Computer Networks Lab

Course Code: PCCCS691
Semester: VI

Department of Computer Science and Engineering

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Course Objectives:

- To understand the working principle of various communication protocols.
- To analyze the various routing algorithms.
- To know the concept of data transfer between nodes.

Course Outcomes:

- Identify and use various networking components
- Understand different transmission media and design cables for establishing a network
- Implement any topology using network devices
- Analyze performance of various communication protocols.
- Compare routing algorithms
- Understand the TCP/IP configuration for Windows and Linux
- Implement device sharing on network
- Learn the major software and hardware technologies used on computer network

Assignments

1. Make an Ethernet Patch Cable Using Crimper, RJ45 and Twisted Pair Cable and Test it in Cable Tester. Discuss the concept of Straight and Crossover cable.
2. Getting started with Basics of Network configurations files and Networking Commands in Linux.
3. To familiarize and understand the use and functioning of System Calls used for Operating system and network programming in Linux.
4. Create a simple topology of two nodes (Node1, Node2) separated by a point-to-point link using NS3
5. Program in NS3 for connecting three nodes considering one node as a central node.
6. Program in NS3 to implement a bus topology.
7. Implement 1D and 2D parity check.
8. Implement Checksum and CRC parity check.
9. Design ethernet network using OPNET.
10. Design token ring network using OPNET.
11. Design switched local area networks using OPNET.
12. Design a Network with Different Users, Hosts, and Services using OPNET.
13. Draw diagram to configure 3 pcs, with a Switch and 2 laptops Hubs send packets to each other in Packet Tracer. Specify the difference between Hub and Switch in Simulation Mode.
14. Draw diagram to configure 2 pc with a router and send packets to each other in Packet Tracer. Discuss the Gateway Concept of a Network.
15. Draw diagram to configure one network from the router and connect with 2 switches, 1 hub and 6 Pcs.
16. Draw diagram to configure 3 pcs, 1 switch, 1 router with 3 pcs, 1 switch, 1 router, 1 server (using DNS Configuration). Set the IP of each pc dynamically using DHCP Configuration.
17. Configure Access Control List and RIP using packet tracer.
18. Configure OSPF using packet tracer.
19. Program in NS3 for connecting multiple routers and nodes and building a hybrid topology.
20. Configuration of Intra VLAN and Inter VLAN using packet tracer.
21. Configure NAT, PAT and SAT in a network with public and private IP addresses and port numbers for data communication.

22. To design and implement TCP sockets at server and client site.
23. To design and implement UDP sockets at server and client site
24. Using Wireshark observe Three Way Handshaking Connection Establishment, Data Transfer and Three Way Handshaking Connection Termination in client server communication using TCP.
25. Implement programs for Inter-Process-Communication using PIPE, Message Queue and Shared Memory.
26. Implement a multi user chat server using TCP as transport layer protocol.
27. Design and configure a network with multiple subnets with wired and wireless LANs using required network devices. Configure the following services in the network- TELNET, SSH, FTP server, Web server, File server, DHCP server and DNS server.
28. 28. Install network simulator GNS3 in any of the Linux operating system and simulate wired and wireless scenarios.
29. Firewall configuration using packet tracer.
30. End-to-end testing using Free5GC and UERANSIM.
31. Project