Computer
Guide

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index

1

Unit

Network

Basics of network

Introduction to networking

Why do we need networking?

If we have two or more computers, and want to share resources such as (printers, CDs or scanner…), exchange files, folders or mail or sharing applications, we need to link these computers together by "Networking". The computers on a network may be linked through cables, telephone lines, satellites, or Bluetooth.

Explanation

If company has many separate computers and want to print documents from each computer, it has two options:
1. Buying a printer for each computer but it is so expensive.
2. Linking these computers together by network, So the company needs to buy just one printer.

Option 1

Option 2

Types of networks
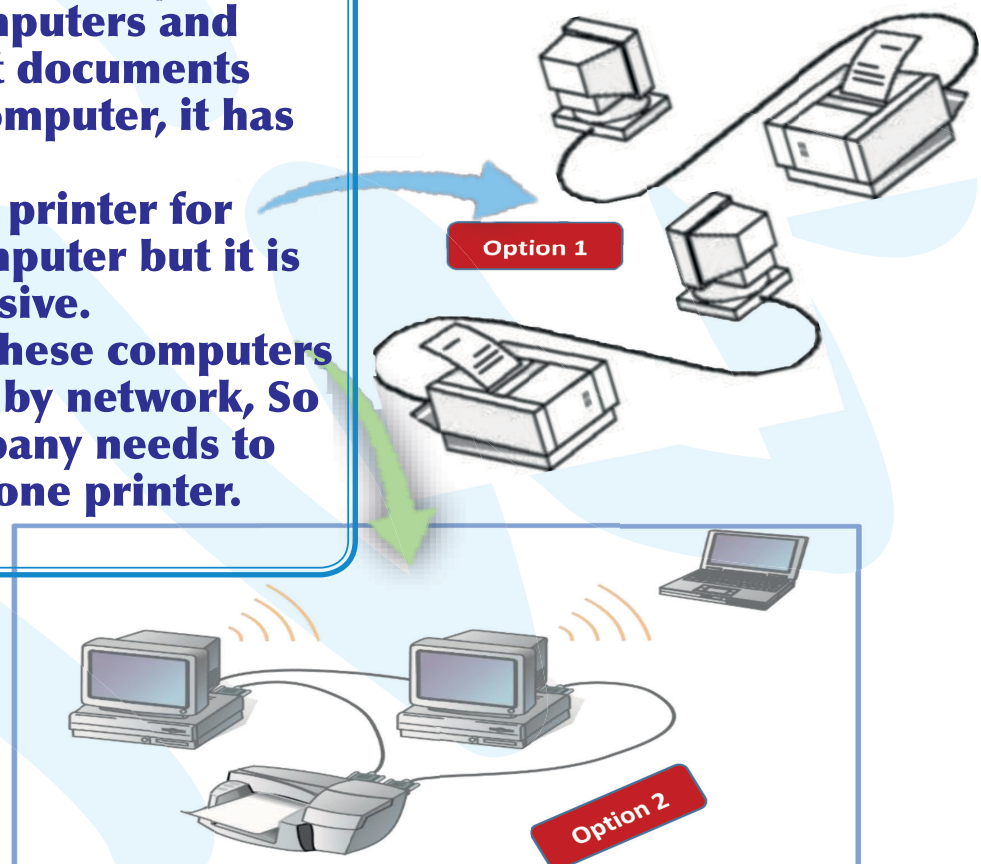
Computer networks are consists of two main types, depending on their size, function and geography.

Local Area Network (LAN)

If the network is contained within a relatively small area, limited network area.

