Data Networking, TELE 5330

Assignment 3 (100 Marks)

Q1. (10 Marks)

a. Briefly describe the difference in the services provided by the Transport Layer and Network Layer.
b. Explain multiplexing and de-multiplexing in the context of sockets.

Q2. (15 Marks)

Suppose the network layer provides the following service. The network layer in the source host accepts a segment of maximum size 1,200 bytes and a destination host address from the transport layer. The network layer then guarantees to deliver the segment to the transport layer at the destination host. Suppose many network application processes can be running at the destination host.

a. Design the simplest possible transport-layer protocol that will get application data to the desired process at the destination host. Assume the operating system in the destination host has assigned a 4-byte port number to each running application process.

b. Modify this protocol so that it provides a "return address" to the destination process.

c. In your protocols, does the transport layer "have to do anything" in the core of the computer network?

Q3. (15 Marks)

Suppose Client A initiates a Telnet session with Server S. At about the same time, Client B also initiates a Telnet session with Server S (consider A's source port to be 467 and B's source port to be 513). Provide possible source and destination port numbers for

a. The segments sent from A to S.

b. The segments sent from B to S.

c. The segments sent from S to A.

d. The segments sent from S to B.

e. If A and B are different hosts, is it possible that the source port number in the segments from A to S is the same as that from B to S?

f. How about if they are the same host?

Q4. (10 Marks)

a. Why is it that voice and video traffic is often sent over TCP rather than UDP in today's Internet?
b. Is it possible for an application to enjoy reliable data transfer even when the application runs over UDP? If so, how?

Q5. (20 Marks)

a. What are the messages sent to establish a TCP connection?
b. How about when closing the connection?

Use a diagram to explain both the questions.

Q6. (30 Marks)

Explain the evolution of RDT protocols from Version 1.0 to 3.0. Use diagrams if needed.