Computer Network Lab

1. **Understanding FRCRCE College Network**

   Post Lab Questions:

   a. What do you mean by Cross over, straight through and Rollover cables? Explain with pinout diagram.
   b. What are the two different type of switching modes available?
   c. What are the different passwords you can set to make your router secure? How do you set these different passwords for your router(write appropriate commands).
   d. Compare between OSI layer and TCP/IP model

2. **Learning Networking devices(hub,switch,router,server,pc,laptop,firewall)etc.**

   Post Lab Questions:

   a. For n devices in a network, what is the number of cable links required for a mesh, ring, bus and star topology?
   b. 2.Differentiate between Mesh, Star, Ring andBus.
   c. 3.Differentiate between Hub andSwitch.
   d. 4.Differentiate between Bridge andRouter
   e. Explain Broadcast domain and Collision Domain with example

3. **Setting up static ip address on linux machine(Virtual Machine)**

   Post Lab Questions:

   a. Explain any 5 linux network troubleshooting commands e.g ping,traceroute,ifconfig,netstat,nmap
   b. Difference between static ip address and dynamic ip address.
   c. Explain all Delays in Computer Networks with formulas
   d. formula for efficiency
   e. formula for throughput

4. **To Implement CRC code generation and error detection.**

   Post Lab Questions:

   A. For the generator polynomial g = 110011 and the data bits (message) m = 11100011 find the CRC and the transmitted string T (since g is 6 bits, i.e. a polynomial of degree 5, L = 5 and the CRC should be 5 bits)
   B. Suppose g = 1001 and the received T = 1010101, did any transmission errors occur? Justify why?
   C. Suppose g = 101 and the received T = 1100110, did any transmission errors occur?
   D. Differentiate between Independent vs Cumulative acknowledgement

5. **To implement error correction using Hamming code.**

   Post Lab Questions:

A. An 8-bit byte with binary value 10101111 is to be encoded using an even-parity Hamming code. What is the binary value after encoding?

B. If the code word is 011100101010. Suppose the word that was received is 011100101110 instead. Then calculate which bit is wrong and correct it.

C. For a hamming distance of 6 how many errors can be detected? How many can be corrected.

D. Generate the hamming code word 1010101. Assume odd parity for the hamming code.

E. Broadcast domain and Collision Domain with example

6. **Packet tracer Lab and introduction (Different priviledge modes) and Setting up a network**

   Postlab Questions

   A. Difference between IP address and MAC Address
   B. limited broadcast address, directed broadcast address multicast address
   C. Define all IP Classful addressing system with number of hosts ranges
   D. Why TTL field is used in IPV4 header
   E. What is IP psuedo header and how it is used in TCP checksum calculation
   F. What is the purpose of the sequence number field in the TCP header?

7. **Build a simple network topology and configure it for static routing as well as for dynamic routing using packet tracer (Static Routing and Dynamic Routing)(2 router network)**
   Postlab Questions:
   A. Explain DCE VS DTE Terminal used for connecting routers.
   B. Explain process of IP fragmentation
   C. LAN VS MAN VS WAN
   D. How ARP works?

8. **Build a 3 router network topology in series as well as triangular fashion and configure it for static routing as well as for dynamic routing using packet tracer (Static Routing and Dynamic Routing)** –
   Postlab Questions:
   A. What is the difference between token bucket and leaky bucket algorithm?
   B. Differentiate between open loop and close loop congestion control methods?
   C. RIP vs OSPF vs BGP
   D.

9. **Design Network for Network Address translation Using Packet Tracer** --- Darlene ,mayank

   Postlab Questions
   1. what are ranges of private IP address and what is need of NAT.
   2. The maximum size of data that can be accommodated in an IP datagram is _____ bytes.
   3. The maximum size of data that can be accommodated in an TCP segment is _____ bytes.

4. The maximum size of data that can be accommodated in an UDP segment is _____ bytes.
5. Explain the terms MTU and MSS with examples

6. An IP packet with 2500 bytes of data (plus header) passes through an IP network with MTU = 500 bytes. How many additional bytes will be delivered at the destination?

10. **Design a Network for Applicatin Layer Services like HTTP,DNS,DHCP,FTP,SMTP**

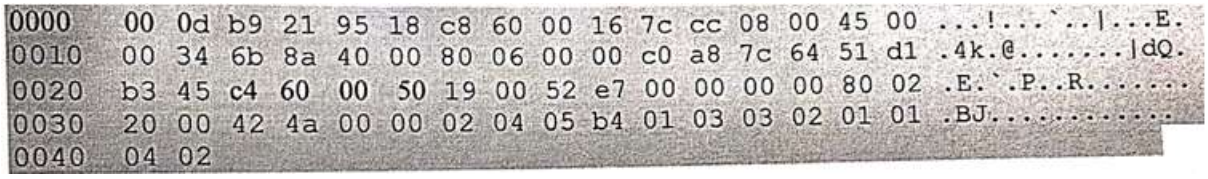
Postlab Questions

1. Explain how DHCP allocates ip address dynamically using DORA process with help of diagram
2. List atleast 15 Application layer protocols with their port numbers and the transport layer protocol they use.
3. Differentiate between POP3 and IMAP

11. **Understanding Network Problems using wireshark.**

Postlab Questions

1. What is difference between display filter and capture filter in wireshark
2. How do you set capture filter to capture
   A. Displays packets with source IP address 10.1.1.1
   B. Display Packets with destination TCP port 3128
   C. Displays packets with source UDP or TCP ports in range 2000-2500 range
   D. Displays packets with source IP address equals to 10.7.2.12 and in the same time not with the destination IP network 10.200.0.0/16



3. If you get a following Hex Dump for a packet, Answer the following
   A. Which part of the above Hex Dump represents frame?
   B. What is the Source MAC address and destination MAC address?
   C. Which protocol is encapsulated in the Ethernet frame?
   D. Which transport layer protocol TCP/UDP the packet carries?Which HEX numbers tells you that?

