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Course Section: 8669

Assignment 1

Total in points (100 points total):

Professor’s Comments:

Affirmation of my independent effort: Diana Zhao

1. a. With packet length L, distance between nodes D, transmission rate R, the total delay will be (D/s + L/R + d(queue) + d(proc)).

1. b. The transmission speed of a fiber optic cable will be the speed of light;

2. a. Protocols: HTTP, TCP, IP, WiFi, Bluetooth, 4G/5G, Ethernet, etc.

2. b. A proliferation of protocols may cause incompatibility issues where one party uses one protocol and the other party uses another, and in general will cause unnecessary complexity. Potential solutions may be enforcing the usage of certain protocols.

3. a. The main difference between TCP/IP and OSI is the different number of layers and the functions they serve.

3. b. A network model is designed with modularity in mind, hence the individual layers that each serve a dedicated purpose. This means that each layer can individually be simple and easier to maintain, however this may also consume more resources and more complexity.

4. a. Network segmentation was introduced to improve performance and security of networks and subnets.

4. b. The transport layer protocol will encapsulate application layer message with its header to create a segment, as well as in the network layer

4. c. segmentation can cause increased complexity and delays

5. a. “This memo documents the process used by the Internet community for the standardization of protocols and procedures. It defines the stages in the standardization process, the requirements for moving a document between stages and the types of documents used during this process.”

5. b. No. HTML was standardised by the W3C; the IETF is more concerned with more general network protocols

5. c. there are many RFCs for TCP and UDP, and there are so many because of the constant development in internet technology.

6. a. In a wireless context packet switching would be more preferable, as they are more flexible and scalable. Packet switching does not require dedicated resources unlike circuit switching, and although it may have more latency, it is still all around better than circuit switching.

6. b. An application such as voice calling that requires minimal latency and real time transmission would use circuit switching, while an internet browser should use packet switching due to constant switching of source and destination and overall flexibility.

6. c. By monitoring the traffic on a circuit, as well as when it is active vs. the overall time that path has been established, the utilisation percentage can be computed for a circuit switched network.

7. a. Case 1: You should keep sending droids to Luke requesting confirmation until you receive a confirmation back. Then, you send another droid (and keep sending them) to Luke to confirm that you received his confirmation. However, Luke still doesn’t know if he should attack until he received your droid back, so unless you know he received your confirmation, you can’t attack either, so when Luke receives your confirmation, he sends another confirmation back and keeps sending it until you receive it. Then you will also have to send droids back to confirm that you know he knows to attack, and he sends another back, and that can end the communication.

Case 2: In this case, with a limited resource but alternative ways of communication, the blue armies can opt for visual communication that can be seen from across the hill if possible, or, if both armies are prepared, simply blowing a horn at noon to signal the attack.

7. b. There are similarities that can be drawn from human and network protocols, however in most cases human communication can be much easier, or complex in different ways than network protocols.