

**SUVA SANGAM COLLEGE**

**YEAR 12**  
**COMPUTER**

**WEEK 1: MONDAY 05/07 TO FRIDAY 09/07**

STRAND	<b>12.2 Application Package</b>
SUB-STRAND	<b>12.15 Communication and Network</b>
CONTENT LEARNING OUTCOME	Describe different types of communications channels
REFERENCE FROM TEXTBOOK	Pg. 55

**ACHIEVEMENT INDICATOR: Define Communications and connectivity**

**Computer communications** is the process of sharing data, programs, and information between two or more computers.

**Connectivity** is a concept related to using computer networks to link people and resources. A communication system is made of four elements.

- *Sending and receiving devices* are simply computers, mobile devices such as PDAs, iPad, iPhone, tablets, mobile phones that transmit data to each other.
- *Communication channels* is the actual medium through which data gets transmitted from one device to another. This medium can be physical or wireless.
- Physical mediums: are actually wires/cables used to connect two or more devices such as twisted pair, coaxial and fiber-optic cables.

**ACTIVITY QUESTIONS**

1. Define Wireless Fidelity?
2. Describe the differences between the three major physical connection mediums: twisted-pair cable, coaxial cable, and fiber-optic cable

- *Twisted pair cables* are usually referred to as telephone lines and at 5/6 cables. It is called twisted pair because it consists of thin strands of intertwined copper wires.
- *Coaxial cable* has a solid copper core in the middle which is insulated thick rubber coating. Coaxial cables are usually used for transmitting television

**Example 1**

Explain data communication and connectivity

Computer communications is the process of sharing data, programs, and information between two or more computers. Connectivity is a concept related to using computer networks to link people and resources.

**Example 2**

Describe physical and wireless communication channels  
Physical mediums: are actually wires/cables used to connect two or more devices

*These* are connections that do not use any physical wires/cables, instead it uses radio frequency, microwave, satellite and infrared to transmit data over the air. Radio frequency (RF) uses radio signals to communicate between wireless devices. The radio frequency standards are known as Bluetooth, WiFi and WiMax.

**WEEK 2: MONDAY 12/07 TO FRIDAY 16/07**

SUB-STRAND	<b>Communication and Network</b>
CONTENT LEARNING OUTCOME	Define communication devices
REFERENCE FROM TEXTBOOK	<b>Pg 56-67</b>

**Achievement Indicators**

**-Define communication devices**

devices that connect the devices to the communication channels for data to be transmitted

Since the computer understands digital language, everything that is sent and received must be in 0's and 1's. Since the telephone lines were designed to carry voice data i.e. analog signals, everything that leaves a computer system must be converted into analog form.

Analog – telephone signals; continuous electronic wave.

Digital – computer signals; presence or absence of an electronic pulse; on/off.



Digital



Analog

The speed with which modems transmit data varies. This speed, called **transfer rate**, is typically measured in **thousands of bits (kilobits) per second (Kbps)**.

**Types of Modems**

- *Telephone* – can be either internal or external; connects computer directly to a telephone line.
- *DSL (Digital Subscriber Line)* – uses standard phone lines; external and uses either USB or Ethernet ports.
- *Cable* – uses coaxial cable – same as your television; uses either USB or Ethernet ports.



**Example 1**

**Define types of modem**

- Telephone
- DSL
- Cable
- Wireless

**Example 2**

**Define the terms for computer network**  
**Network card**  
**Client**  
**Server**

1. NIC

The NIC contains the electronic circuitry required to communicate using a wired connection (e.g., Ethernet) or a wireless connection (e.g., WiFi). A network interface card is also known as a network interface controller, network adapter, or Local Area Network (LAN) adapter.



1. Switch

Switch is a device that channels incoming data from any of multiple input ports to the specific output port that will take the data toward its intended destination.



1. Routers

A router is a device that forwards data packets along networks. A router is connected to at least two networks, commonly two LANs or WANs or a LAN and its ISP's network. Routers are located at gateways, the places where two or more networks connect



**ACTIVITY QUESTIONS**

1.Explain with an example how computers in a network can easily share files and data. share resources such as printers and internet connection.