LAN's network is suitable for classroom, school, or building because it's Lowest in coast and Easy to install.
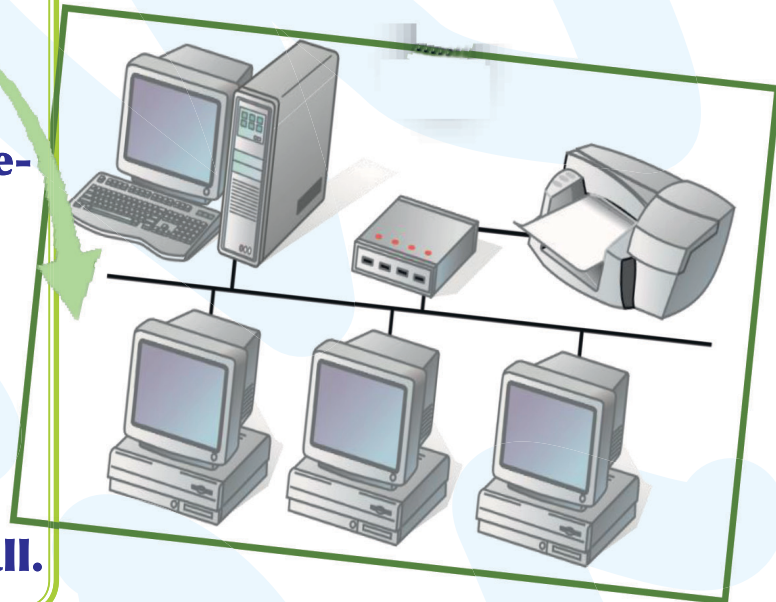
Wide Area Network (WAN)

If the network is contained within a relatively larger area networks and long distance, such as countries or cities.

The Internet is a famous example of WAN.

Discuss, then answer the following questions:

1. **What is a computer network?**

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   ....

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2. **What are three advantages of using a computer network?**

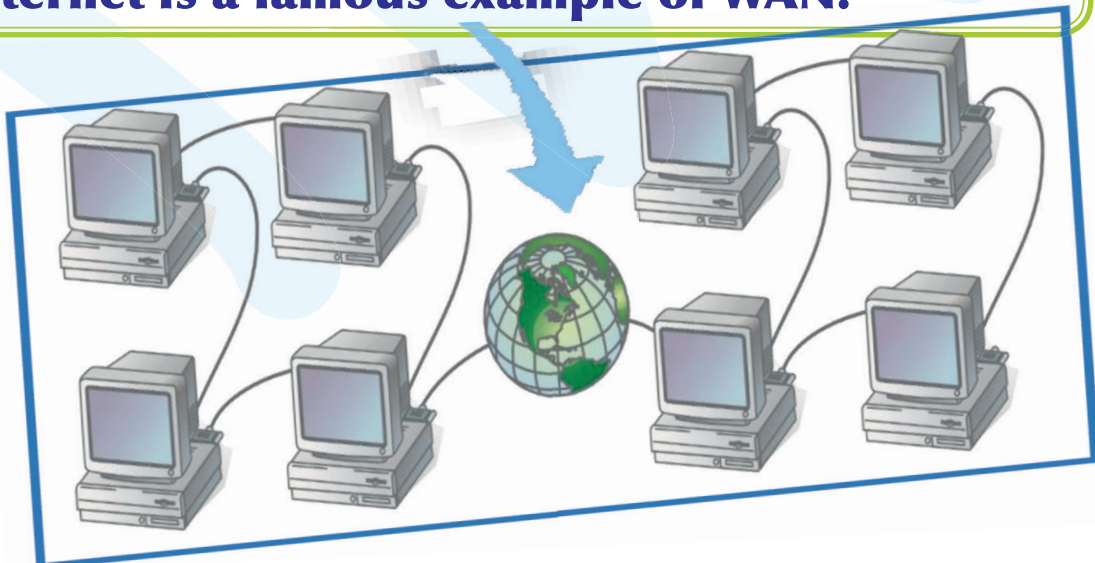   ....

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3. **Give two examples of a LAN configuration.**

   ....

   ....

   ....

   ....

4. **Give two examples of a WAN configuration.**

   ....

   ....

   ....

   ....

