Semester	T.E. Semester VI – EXTC Engineering
Subject	Computer Communication Network (CCN)
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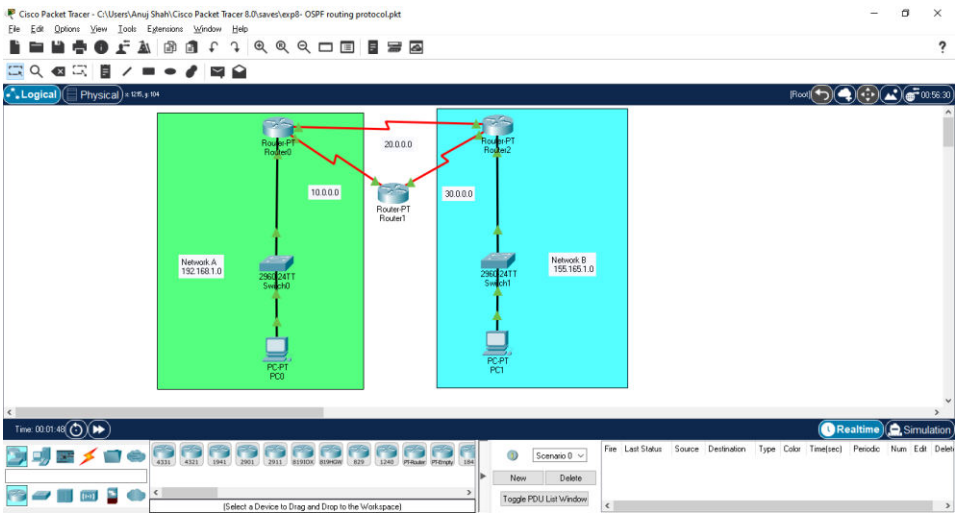
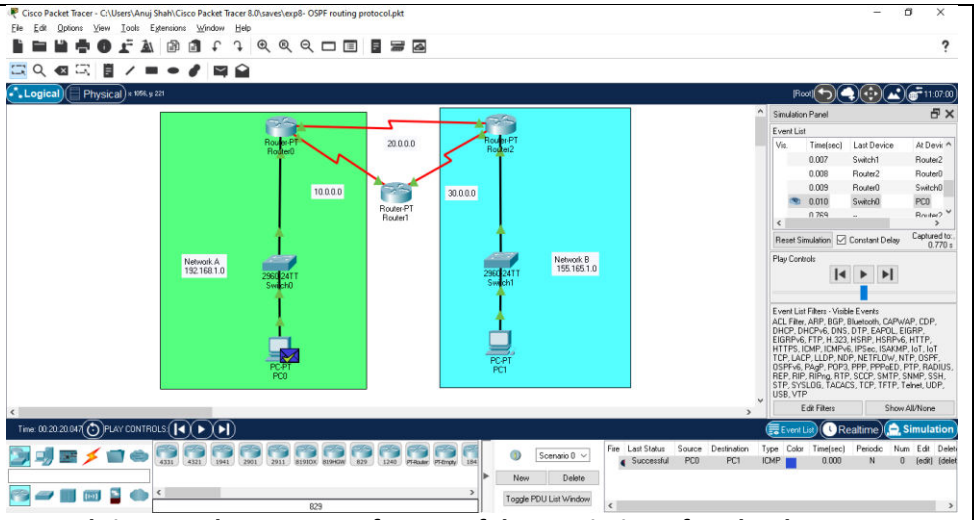
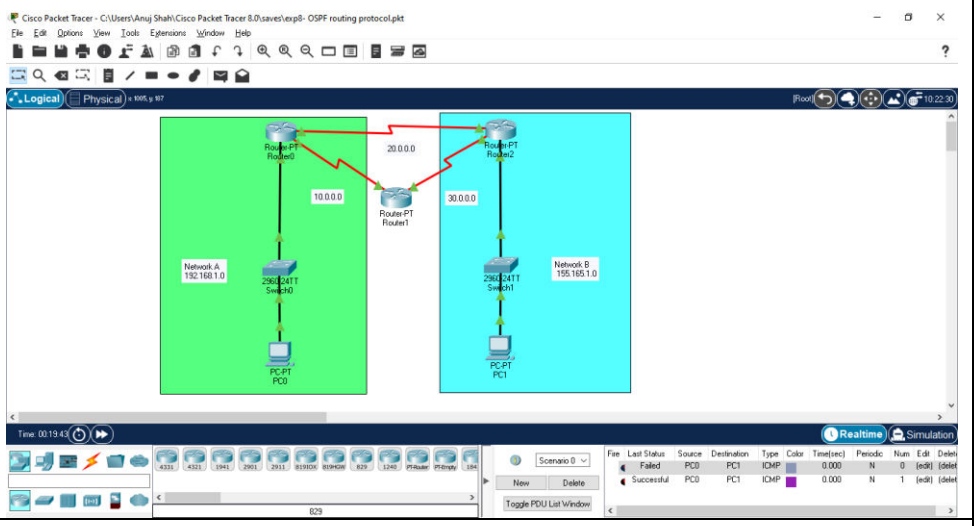
Experiment Number	08	
Experiment Title	Implementation of Open shortest path First (OSPF) Routing algorithm in Cisco packet Tracer	
Aim	To set up and configure a network using Open shortest path First (OSPF) Routing algorithm) in Cisco packet tracer .Establish transmission of packets from source to destination and verify its successful transmission	
Resources / Apparatus Required	Hardware: Internet Connected PC	Software: Cisco Packet Tracer
Theory:	Open Shortest Path First (OSPF) is a routing protocol for Internet Protocol (IP) networks. It uses a link state routing (LSR) algorithm and falls into the group of interior gateway protocols (IGPs), operating within a single autonomous system (AS). The OSPF protocol is a link-state routing protocol, which means that the routers exchange topology information with their nearest neighbors. The topology information is flooded throughout the AS, so that every router within the AS has a complete picture of the topology of the AS. This picture is then used to calculate end-to-end paths through the AS, normally using a variant of the Dijkstra algorithm. Therefore, in a link-state routing protocol, the next hop address to which data is forwarded is determined by choosing the best end-to-end path to the eventual destination. The main advantage of a link state routing protocol like OSPF is that the complete knowledge of topology allows routers to calculate routes that satisfy particular criteria. This can be useful for traffic engineering purposes, where routes can be constrained to meet particular quality of service requirements. The main disadvantage of a link state routing protocol is that it does not scale well as more routers are added to the routing domain. Increasing the number of routers increases the size and frequency of the topology updates, and also the length of time it takes to calculate end-to-end routes. This lack of scalability means that a link state routing protocol is unsuitable for routing across the Internet at large, which is the reason why IGPs only route traffic within a single AS. Each OSPF router distributes information about its local state (usable interfaces and reachable neighbors, and the cost of using each interface) to other routers using a Link State Advertisement (LSA) message. Each router uses the received messages to build up an identical database that describes the topology of the AS.	

