

CSE320: Data Communication

Assignment - 1

Total Marks: 10

Q1. Identify different layers of the OSI model from the following analogy, briefly justify your answer.

Student: Hello Sir, Can I come for a consultation?

Teacher: Yes, I will be at my office from 9.30-12.30. Please come within the time frame.

Student: Okay, I'll meet then. (1)

At Consultation

Teacher: I actually teach 2 courses, CSE320 & CSE220, for which course do you have confusions?

Student: CSE220, Data Structure.

Teacher: OK, let's discuss it. (2)

Student: Sir I can understand Lab task 4 but can not convert it to code properly, can you help me writing the code?

Teacher: Let's write a python program. (3)

Student: Thank you sir.

Teacher: Actually you can break the problem into 3 parts. Create an array first, then store the unique hobbies to it. Finally count the frequency of each hobby. (4)

Students: Wow, the task looks easy now. I will write the code myself and send it to you using slack for reviewing.

Teacher: Great. See you next class. (5)

Q2. What is the difference between Reliability and Security? Can communication be secured but less reliable?

Q3. 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.

Q4: UNICODE data representation can represent texts such as symbols, letters, digits. Why do we still use ASCII code in some cases for data representation?

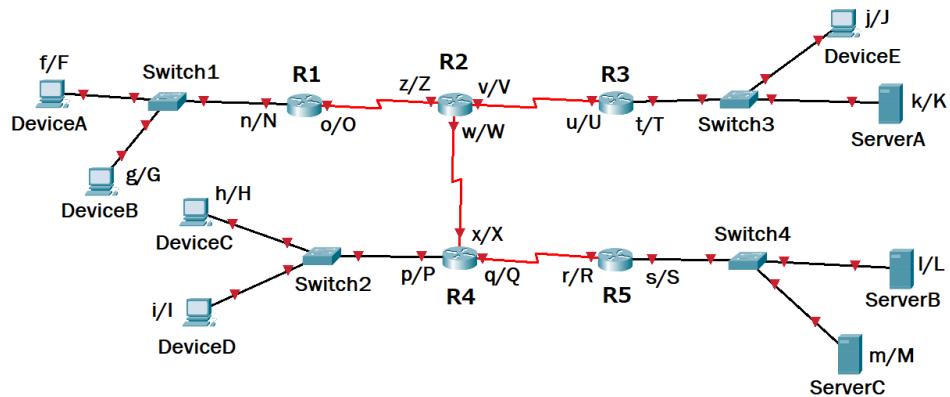
Q5: Match the following to one or more layers of the TCP/IP protocol suite:

- A. Encryption and Decryption
- B. Cookies management
- C. Data fragmentation and reassembly
- D. Data translation
- E. Hop to hop communication
- F. Route Discovery

Q6: Suppose we want to design a network system for BRACU. There are 5 main academic buildings which need to be connected in such a way that the network is never down. 4 labs are connected with each academic building using hubs. There are 30 computers in each lab. The computers in a lab are connected in such a way that the cabling-cost is minimized but no single point of failure. Now as a CSE engineer, design a hybrid topology that fulfills all the requirements. Calculate the total links required for the network systems. Calculate total cost using the table below:

Topology	Cost Per Link (tk)
Mesh	25
Star	100
Bus	70
Ring	60

Q7: You have been tasked to work with the network topology shown below. Assume the physical addresses to be the uppercase letters and the logical addresses to be the lowercase letters. For the Devices, use a Port number from the dynamic range (49152 - 65535).



- How many networks are there in total? What is a hop-to-hop delivery and which layer of the OSI model is responsible for maintaining this?
- Device E has a process running which is trying to receive a data frame from Server C, which is a Web Server using Port 80.
How many hops will there be? Complete Frame 1 below by writing the Destination and Source physical, logical and appropriate port addresses if the data frame is in its second hop.
- Device B is trying to send a data frame to Device F, which is using Port 56025.
How many hops will there be? Complete Frame 2 below by writing the Destination and Source physical, logical and appropriate port addresses if the data frame is in its second last hop.

Frame 1

D. Mac	S. MAC	D. IP	S. IP	D. Port	S. Port
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Frame 2

D. Mac	S. MAC	D. IP	S. IP	D. Port	S. Port
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Q8: What are fundamental characteristics that define the effectiveness of a network communication?

Q9. Write down the key functionalities of each of the layers in OSI Model.

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