CS 335, Assignment 1

(Please submit your answers in a single PDF file using UR Courses)

**NOTE: The objective of this assignment is that you study the textbook and the slides, and then answer the questions below yourself. You SHOULD NOT simply copy and paste the answers from the textbook or from the slides.

Total = 65

1. (i) [3] Write the three basic elements of a Computer Network.

(ii) [2] Write any two protocols which are used in internet.

(iii) [2] What is an access network?

(iv) [3] Give a name of access technology used for each of the following: home, enterprise and mobile communication.

(v) [2] Why is DSL asymmetric access?

(vi) [3] Give any three communication links which are mostly used.

2. Assume that a network uses the packet switching technique to send its packets. The transmission rate for each communication link is R bps. The length of each packet is L bits.

(i) [2] If there is a single communication link between the sending host A and the receiving host B, what is the transmit time for a packet from A to B?

(ii) [2] If there are 2 communication links between A and B, what is the transmit time for a packet from A to B?

(iii) [3] If there are N communication links between A and B, what is the transmit time for a packet from A to B?

(iv) [5] If there are N communication links between A and B, what is the transmit time for P packets from A to B?

3. (i) [4+2] What are the various packet delays in computer network? Which delays are constant and which are variable?

(ii) [2+2] Define traffic intensity. What happens if the traffic intensity is greater than 1?

(iii) [10] Consider a packet of 1500 bytes that begins at host A and travels over three links over destination host B, using the packet switching technique. The specification of the links are as follows:

<u>Communication link 1:</u>

Length = 5000 km

Propagation speed = $2.5 * 10^8$ m/s

Transmission rate = 1 Mbps

<u>Communication link 2:</u>

Length = 4000 km

Propagation speed = $2 * 10^8$ m/s

Transmission rate = 1.5 Mbps

Communication link 3:
Length = 1000 km
Propagation speed = $3 * 10^8$ m/s
Transmission rate = 2 Mbps

The processing delay for each packet switch is 3 msec. Assuming that there is no queueing delay in the network. What is the end-to-end delay for a packet from A to B?

4. (i) [4] What are the various layers of the TCP/IP protocol stack?
(ii) [7] Give the full name and the corresponding layer to the following protocols: HTTP, SMTP, FTP, TCP, UDP, IP, BGP.
(iii) [4] What are message, segment, datagram and frame?
(iv) [3] What is the difference between a virus and a worm?