val trace 039

34%2 +3; = 3

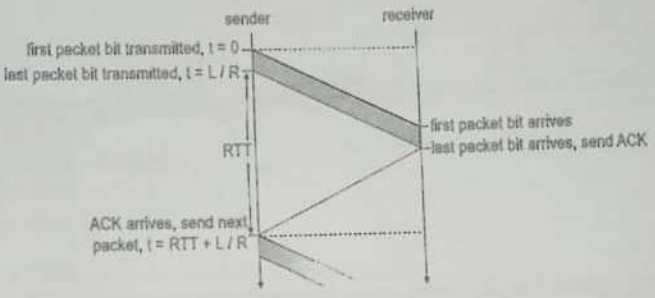
United International University (UIU)
Dept. of Computer Science and Engineering (CSE)
Final Examination Year: **2022** Semester: **Spring 2022**
CSE 323: Computer Networks Marks: **40** Time: **2 Hours**

There are **4 (Four)** questions. Answer **all 4 (Four)** questions.

Q.1 a) Consider a node A that is using TCP flow control. If **RcvBuffer** = 1300, **LastByteRcvd** = 2500 and **LastByteRead** = 2250. The value of **LastByteSent** = 3700 and **LastByteAcked** = 2600. Now answer the followings: **[2+2+2]**

i. What is the present value of **rwnd**?
ii. What is the amount of un-acknowledged data that A has sent into the connection?
iii. How does TCP make sure that a sender will never overflow the receiver's buffer?

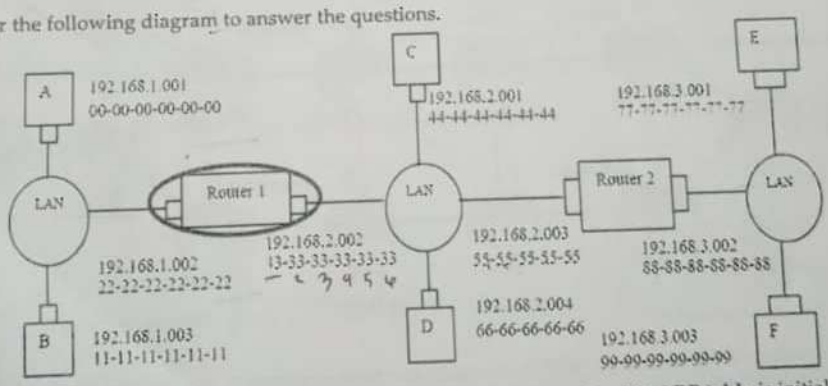
b) Using the following figure, explain how pipelining can increase the utilization of a channel from the stop and wait protocol. Show necessary calculations assuming, pipeline size n = 5, RTT = 2.5s, Packet Size = 150 kilobytes and Transmission Rate = 1000kbps. **[2]**



c) Differentiate between the **Go-Back-N** and **Selective Repeat Request** protocols in terms of: **[2]**

i. Retransmission of packets
ii. Acknowledge sent by the receiver

Q.2 a) Consider the following diagram to answer the questions.



Suppose **Host B** would like to send an IP datagram to **Host E**, and assume that **B's ARP table** is initially **empty**.

i. **What** will be the **destination MAC** of the ARP query sent by **Host B**?
ii. **Which nodes** in the network will **receive** the ARP query from **Host B**?
iii. **Which IP** address will respond to the ARP query sent by **Host B**?
iv. List down the **source and destination IP and MAC addresses of the Ethernet Data frame** (containing IP datagram destined to E) that is delivered to **Router 1**, and **Router 2**.

b) Which IP addresses can we get through DHCP protocol? Why are the DHCP messages sent with broadcast address?

c) Define the main idea behind carrier sense multiple access (CSMA) protocol? What action does it take if it sens channel idle and busy?

