Internet Technologies (COMP90007_2020_SM2)

Assignment 2

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Question 1:
Answer 1:

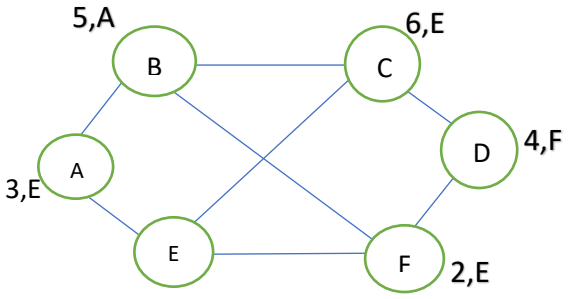
1)

Distance to E

n	A	B	C	D	E	F	
1	∞	∞	∞	∞	**0**	∞	{E}
2	3	∞	6	∞	--	**2**	{E,F}
3	**3**	9	6	4	--	--	{E,F,A}
4	--	5	6	**4**	--	--	{E,F,A,D}
5	--	**5**	6	--	--	--	{E,F,A,D,B}
6	--	--	**6**	--	--	--	{E,F,A,D,B,C}

Shortest distance from E ->A = 3
Shortest distance from E ->C = 6
Shortest distance from E ->F = 2
Shortest distance from E ->B = 5
Shortest distance from E ->D = 4
Shortest distance from E-> E = 0

2) Sink tree of node E



The network link E->E = 0 is there in the table above but not in the sink tree of node E.

Question 2:
Answer 2:

Application	Bandwidth	Delay	Jitter	Loss
Zoom Meeting	High	High	High	Low
Online shopping	Medium	Medium	Low	Medium
VoIP	Low	Low	High	Low
Bank Transactions	Low	Medium	Medium	Medium

Question 3:
Answer 3:

TCP maximum data size = MTU (Maximum Transmission Unit) for Ethernet - **1500 bytes**

UDP safe maximum data size = **576 bytes** (including 8 bytes UDP header)

Question 4:
Answer 4:

1)
Flow control Congestion is accomplished by the receiver sending back a window to the sender.
TCP window is the amount of un-acknowledged data a sender can send on a particular connection before
it gets an acknowledgment back from the receiver.
Sender : -
The sending device sends all packets within the TCP window size as per TCP header without receiving an ACK,
and starts a timeout timer for each of them. It decrease the windows size by analyzing the traffic Congestion to reduce flow.
If a packet ACK not received at sending device, a timeout will occur and it will re transmit the lost Segment.
Receiver : -
Receiving device acknowledge each packet it received and have the sequence number of the last received packet.
After receiving the ACK from the receiving device, the sending device slides the window to right side.

2)
Window size is number of bytes determined by the receiving device which can vary.
Big windows are good for high bandwidth networks.
Window size keeps increasing as long as the receiver sends acknowledgments for all segments till max limit
and it get reduced when ACK not received (timeout).

In TCP slow start, the window size will initially grow exponentially window size doubles but once a packet is dropped, the window size will be reduced to one segment.

Question 5:
Answer 5:

When time out occurs TCP reacts strongly

1. It sets the value of threshold to one-half of the current window size
2. It sets congestion window to size of one segment
3. It starts the slow start phase again

Here when the congestion window size is 39KB when stime out occurs...Let's say the size of one segment is 1Kb so TCP set's congestion window to 1 Kb and threshold to 20Kb and starts slow start phase again.(**In slow start phase window size increases exponentially)**...

Here when congestion size is 1Kb 4 transmissions(rounds) are successful...after 1st round CNWD(congestion window) size will be 2...After second round CNWD size is 4Kb ...After third round CNWD size is 8Kb...after fourth round CNWD size is 16KB....Therefore the window size will be **16Kb** after 4 transmission bursts.

Answer : 16 Kb