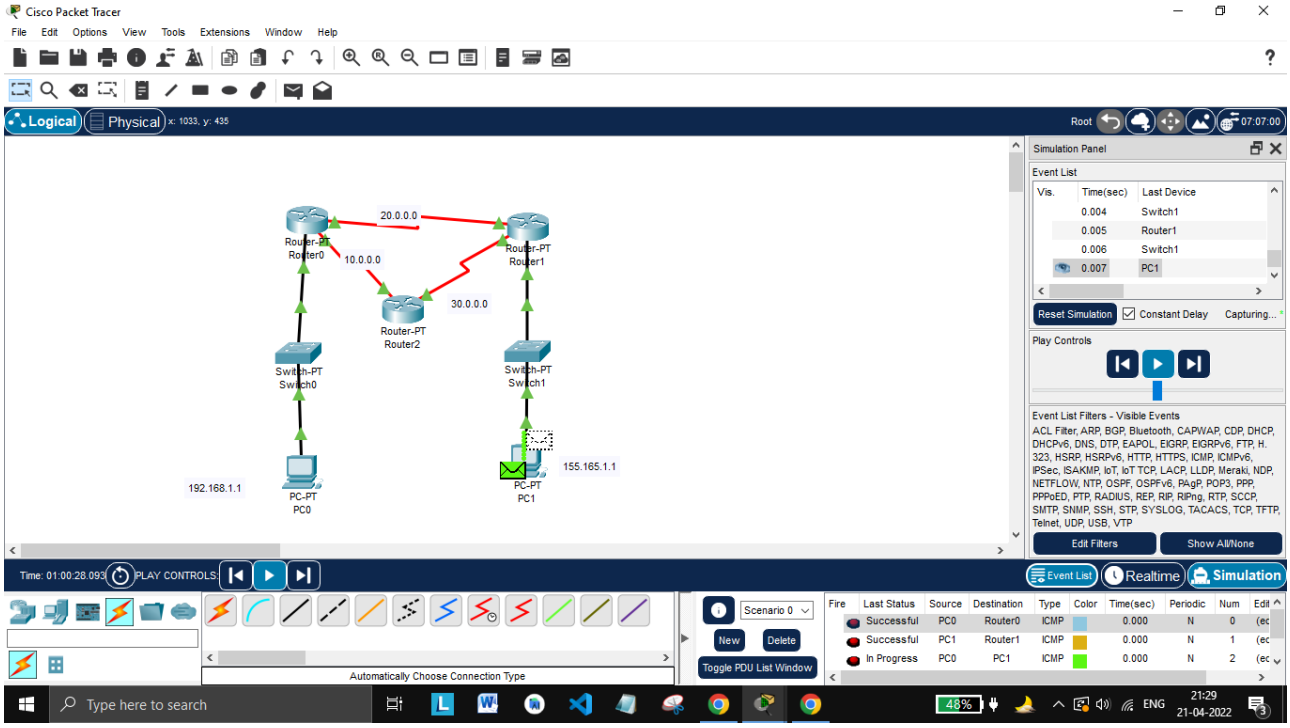
Output :

