**King Saud University**

**College Of Computer & Information Sciences**

**Department Of Computer Sciences**

**Tutorial 1 Fall 15**

**(Computer Networks CSC 329)**

1. Explain the functions of the three first layers of the OSI model ( Physical layer , Data link layer , Network layer ).
2. How many layers are defined in TCP/IP model? List them from top to bottom.
3. Discuss the advantages and the disadvantage of the Bus topology and the ring topology.

1. What is the difference between end-to-end delay and packet jitter? What are the causes of packet jitter?
2. Suppose you are using a PC at home, which is connected to the Internet using a modem over a telephone communication link. The modem can transfer data at a maximum rate of 28,800 bits/sec. How long would it take to download a file (which is 1000000 bytes long) from a server your PC is connected to.
3. Suppose that the answer to (a) is X seconds and you transferred the same sized files numerous times. You find that the actual time to transfer always takes longer than X seconds. Give a plausible explanation for this.

Consider sending a file of (**F=M\*X** bits) from A to D over the network below, consisting of four nodes and three links ( figure 1).

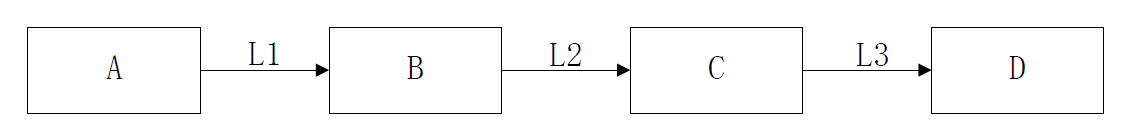


Figure1.

We assume that the network is a packet-switched network and that the file is split into **M** packets each of size **X**. Each packet is then given additional **h** bits of header.

Each entity (A, B, C and D ) transmits data through the physical media at **R** bps .

1. Assume that propagation delay on the links is negligible. How much time does it take from when the first bit of the file leaves A to when the last bit arrives at D? Explain your answer.