CSC 435/524 Computer Networks

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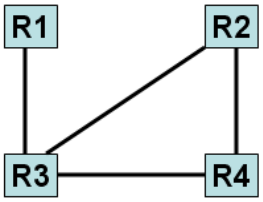
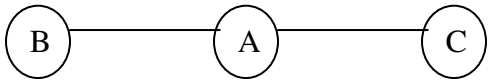
Module 5 - Routing Protocols

1) Complete the forwarding table at routers R1, R2, R3 and R4 shown below. Minimize the number of entries in the routing tables as much as possible using default entries.



2) Consider the following simple network (chain) and the routing tables at the three routers. Explain how the failure of link B - A could trigger a count-to-infinity problem.



Routing table at A

Dest.	Cost	Next Hop
A	0	-
B	1	B
C	1	C

Routing table at B

Dest.	Cost	Next Hop
A	1	A
B	0	-
C	2	A

Routing table at C

Dest.	Cost	Next Hop
A	1	A
B	2	A
C	0	-

3) Briefly explain the three solutions for the count-to-infinity problem.

4) What is the fundamental difference between the Distance Vector Routing Protocol and the Link State Routing Protocol? Briefly explain.

5) What are the two types of routing protocols for the Internet? What is the main difference between these two categories of protocols in terms of the routing principles? Give an example for each.

6) Briefly explain the following terms: (a) Reverse Path Broadcast and (b) Reverse Path Multicast

7) Briefly explain the working of the following multicast protocols:
a. Flood and Prune
b. PIM-SM (Protocol-Independent Multicast) protocol
c. MOSPF

8) What are the pros and cons of PIM-SM? How is it different from OSPF?

Module 6 - Internet Layer

1) Compute the minimum and maximum size of an IP header? Justify your answer.

2) Is the IP Header Checksum changed at every router? Why or why not?

3) What are the fields in the IP header that are used for fragmentation and reassembly? Explain their individual roles?

4) Why fragmentation reassembly is done only at the end hosts?

5) Let an IP datagram with the following data and header sizes be sent through a network of MTU 500 bytes. Calculate the fragment offset values that should be set for the different fragments?

IP header = 40 bytes TCP header = 60 bytes Data = 900 bytes

6) Assume there are two hosts H1 and H2 with IP addresses 143.132.1.2 and 143.132.4.5 and their MAC address be: 12:34:56:AB:CD:EF and AB:CD:EF:12:34:56. New!!

(a) If H1 runs the ARP protocol to find the MAC address of H2, what would be the source/destination IP addresses and source/destination MAC addresses of the ARP Request packet? Justify your answer.

(b) Let H2 be the DHCP server for the network. H1 releases its current IP address and runs the DHCP protocol to obtain an IP address. What would be the source/destination IP addresses and source/destination MAC addresses for the DHCP Request packet? Justify your answer.

7) What is meant by IP-in-IP encapsulation? Give two examples of where you saw it in use in this module. Explain the encapsulation involved.

8) Compute the IPv4-compatible IPv6 address for 143.132.10.45