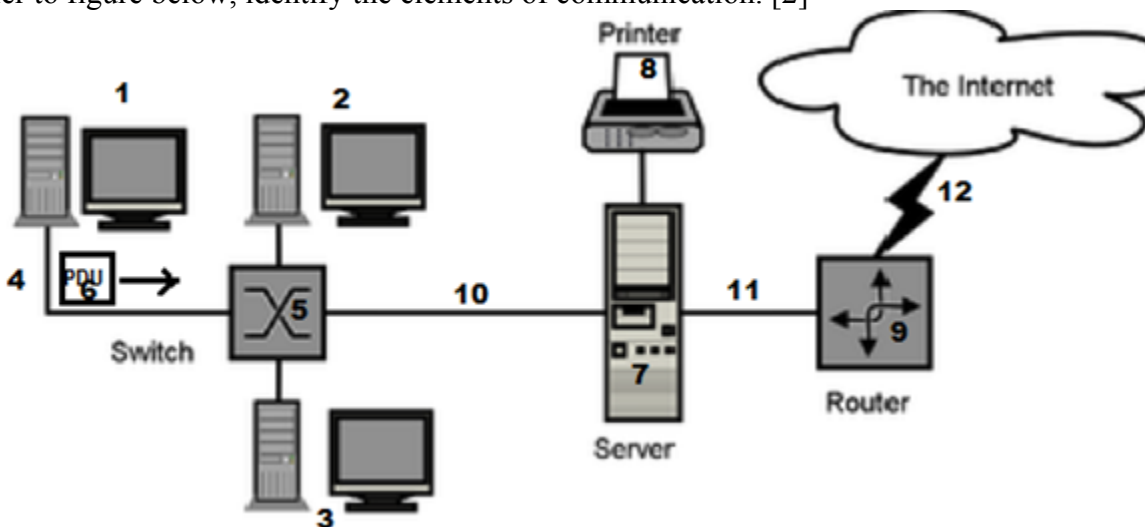# CSE320: Data Communications
Assignment - 1
Semester: Spring 2024
Total Marks: 50

Q1. Refer to figure below, identify the elements of communication. [2]

** *Hint: 1----> end device, 11-----> transmission media*

Q2. For n devices in a network, what is the number of cable links required for a mesh, ring, bus, and star topology? Show the calculation. [4]

Q3. Suppose there are 3 academic buildings and 3 administration buildings in your University campus. Administration buildings need to be connected with each other in such a way that the network is never down. 3 academic buildings and 3 administration buildings are connected using bus topology. Each academic building has 4 computer labs. Each lab has 5 computers. The computers in a single lab are connected using bus topology and the labs of a single building are connected using star topology. There is a conference room in administrative building1 where 6 computers are connected using ring topology. Draw your campus's hybrid topology. How many links will there be if the transmission mode is full-duplex? In the topology drawn, identify one possible problem or failure and justify your answer. [6]

Q4. How do we represent data? Name two different data types and their standards. [2]

Q5. Inspect the conversation between two friends:
 Friend 1: Hey, I had some parcels for you. Are you at home?
 Friend 2: Yes, I'm at home.

Friend 1: Okay, I'll send you the parcels then.
Friend 2: I'll receive your parcels.
Friend 1: Are you ready to receive the parcels?
Friend 2: Yes, I'm ready to receive the parcels.
Friend 1: I'll send you 10 parcels in one shipment.
Friend 2: Can you send 5 parcels though?
Friend 1: Sure. I'll send you 5 parcels.

