

SOLUTIONS MANUAL



Discussion Question Answers

Data Communications & Network Security

Houston H. Carr, Ph.D. and Charles A. Snyder, Ph.D.

Introduction

I.1. Compare and contrast the terms communications, telecommunications, and data communications. Communications refers to the transfer of information or ideas from one to another. Telecommunications adds the concept of 'at a distance.' Data communications refers to machine-to-machine communications. All involve a sender, medium, and receiver.

I.2. Examples of data communications that might be found in the home are *AOL®*, *Earthlink®*, and *CompuServe®* or *MSN®* as they are used with home computers. What capabilities do these services offer? Does noise affect these services?

These data communications are for connectivity to the Internet and allow users to access any other who is connected, all of the resources of the WWW, e-commerce. Noise affects all of the services.

I.3. Why is it essential for managers to understand data communications? Answer in terms of (a) local, (b) regionally dispersed, and (c) global operations.

Managers must know that their firms depend upon data communications for getting business done. For even local contact, data needs to move to and from customers, suppliers, and partners. Regionally dispersed organizations rely on data communications to manage as they were local. When it comes to global operations, data communications are needed to coordinate across time zones and borders.

I.4. Can you cite examples of how companies have used telecommunications or data communications for competitive advantage?

Dell Computers has used data communications to establish a new model of customer service and mass customization that allows customers great choice in tailoring computer systems for their use. All of this has helped Dell achieve a direct-to-customer model that has given them a great competitive advantage.

I.5. How can a decentralized organization operate without telecommunications?

Very poorly, if at all! This means people would be on the move constantly in trying to have face-to-face communications.

I.6. Compare and contrast the telecommunications equipment and media of Dick Tracy, Maxwell

Smart, Napoleon Solo, James Bond, James T. Kirk, and Jean Luc Picard.

Dick Tracy - wrist two-way radio

Maxwell Smart - shoe dial (wired) phone

Napoleon Solo - pen global communications

James Bond - various voice radio devices

James T. Kirk - hand-held communicator worn on his belt; constant contact with *Enterprise*

and Jean Luc Picard - broach on uniform; includes GPS and constant communications with computer; used voice commands.

I.7. Many individuals and groups start new companies each year. What are the major data communications considerations for such a venture?

Any new venture needs to address data communications for a variety of reasons. Many ventures need EDI, Web access and presence, VoIP, Fax, image capture and storage, ability to do EFT, etc. The type of business helps dictate need for data communications.

I.8 What are the network applications in your work environment?

This will vary as to the type of organization. Most may find a local area network for communications, sharing resources, etc. Many will find a need for WWW presence, EDI, etc.

I.9 Is a mainframe computer-to-personal computer connection a data communications example? Why?

Yes. This is a prime example of machine-to-machine communications.

I.10 What were the early means of data communications (prior to the invention of the telegraph)?

Some of the earliest means were drums, horns, smoke, torches, bells, gun shots, signal flags (semaphore), other visual signals, lanterns (recall Paul Revere), flags on trees, and mirrors.

Chapter 1

1.1. Is it practical to use communication devices other than those discussed in this chapter?

This largely circumstantial. There are some situations that may call for employment of the early devices, e.g., when on a disabled vessel one may need to use signal flares or lights.

1.2. Why is the voice telephone network used for data communications since the data cannot be transmitted in their original digital form?

The use of modems allows the analog infrastructure to be used for data communications.

1.3. If you buy an article at a grocery store and its UPC bar code is read at the checkout point-of-sale (POS) terminal, how is data communications being used?

The data are used to provide update to the store's inventory. Often, the data may be used to analyze sales or particular items in specific stores and markets. Automatic re-stock can be triggered by inventory control.

1.4. List all of the data communications that you have employed in the past week. Separate them into analog and digital modes.

An analog telephone; digital cell phone; T-1 Internet connection (digital); VoIP phone (digital), yelling! (Analog); flipping a driver (digital), PDA, GPS, printer, scanner, etc.

1.5. Does noise seem to be a problem in your world, e.g., TV, radio, etc.? What does it come from? How to you reduce it?

Noise is usually a problem. It can cause unpleasant interference on radio and TV. Our world is filled with multiple sources for noise from natural (electrical storms) to man-made sources such as crosstalk, electric motors (AC and frig). We use frequency modulation to reduce noise and twist wires or shield them.

1.6. What communication methods were used by George Washington and his British counterpart in the U.S. War of 1776?. By the general in the movie *Gladiator*? By the allied field commanders in Iraq in 1991 and 2003?

In the movie *Gladiator*, days of Roman conquest, as in the US War of 1776, many commanders relied upon couriers and dispatch riders (See I-10 for you list of modes). Telegraph came into use in WWI; radio in WWII; walkie-talkie in Korean War and Viet Nam War; in-field television, digital networks, GPS in Iraq

1.7. Discuss the analog communications used in your school or organization. Could they and should they be converted to digital format? What effect does noise have?

The answer will vary widely. Contact your telecommunications Manager for a list and see if they can be classified. Most analog communications will be converted to digital somewhere. Noise may be digitized also unless the analog signal is converted prior to noise inclusion, thus the signal will be noise-free..

1.8. How would the conversion in 1.7 be done?

Pulse code modulation.

1.9 Some telephone sets have music-on-hold built in so that the other party will be entertained when the caller places them on hold. How does this work?

This requires a PBX at the senders location. When s/he pushes the HOLD button, it transfers the active line to the music source and allows him/her to have access to another PBX line if needed. When finished, s/he presses HOLD again and the active line is switched back.

1.10 What is your prediction for the future of analog voice versus digital within the industrialized world? Lay out a time line for your predicted evolution.

Since there has been a steady progression towards digital, it is likely that most voice will be converted to digital within the next 10 years. VoIP is an example of the rate or change.