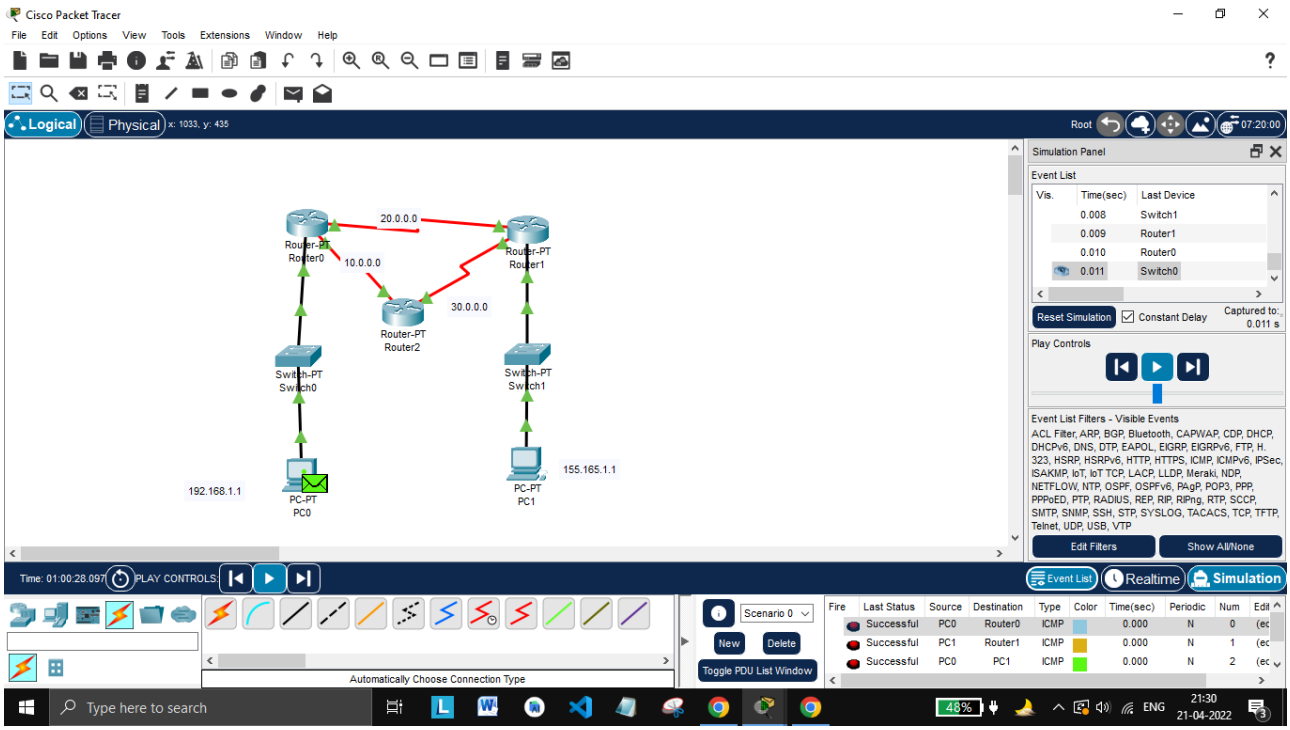

Cisco Packet Tracer
File Edit Options View Tools Extensions Window Help
Logical Physical x: 888, y: 435
Root 06:29:00
20.0.0.0
10.0.0.0
30.0.0.0
Router-PT Router0
Router-PT Router1
Router-PT Router2
Switch-PT Switch0
Switch-PT Switch1
192.168.1.1
155.165.1.1
PC-PT PC0
PC-PT PC1
Time: 00:59:15
Realtime Simulation
Scenario 0
New Delete
Toggle PDU List Window
Automatically Choose Connection Type
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit
Successful PC0 Router0 ICMP 0.000 N 0
Successful PC1 Router1 ICMP 0.000 N 1
Successful PC0 PC1 ICMP 0.000 N 2
Type here to search
47%
ENG
21:28
21-04-2022

