

Computer Facilities and Network Management

BUS3150

Tutorial - Week 2

***** FOR TUTORS ONLY *****

Objective of this tutorial:

The objective of this tutorial is to strengthen the conceptual understanding of the material covered in the lecture by reflecting on the material in small groups. The tutor will provide feedback to enhance your understanding and diminish misunderstandings, if any.

How to participate in the tutorial:

Form groups of four to five students in each and discuss the answers for the following reflective questions with the group members. After spending about ten minutes for each question, discussing with group members, discuss your solutions with the tutor and other groups. The tutor will provide feedback on your solutions.

Question 1 - The components of the simple data communications model described in the lecture consisted of a source, transmitter, transmission system, receiver and destination. Identify these components, and comment on methods for exchange management for the following forms of communication:

1. people speaking in a room
2. people speaking on a telephone
3. television and radio
4. CB radio (a push-to-talk system)

There is no strictly correct answer for this one. The following is one possible solution. Some attempt at separating source from transmitter and destination from receiver is needed. The solution may be technical or non technical in nature.

- *people speaking in a room*
 - *source = person A; transmitter = voice; transmission system = air; receiver = ear drum; destination = person B.*
 - *exchange management = start with polite greetings/introductions and end with farewells. Take it in turns to talk, requests to slow down if talking too fast. Requests to repeat what was said if destination could not hear correctly.*
- *people speaking on a telephone*
 - *source = person A voice into microphone; transmitter = telephone A convert sound waves to electrical waves; transmission system = telephone network (PSTN); receiver = telephone B convert electrical waves back to sound waves using a speaker; destination = person B ear drum.*
 - *exchange management = dial phone number to ring destination phone. Destination lift receiver (if not busy). Exchange management can then proceed as in (1.1).*

- *television and radio*
 - *source = television or radio station; transmitter = modulator and antenna; transmission system = air; receiver = television set; destination = person.*
 - *exchange management = simply switching the television or radio on. No error control, flow control, etc.*
- *CB radio*
 - *source = person A; transmitter = modulator and antenna; transmission system = air; receiver = antenna and demodulator; destination = person B.*
 - *exchange management = broadcast a request for a response from a particular person/group. Use terms like "over" to indicate end of talking. Use terms like "over and out" to indicate end of communication.*

Question 2 - You will learn more about circuit switching and packet switching during the course of this semester. With your current knowledge base, what are the similarities and differences between the two techniques?

- *Both involve switching data through multiple nodes of a network.*
- *In circuit switching, a single dedicated communications path is established for the duration of the conversation through the nodes of the network while multiple shared paths are used for packet switching.*
- *For circuit switching, incoming data is switched to the outgoing channel without delay, however in packet switching, packets are received, stored briefly and then retransmitted increasing delay.*
- *Circuit switching sends data as a continuous stream, while packet switching breaks the stream of data into small chunks (packets) and sends them sequentially.*
- *In circuit switching, the data will be received in the same order that it was sent, however with packet switching, the data may be received out of sequence.*

Question 3 - Discuss the fundamental differences between Wide Area Networks (WAN) and Local Area Networks (LAN).

- *WANs cover a large geographical, LANs are typically located in a building or around a small cluster of buildings (campus).*
- *WANs rely in part on common carrier circuits so they can cross public rights of way (microwave can be a way around this), while LANs are usually owned by the same organisation as the attached devices.*
- *Traditionally a LAN is broadcast based while a WAN is switched (LANs are becoming switched however).*
- *Traditionally data rates for LANs are typically much higher than those of WANs (this is also changing).*

Question 4 - Discuss the link between addressing and routing in a switched network. Use a real world example in this discussion. For example, consider sending a package through the postal service from one continent to another, where it may travel by sea or air.

- *The communication link is shared by multiple connections. In a shared environment, to deliver the data correctly at the intended destination, the source must specify some form of address for the destination. The may then travel along one or more paths through the network, as determined by the the address. Determination of such path(s) for data is called routing.*

- *In the postal system, we use a name and postal address to send a package to an intended destination. Depending on the destination address, the package will need to take a particular path across the globe. For example, a package addressed to America and a package addressed to Egypt will follow different routes. Likewise, the route taken could be slow and cheap (by sea) or fast and expensive (by airmail).*