Networks architecture

Computer networks architecture is the design of computer network that describe how the computer network is configured. The two main types of computer network design are:

1- Peer to Peer network

All students in classroom, are in one network with the same rules, same books, and same chairs. But different in their shapes. No one has advantage than other.
Peer to Peer network like students network, all computers have the same rules, same application, but it has different files and folders.
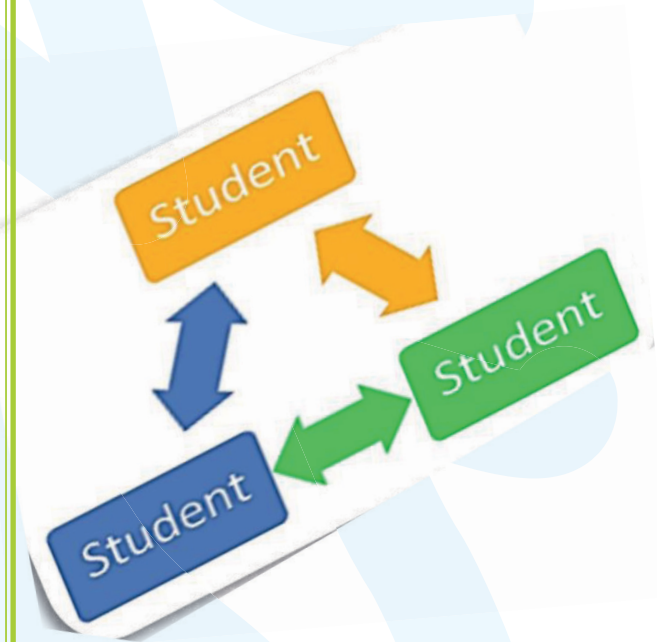
2- Client- Server network:

When you go to dinner at a restaurant, you become a customer, or client, enjoying the food and drink prepared and served to you by the restaurant. On the other hand, the waiter works as a server.
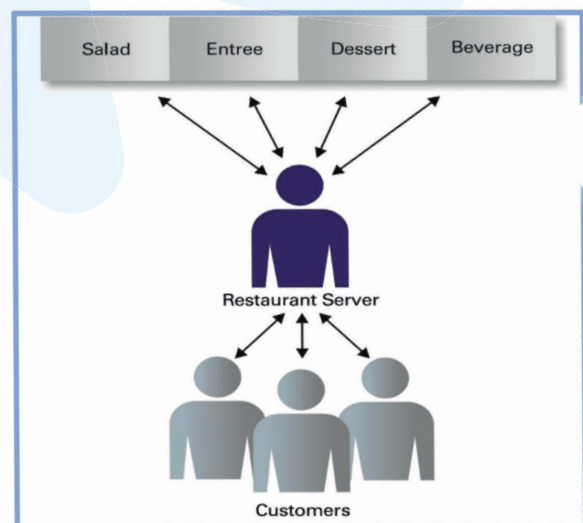
Continue

Client / Server network. A computer network in which one centralized, powerful computer (called the server) is a hub to which many less powerful personal computers or workstations (called clients) are connected.

Or, Server is a computer that provides services to other computers and a client. Computer is an individual computer that accesses the information and programs stored on a server as a part of a network environment.

Networks Cables

Networking cables are used to connect one network device to another network devices or connecting two or more computers to share printer, scanner etc. There are different types of network cables like Coaxial cable, Twisted Pair and Optical fibre cable. The cable used depends on the size of the network.

1-Coaxial Cable:

Coaxial cable "like the cable linked between TV and receiver "is used by telephone companies from their central office to the telephone poles near users. It is also widely installed for use in business of local area network.
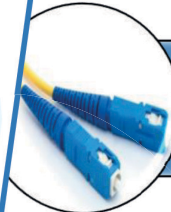
Antenna

