Homework 4

CH4 homework

Please complete these and submit to e-learning. All must be handwritten. Write, scan as pdf, submit.

1. Within this chapter, name a layer-3 device.
2. Why is that device in Q1 called a layer-3 device?
3. Explain the 2 main functions of the network layer.

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     172.16.0.0/16 is variably subnetted, 8 subnets, 3 masks
O       172.16.224.0/23 [110/65] via 172.16.230.5, 00:00:13, Serial2/0
O       172.16.226.0/23 [110/129] via 172.16.230.5, 00:00:13, Serial2/0
C       172.16.228.0/24 is directly connected, FastEthernet1/0
O       172.16.229.0/24 [110/65] via 172.16.230.14, 00:00:13, Serial3/0
O       172.16.230.0/30 [110/128] via 172.16.230.5, 00:00:13, Serial2/0
C       172.16.230.4/30 is directly connected, Serial2/0
C       172.16.230.8/30 is directly connected, FastEthernet0/0
C       172.16.230.12/30 is directly connected, Serial3/0
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Figure 1

4. Figure 1 shows a forwarding table of a router. Refer to Figure 1 to answer the following questions.
    a. What routing algorithm is being used here?
    b. Can you tell how many subnets are in the network topology from the information on the routing table? How many?
    c. If a packet with a destination address of 172.16.227.123 arrives at the router, which output port will it be sent to?
    d. If a packet with a destination address of 172.16.231.2 arrives at the router, which output port will it be sent to?
5. If an IP address (200.20.226.5/21) is given, find the subnet's network and broadcast address. Show your workings.
6. Organization is given network address 188.192.192.0/22. Subnet using VLSM for 5 departments A (100 hosts), B (210 hosts), C (80 hosts), D (40hosts), E (10 hosts). All hosts mentioned here are usable host.
    a. Show your workings clearly and present final results in a subnet addressing table. **Note: table header shown below.*
    b. Calculate all the unused hosts in each subnet.

Subnet	Hosts Needed	Hosts Available	Unused hosts	Network Address	Subnet Mask (Slash format)	Subnet Mask (dotted decimal format)	Usable address Range	Broadcast

7. With respect to DHCP, answer the following questions.
    a. What is DHCP?
    b. How does DHCP works?
    c. What is the benefit of DHCP?
    d. When configuring DHCP, what portion of the subnetwork address is used for distribution?
    e. What is the lease time for an IP address, and what happens when it expires? Additionally, what occurs if the lease expires while the host is still actively using the address?
8. With regards to Network Address Translation (NAT), answer the following questions.
    a. What is NAT?
    b. What is the purpose of NAT?
    c. How does NAT works?
9. Given N=5000, RTT = 150ms, C = 5Gbps, how much is average buffer size B?
    a. Following rule of thumb.
    b. Following recent recommendations.
10. If a file with a size 6000bytes is sent to destination through a link with and MTU of 1500bytes, explain the fragmentation process that happens here. ***Please use the fragmentation table as given in class.*

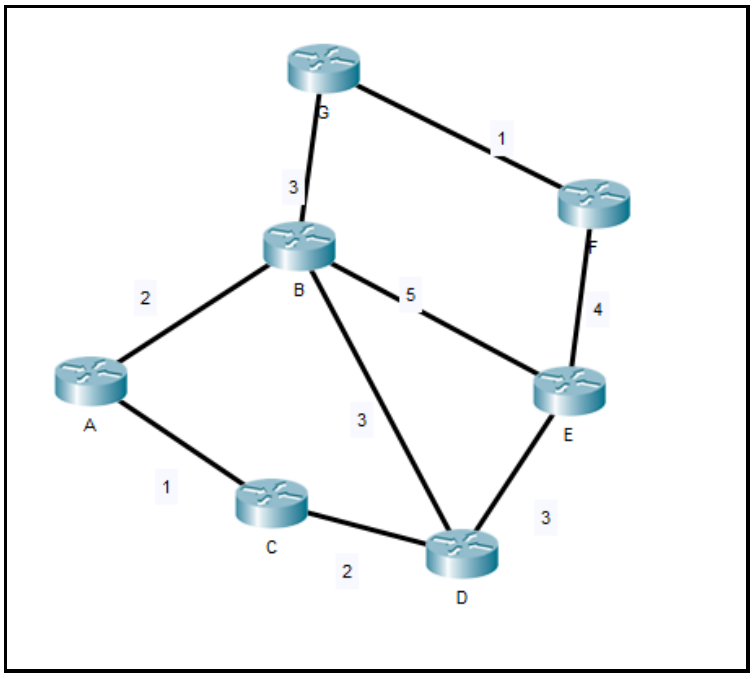

Figure 2

11. Given the network topology in Figure 2, answer the following questions. Show your workings.
    a. Create the forwarding table, using Djikstra algorithm (for Link State routing) for the source router A.

b. Create the forwarding table, using Bellman-Ford algorithm (for Distance Vector routing) for the source router A. **forwarding table here means for the whole network.*

12. Why was UDP chosen for SNMP instead of TCP? Explain your answer.

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