

Computer Networks

Assignment #1

Due Date:1401/08/20

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Pass: Networks

Write down your answers and use CamScanner or similar applications to create a PDF file.

Apply the following format to your filename: name_studentNumber.pdf

1-Describe each layer in the OSI model and their responsibility.

2-What are processing delay, transmission delay, propagation delay and queuing delay?

Explain.

3-Why will two ISPs at the same level of the hierarchy often peer with each other? How does an IXP earn money?

4-What parts are the delays related to each node? Explain each one briefly.

5-Explain traceroute.

6-Explain IP spoofing.

7-In a typical mobile phone system with hexagonal cells, it is forbidden to reuse a frequency band in an adjacent cell. If 840 frequency bands are available, how many can be used in a given cell?

8-Suppose the algorithm used to implement the function of layer k is changed. What effect does this have on the operation of the layers $k-1$ and $k+1$?

9- Compare the delay in sending an x -bit message over a k -hop path in a circuit-switched network and in a packet-switched network. The circuit setup time is ' s ' sec, the propagation delay is ' d ' sec per hop, the packet size is ' p ' bits, and the data rate is ' b ' bps. Under what conditions does the packet network have a lower delay?

10-Suppose there is exactly one packet switch between a sending host and a receiving host. The transmission rates between the sending host and the switch and between the switch and the receiving host are R_1 and R_2 , respectively. Assuming that the switch uses store-and-forward packet switching, what is the total end-to-end delay to send a packet of length L ? (Ignore queuing, propagation delay, and processing delay.)

11-A simple intercity telephone system for communication between two cities consists of two end offices and an intermediate office. Intermediate office is connected to each one of end offices in the cities through 1MHz full-duplex-link. In every 10-hour workday, a telephone device makes 6 calls which duration is 5 minutes in average. 20 percent of the calls are long distance (It means end office sends the data to intermediate office) and 80 percent of the calls are inner city calls (They are just handled by end office of the city and assume that each end office has enough circuits to handle any number of calls in its own city). Find out the maximum number of telephones that each end office can support (each circuit is 4KHz).