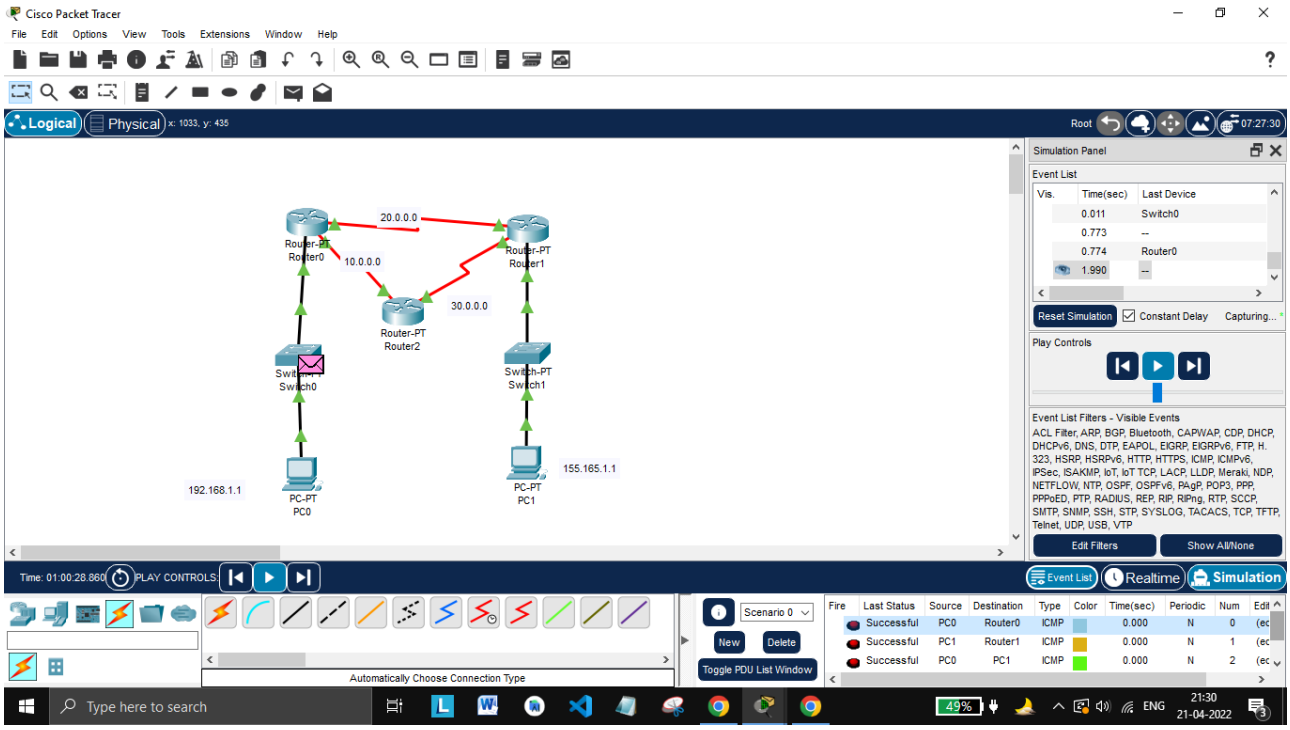

Cisco Packet Tracer
File Edit Options View Tools Extensions Window Help
Logical Physical x: 989, y: 428
Root 06:45:30
20.0.0.0
10.0.0.0
30.0.0.0
Router-PT Router0
Router-PT Router1
Router-PT Router2
Switch-PT Switch0
Switch-PT Switch1
192.168.1.1
155.165.1.1
PC-PT PC0
PC-PT PC1
Time: 01:00:14
Realtime Simulation
Scenario 0
New Delete
Toggle PDU List Window
Automatically Choose Connection Type
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit
Successful PC0 Router0 ICMP 0.000 N 0
Successful PC1 Router1 ICMP 0.000 N 1
Successful PC0 PC1 ICMP 0.000 N 2
Type here to search
47%
ENG
21:29
21-04-2022