2.What is one advantage and one disadvantage of having data stored centrally (on a server)? (Think about the computers linked in Lab

3.Explain 2 benefits apart from the ones mentioned earlier of having computers connected to the internet.

**WEEK 3: MONDAY 19/07 TO FRIDAY 23/07**

SUB-STRAND	<b>Communication and Network</b>
CONTENT LEARNING OUTCOME	Define bandwidths
REFERENCE FROM TEXTBOOK	<b>Pg 58</b>

Bandwidth is the capacity of the communication channel that determines the volume of data that can be transmitted in a given amount of time

**Categories of bandwidth**

*Voiceband* also known as low bandwidth, is used for standard telephone communication.

It is effective for transmitting text documents however it is too slow for many types of transmission, including high-quality audio and video.

*Medium band* is used in special leased lines to connect servers as well as transmit data over long distances. This band width is capable of very high-speed data transfer.

*Broadband* is widely used for DSL, cable and satellite connections to the internet. Several users can simultaneously use a single broadband connection for high-speed data transfer.

*Baseband* is widely used to connect individual computers that are located close to one another. Like broadband, it is able to support high-speed transmission. Unlike broadband, , however, baseband can only carry a signal at one time.

**Example 1**

Explain the term packetization

Protocols are rules for exchanging data between computers

**Example 2**

Describe the function of a modem

Modems do just that, convert the digital signal from the computer into analog signal from the sending computer and converts converts the analog signal back into digital signal on the receiving computer. This process is known as modulation-demodulation, hence the name modem (modilator-demodulator

Protocols are rules for exchanging data between computers. The standard protocol for the internet is TCP/IP (transmission control protocol/Internet protocol).

TCP/IP is a two-layer protocol.

The higher layer, Transmission Control Protocol, manages the assembling of a message or file into smaller packets that are transmitted over the Internet and received by a TCP layer that reassembles the packets into the original message. This process is known as *packetization*.

The lower layer, Internet Protocol, handles the address part of each packet so that it gets to the right destination. Each gateway (router/server) on the network checks this address to see where to forward the message. Even though some packets from the same message are routed differently than others, they will be reassembled

**WEEK 4: MONDAY 26/07 TO FRIDAY 30/07**

SUB-STRAND	<b>Communication and Network</b>
CONTENT LEARNING OUTCOME	Define bandwidths
REFERENCE FROM TEXTBOOK	<b>Pg 58-59</b>

**Methods and modes of data transmission**

In *asynchronous transmission*, the method frequently used with microcomputers, data is sent and received one byte at a time. Asynchronous transmission is often used for terminals with slow speeds. Its advantage is that the data can be transmitted whenever convenient for the sender. Its disadvantage is relatively slow rate of data transfer.

*Synchronous transmission* is used to transfer great quantities of information by sending several bytes or a block at a time. For the data transmission to occur, the sending and receiving of the blocks of bytes must occur at carefully timed intervals. Thus, the system requires a synchronized clock. Its advantage is that data can be sent very quickly. Its disadvantage is the cost of the required equipment.

**Serial and Parallel Data Transmission**

**Serial Data Transmission** - bits flow in a series of continuous stream, like cars crossing a one lane bridge. Each bit travels on its own communication line. Serial transmission is the way most data is sent over telephone line.

**Parallel Data Transmission** – bits flow through separate lines simultaneously. In other words, they resemble cars moving together at the same speed on a multiple freeway. Parallel transmission is typically limited to communication over a short distance therefore is not used in telephone lines

Directions of communication  
There are three directions of data flow in a data communication system: Simplex, Half duplex, Full duplex.

**Simplex Communication -**  
Resembles the movement of cars on a one way street. It is not frequently used in data communication system today. One instance in which it may be used is POS terminals in which data is being entered only.