Manual trace 039

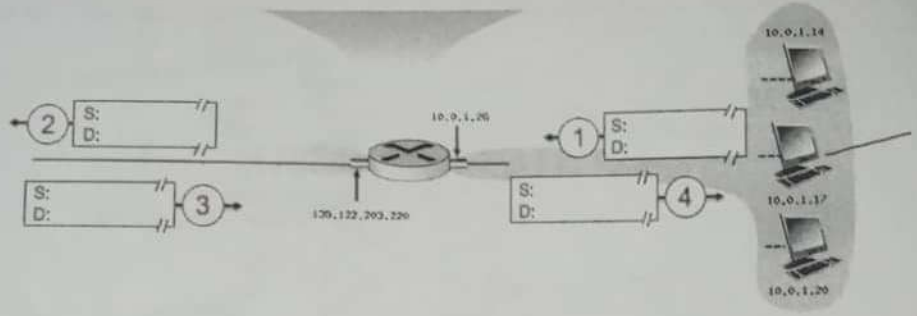
a = 34%2 + 3; = 3

b = 2100 10

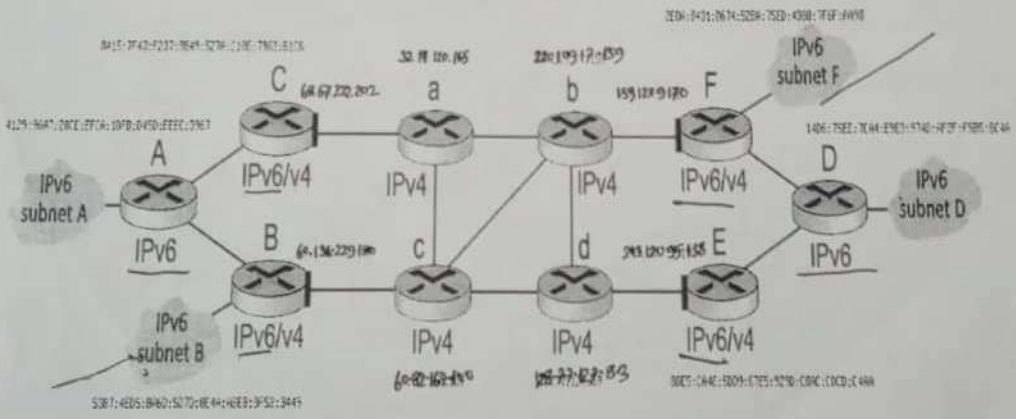
Q3. a) There are three hosts, each with an IP address of 10.0.1.14, 10.0.1.17, and 10.0.1.20, are in a LAN behind a [illegible] that lies between them and the Internet. All IP packets transmitted to or from these three hosts must cross via this [illegible] router. The LAN interface of the router has an IP address of 10.0.1.26 which is the default gateway of that LAN, whereas the Internet interface has an IP address of 135.122.203.220. The IP address of UIU webserver is 210.4.73.233. A user from the host 10.0.1.17 browsing the UIU website. [4]

i. **Now, fill up all the tables where 'S' and 'D' stand for source and destination 'IP address: port' respectively, at steps 1, 2, 3 and 4. You may have to assume necessary port numbers.**

ii. **What will be entries of the NAT translation table?**



b) Consider the network scenario depicted below, which has four IPv6 subnets connected by a combination of IPv6 only routers (A, D), IPv4-supported routers (a, b, c, d), and dual-stack IPv6/IPv4 routers (B, C, E, F).



Assume a host of subnet F wants to send an IPv6 datagram to a host on subnet B. Assume that the forwarding betwe these two hosts goes along the path: F --> b --> d --> c --> B [0.5*4=

Now answer the followings:

i. Is the datagram being forwarded from F to b as an IPv4 or IPv6 datagram?

ii. What is the source address of this F to b datagram?

iii. What is the destination address of this F to b datagram?

iv. Is this F to b datagram encapsulated into another datagram? Yes or No.

c) Suppose a router receives a TCP segment of size 4800 bytes (including header of 20 bytes) that is stamped with identification number of 333. However, the outgoing line has the maximum capacity of MTU of 1120 bytes (includ header of 20 bytes).

i. How many fragments will be created?

ii. For each fragment mention the length, ID, Offset and Flag value.

(36)

a = 34

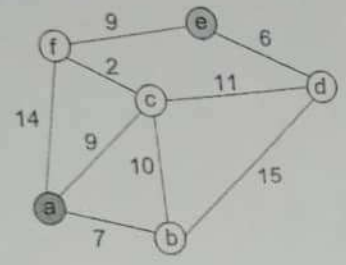
i = 6

34 + 6 = 40

Q4. a) Perform Dijkstra's routing algorithm on the following graph. Here, Source node is 'a', and to all network nodes.

i. Show how the algorithm works by computing a table. [4]

ii. Draw the shortest path tree and the forwarding table for node 'a'. [2]



[2]

b) Suppose you are given two destination addresses.

i. 11001000 00010111 00010110 10100001

ii. 11001011 00010111 00011000 10101010

Why is the Longest Prefix Match rule used during forwarding?

Using the following rule table, which link interfaces these two addresses will be forwarded?

Destination Address Range	Link interface
11001000 00010111 00010*** ********	0
11001000 00010111 00011000 ********	1
11001000 00010111 00011*** ********	2
otherwise	3

c) Briefly explain TCP slow start mechanism with the help of a diagram.