Which layer of the OSI model do you think the communication is being carried out in and why? [4]

Q6. All of us know by now that performance is inversely related to delay. When you use the Internet, which of the following applications are more sensitive to delay. Write your answer and provide your own logic. [6]
a. Facebook Live
b. Transferring a File
c. Online Banking

Q7. Imagine, in a network, PC1 and PC2 are connected to a switch, and the switch is then connected to router R1. Router R1 is then connected with router R2. Router R2 is connected to another PC, PC3. Which device is the first hop, if PC3 is the source? Which device is the first hop, if router R2 is the source and PC2 is the destination? Draw the physical topology. [3]

Q8. In the diagram below, R1, R2 and R3 are three routers. How many different networks do you think the topology has and why? If PC4 wants to send data to PC1 then what is the 1st hop that the data has to go from source PC4? [4]


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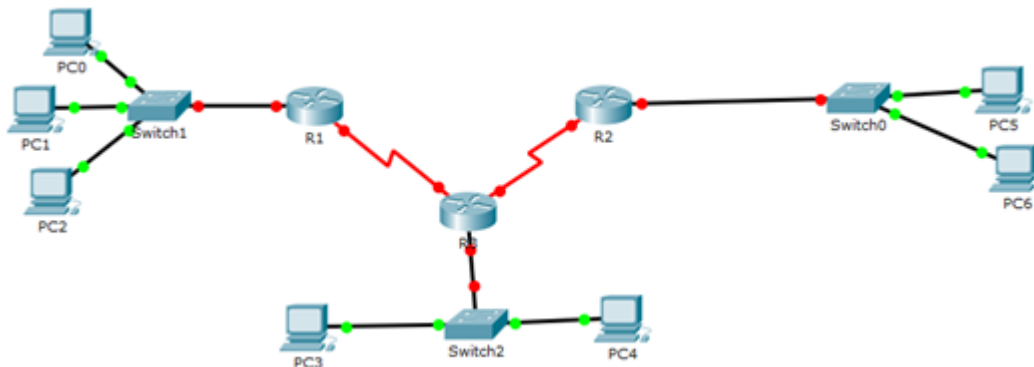
Q9. Match the following to one or more layers of the **OSI protocol suite**: [5]
a. route determination
b. providing independence from differences in data representation
c. log-in and log-out procedures
d. creating user datagrams
e. responsibility for handling frames between adjacent nodes

Q10. What are the differences between the error control mechanism in Transport layer and Data Link layer? Suppose a computer sends a packet at the network layer to another computer somewhere in the Internet. The logical destination address of the packet is corrupted. What happens to the packet? [4]

Q11. Draw the PDU (Protocol Data Unit) of Network Layer. What are the differences between a port address, a logical address and a physical address? [4]

Q12. Complete the frames (x & y) given below with appropriate port, IP and MAC addresses. The frame x is intended for the BRACU Web server and frame y is coming from the Email Server. MAC addresses are alphabets and IP addresses are numbers. For the user processes, use port addresses between 49,152 - 65,535. [6]
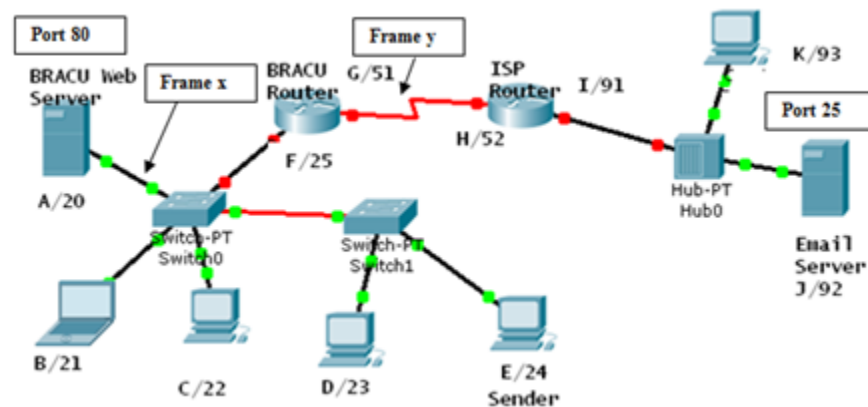
Frame x

D. Mac	S. MAC	D. IP	S. IP	D. Port	S. Port	Data	Trailer

Frame y

D. Mac	S. MAC	D. IP	S. IP	D. Port	S. Port	Data	Trailer

END