	From this database, each router calculates its own routing table using a Shortest Path First (SPF) or Dijkstra algorithm. This routing table contains all the destinations the routing protocol knows about, associated with a next hop IP address and outgoing interface.
Procedure :	1. Open cisco packet tracer. 2. Select the required end devices such as PC, Laptop, router,switches from the end devices and Network devices 3. Connect Network using automatic connections 4. Configure the end devices(PC's) using the suitable IP addresses 5.Configure the routers in their fast Ethernet port and turn them on 6. Configure the links between three networks which are present between the 3 routers on serial port. Select the clock speed as 64000 if clock is present and if absent select not set option from clock rate. 7. Observe that the entire network has turned from red to green 8. Using CLI of each router with commands for OSPF configure the OSPF 9. Choose the packet from tools and select its source and destination. 10.Confirm successful delivery in the real time mode 11. Click Start simulation. Observe the successful delivery of packet through tick mark(Acknowledgement)
Screenshots of the Output(Response)	**Network with three Routers and connections active**  **Successful transmission of packet from source to destination with acknowledgment received in simulation mode(Tick mark)**



In real time mode message of successful tranmission of packet between two networks



Conclusion:	In this practical, we learned how to implement the OSPF routing algorithm in Cisco packet tracer, and we verified that it works by sending a packet over the network.
Post Lab Questions:	1. What is Routing? 2.List the features of OSPF Routing protocol **Routing** Routing is the process of selecting a path for traffic in a network or between or across multiple networks. Broadly, routing is performed in many types of networks, including circuit-switched networks, such as the public switched telephone network (PSTN), and computer networks, such as the Internet. In packet switching networks, routing is the higher-level decision making that directs network packets from their source toward their destination through intermediate network nodes by specific packet forwarding mechanisms. Packet forwarding is the transit of network packets from one network interface to another. Intermediate nodes are typically network hardware devices such as routers, gateways, firewalls, or switches. General-purpose computers also forward packets and perform routing, although they have no specially optimized hardware

	for the task. The routing process usually directs forwarding on the basis of routing tables. Routing tables maintain a record of the routes to various network destinations. Routing tables may be specified by an administrator, learned by observing network traffic or built with the assistance of routing protocols. Source: https://en.wikipedia.org/wiki/Routing OSPF routing protocol • OSPF is a link-state protocol in which all routers in the routing domain exchange information and thus know about the complete topology of the network. • Because each router knows the complete topology of the network, the use of the SPF algorithm creates an extremely fast convergence. • OSPF provides routing information to the IP section of the TCP/IP protocol suite, the most commonly used alternative to RIP. • OSPF Sends updates to tables only, instead of entire tables, to routers. • OSPF is a more economical routing protocol than RIP over time because it involves less network traffic. Source: https://sourcedaddy.com/networking/ospf-characteristics.html