12. **Demonstrate Virtual Private Network using Packet Tracer.**

Postlab Questions

A. What is wild subnet mask and its purpose?
B. what fields remain static in IP header and what fields may change when packets over from source to destination.
C. what is pdu for each layer in TCP/IP. refer http://knutsonco.tripod.com/id9.html

D. A TCP connection is using a window size of 10000 bytes, and the previous acknowledgment was 22001. It receives a segment with acknowledgment number 24001.Draw a diagram to show the situation of the window before and after.

13. Write a program to implement a client-server socket programming using connection oriented service (Using TCP and UDP).

Postlab Questions

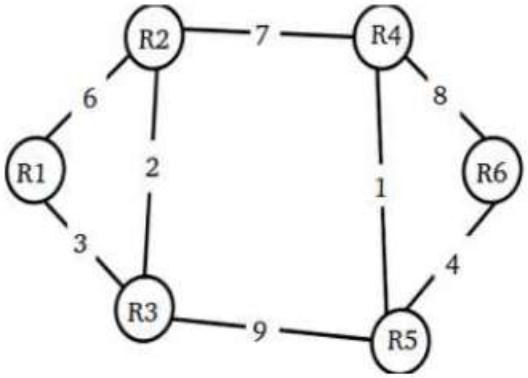
A. What's with the second parameter in bind()?
B. If bind() fails, what should I do with the socket descriptor?
C. What is the difference between read() and recv()?
D. Differentiate between connection oriented services vs Connectionless services.

14. **Implementation of Distance Vector Routing/Dijkshtra algorithm Protocol** shubham

Post Lab Questions:

Q-1 List and explain any two practical applications of Dijkstra's shortest path algorithm.

Q-2 Consider the following graph, with 6 routers R1 to R6 connected with links having weights as shown on the arc. Explain your answer with calculations or diagrams.



All the routers use the **distance vector based routing algorithm** to update their routing tables. Each router starts with its routing table initialized to contain an entry for each neighbor with the weight of the respective connecting link. After all the routing tables stabilize, how many links in the network will **never be used** for carrying any data?

15. Mini Project

Assignment Questions:

1. How many trailing zeroes are there in a subnet mask of category 240?
2. Identify the Network address for the IP address 192.168.0.1 with subnet mask 255.255.255.240
3. Represent the following IP address in binary octet form: 192.56.79.178

4. If the IP header is 192 bits long, what will be the value of the "HLEN" field?

5. An IP packet arrives at a router with the first eight bits as 01001000. How many bytes are there in the OPTIONS field?

6. In an IP packet, the value of HLEN is 5, and the value of the TOTAL LENGTH field is 1000 (in decimal). The number of data bytes in the packet will be _____

7. What do the following IP address signify: 144.16.255.255 ?
8. What is the subnet address if the destination IP address is 144.16.34.124 and the subnet mask is 255.255.240.0?
9. The maximum number of hosts that are possible in a class C network is _____
10. Which of the following is the valid host range for the subnet on which the IP address 192.168.168.188 255.255.255.192 resides?
11. Which class of IP address has the most host addresses available by default?
12.

The default route is specified in a routing table by using the host address:

a. 0.0.0.0
b. 255.255.255.255
c. 127.0.0.1
d. None of these

13.

Consider the following routing table in a router. On which interface will an IP packet with destination address 144.25.64.120 be forwarded?

Destination	Subnet Mask	Interface
144.25.0.0	255.255.0.0	Eth0
144.25.64.0	255.255.224.0	Eth1
144.25.68.0	255.255.255.0	Eth2
144.25.68.64	255.255.255.224	Eth3
default	0.0.0.0	Eth2

a. Eth0
b. Eth1
c. Eth2
d. Eth3

14.

An entry in the routing table has 135.46.56.0 as the destination and /22 as the subnet mask. What will be the network address?

a. 135.46.56.0
b. 135.46.0.0
c. 135.46.48.0
d. None of these.

15. Find the range of addresses in the following blocks.
a. 200.17.21.128/27
b. 17.34.16.0/23

16. In a block of addresses we know the IP address of one host is 182.44.82.16/26. What are the first address and last address in this block?

17. An organization is granted the block 211.17.180.0/24. The administrator wants to create 32 subnets.
a. Find the subnet mask.
b. Find the number of addresses in each subnet.
c. Find the first and last address in subnet 1.
d. Find the first and last address in subnet 32.

18. An organization is granted the block 16.0.0.0/8. The administrator wants to create 500 fixed length subnets.
a. Find the subnet mask.
b. Find the number of addresses in each subnet.
c. Find the first and last address in subnet 1.

d. Find the first and last address in subnet 500.