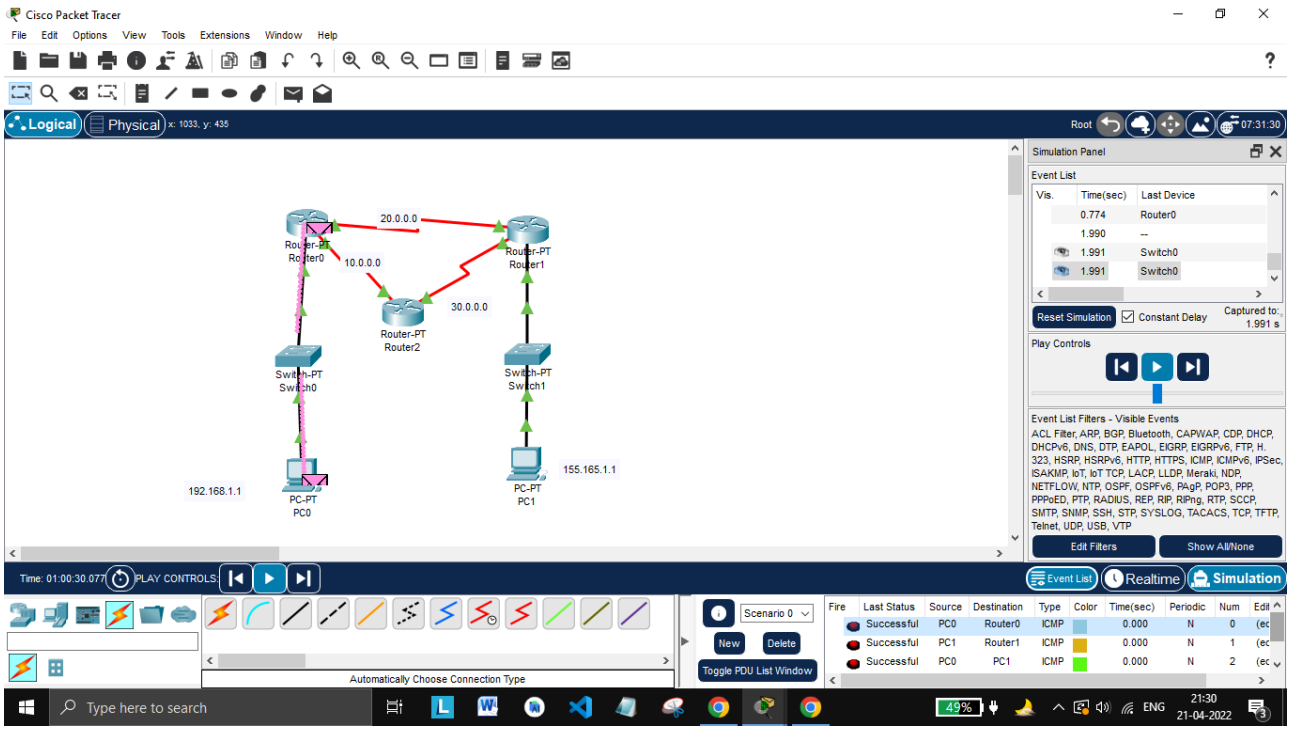

Cisco Packet Tracer
File Edit Options View Tools Extensions Window Help
Logical Physical x: 1033, y: 435
Root 06:52:30
20.0.0.0
10.0.0.0
30.0.0.0
Router-PT Router0
Router-PT Router1
Router-PT Router2
Switch-PT Switch0
Switch-PT Switch1
PC-PT PC0
PC-PT PC1
192.168.1.1
155.165.1.1
Simulation Panel
Event List
Vis. Time(sec) Last Device
0.001 --
0.002 PC0
0.002 Switch0
0.002 Switch1
Reset Simulation
Constant Delay
Captured to: 0.002 s
Play Controls
Event List Filters - Visible Events
ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, IoT, IoT TCP, LACP, LLDP, Meraki, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoED, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP
Edit Filters
Show All/None
Time: 01:00:28.088 PLAY CONTROLS
Event List Realtime Simulation
Scenario 0
New Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit
In Progress PC0 Router0 ICMP 0.000 N 0
In Progress PC1 Router1 ICMP 0.000 N 1
In Progress PC0 PC1 ICMP 0.000 N 2
Automatically Choose Connection Type
Type here to search
48%
ENG
21:29
21-04-2022


Cisco Packet Tracer
File Edit Options View Tools Extensions Window Help
Logical Physical x: 1033, y: 435
Root 06:59:00
20.0.0.0
10.0.0.0
30.0.0.0
Router-PT Router0
Router-PT Router1
Router-PT Router2
Switch-PT Switch0
Switch-PT Switch1
PC-PT PC0
PC-PT PC1
192.168.1.1
155.165.1.1
Simulation Panel
Event List
Vis. Time(sec) Last Device
0.003 Router1
0.004 Router0
0.004 Switch0
0.004 Switch1
Reset Simulation
Constant Delay
Captured to: 0.004 s
Play Controls
Event List Filters - Visible Events
ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, IoT, IoT TCP, LACP, LLDP, Meraki, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoED, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP
Edit Filters
Show All/None
Time: 01:00:28.090 PLAY CONTROLS
Event List Realtime Simulation
Scenario 0
New Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit
Successful PC0 Router0 ICMP 0.000 N 0
Successful PC1 Router1 ICMP 0.000 N 1
In Progress PC0 PC1 ICMP 0.000 N 2
Automatically Choose Connection Type
Type here to search
48%
ENG
21:29
21-04-2022


Cisco Packet Tracer
File Edit Options View Tools Extensions Window Help
Logical Physical x: 1033, y: 435
Root 07:07:00
20.0.0.0
10.0.0.0
30.0.0.0
Router-PT Router0
Router-PT Router1
Router-PT Router2
Switch-PT Switch0
Switch-PT Switch1
PC-PT PC0
PC-PT PC1
192.168.1.1
155.165.1.1
Simulation Panel
Event List
Vis. Time(sec) Last Device
0.004 Switch1
0.005 Router1
0.006 Switch1
0.007 PC1
Reset Simulation Constant Delay Capturing...
Play Controls
Event List Filters - Visible Events
ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, IoT, IoT TCP, LACP, LLDP, Meraki, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoED, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP
Edit Filters Show All/None
Time: 01:00:28.093 PLAY CONTROLS
Event List Realtime Simulation
Scenario 0 New Delete Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit
Successful PC0 Router0 ICMP 0.000 N 0
Successful PC1 Router1 ICMP 0.000 N 1
In Progress PC0 PC1 ICMP 0.000 N 2
Automatically Choose Connection Type
Type here to search
48% ENG 21:29 21-04-2022


Cisco Packet Tracer
File Edit Options View Tools Extensions Window Help
Logical Physical x: 1033, y: 435
Root 07:20:00
20.0.0.0
10.0.0.0
30.0.0.0
Router-PT Router0
Router-PT Router1
Router-PT Router2
Switch-PT Switch0
Switch-PT Switch1
PC-PT PC0
PC-PT PC1
192.168.1.1
155.165.1.1
Simulation Panel
Event List
Vis. Time(sec) Last Device
0.008 Switch1
0.009 Router1
0.010 Router0
0.011 Switch0
Reset Simulation Constant Delay Captured to: 0.011 s
Play Controls
Event List Filters - Visible Events
ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, IoT, IoT TCP, LACP, LLDP, Meraki, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoED, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP
Edit Filters Show All/None
Time: 01:00:28.097 PLAY CONTROLS
Event List Realtime Simulation
Scenario 0 New Delete Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit
Successful PC0 Router0 ICMP 0.000 N 0
Successful PC1 Router1 ICMP 0.000 N 1
Successful PC0 PC1 ICMP 0.000 N 2
Automatically Choose Connection Type
Type here to search
48% ENG 21:30 21-04-2022





Conclusion : Therefore we have successfully implemented Open Shortest Path First (OSPF) in cisco packet tracer.