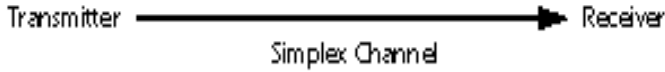
**Half Duplex Communication -**  
Data flows in both directions but not simultaneously, that is data flows in only one direction at any one time for example radio telephone. Half duplex is very common and is frequently used for linking microcomputers by telephone lines to other minis, micros or mainframe computers.

**Full Duplex Communications -**  
Data is transmitted back and forth at the same time like traffic on a two way street. It is the faster and the most efficient way of two way communication. However it requires special equipment and is used primarily for main forms of communication for example internet

Asynchronous and synchronous communication refers to methods by which signals are transferred. These signals allow computers to transfer data between components within the computer or between the computer and an external network

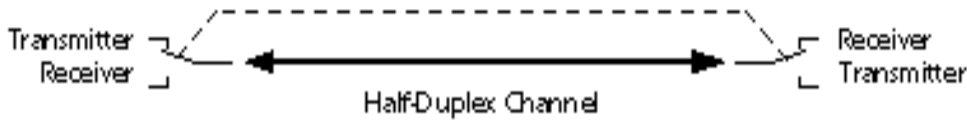
**Example 1**

**Explain with diagrams Simplex Communication**



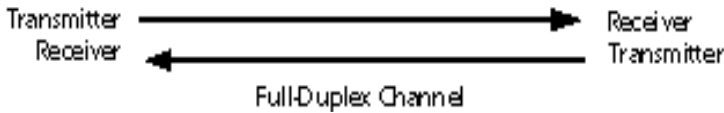
**Example 2**

**Explain with diagram Half Duplex Communication**



**Example 3**

**Explain with diagram Full Duplex Communication**



**WEEK 5: MONDAY 02/08 TO FRIDAY 06/08**

SUB-STRAND	<b>Communication and Network</b>
CONTENT LEARNING OUTCOME	Define Computer networks
REFERENCE FROM TEXTBOOK	<b>Pg 60-61</b>

**Computer Networks**

A computer network is formed when two or more computers are connected to each other either to exchange data, share information and resources. Network connections between computers are typically created using cables (wires).

**QUESTIONS**

a) State at least one advantage of asynchronous transmission over synchronous transmission?

b) Differentiate between half duplex and full duplex transmission

*Switch* –a central node that coordinates the flow of data by sending messages directly between sender and receiver nodes.

**Example 1**  
**Explain the communication device router**

A *router* is a network device that connects together two or more networks.

**Example 2**  
**Explain the communication device Bridge**

A *bridge* is a network device that typically links together two different parts of a LAN.

**Using a computer connected to a network allows us to:**

- Easily share files and data
- Share resources such as printers and Internet connections
- Communicate with other network users (e-mail, instant messaging, video-conferencing, etc.)
- Store data centrally (using a file server) for ease of access and back-up

**Keep all of our settings centrally so we can use any workstation In particular, if we use a computer connected to the internet, we can:**

- Make use of on-line services such as shopping (e-commerce) or banking
- Get access to a huge range of information for research
- Access different forms of entertainment (games, video, etc.)
- Join on-line communities (e.g. MySpace, Facebook, etc.)

**Specialized terms that is used to describe computer networks:**

**Network Interface Card (NIC)** these are expansion cards located within the system unit that connect the computer to a network.

**Network Operating System (NOS)** control and coordinate the activities of all computers and other devices on a network.

**Client** –a node that requests and uses resources available from other nodes.

**Server** –a node that shares resources with other nodes.

**Host** –any computer system that can be accessed over a network.

**QUESTIONS**

- a) State three advantages of computers connected to a network.
- b) State four advantages of connecting computer to internet.
- c) Differentiate between switch and a router

**ESSAY REF YR 12 2014**

Communication channels are essential elements of every communication system. The transmission can either be physical or wireless. Describe the **five** communication channels and for each, state **one advantage & one disadvantage**

**(5marks)**

Identify the **three** types of bandwidths used in data communications **(4marks)**