Inside cable

Cable with antenna

Cable with RJ

Inside cable

RJ connector
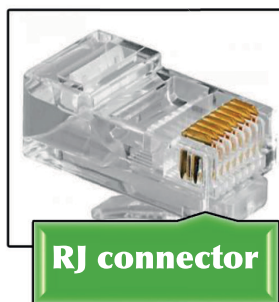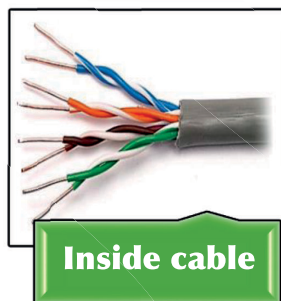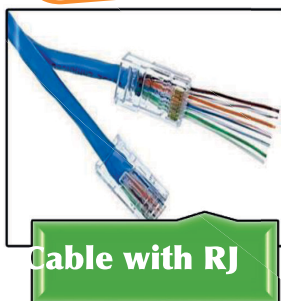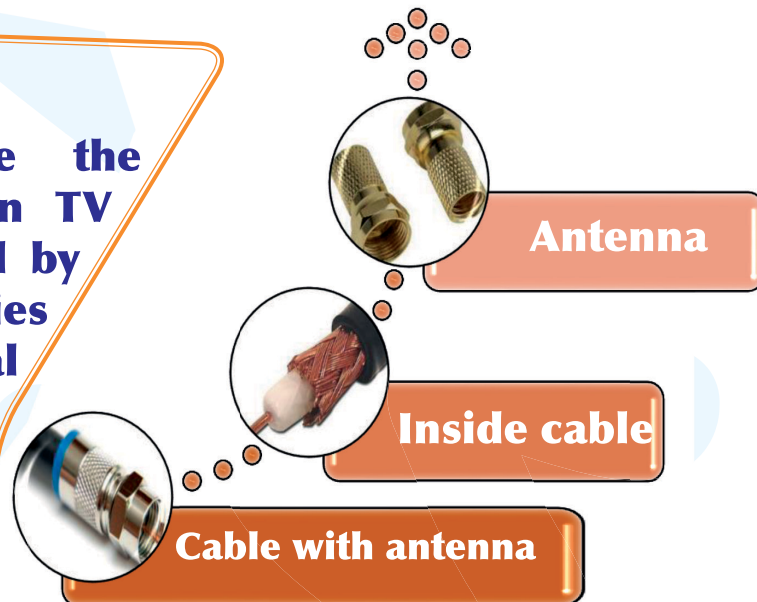
2- Twisted Pair

A type of cable that consists of two independently insulated wires twisted around one another. The use of two wires twisted together helps to reduce electromagnetic induction. Twisted-pair cable is used by older telephone networks and is the least expensive type of local-area network (LAN) cable.
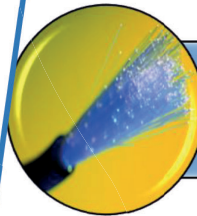
3- Fiber optics

The information is traveling in different ways:

A. When we speak into a landlines telephone, a wire cable carries the sounds from our voice into a socket in the wall, where another cable takes it to the local telephone exchange.

B. Cell phones work in a different way: they send and receive information using invisible radio waves, that technology called wireless because it uses no cables.

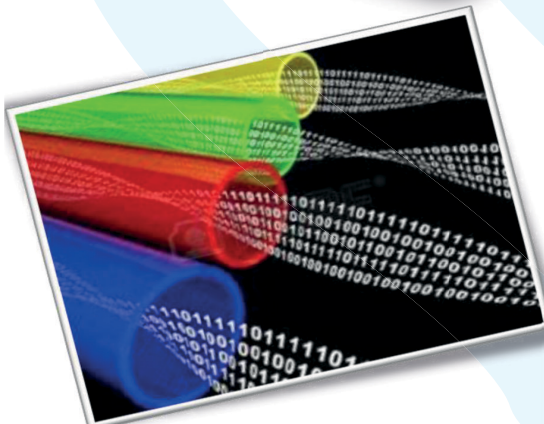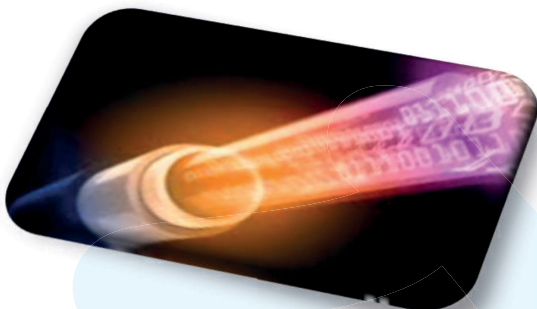C. Fiber optics works in a third way: It sends information coded in a beam of light down a glass or plastic pipe.

Cable with antenna

**Inside cable**

Antenna

Optical technology

A fiber-optic cable is made up of incredibly thin strands of glass or plastic known as optical fibers; one cable can have as few as two strands or as many as several hundred. Each strand is less than a tenth as thick as a human hair and can carry about 25,000 telephone calls, so an entire fiber-optic cable can easily carry several million calls.

Fiber-optic cables carry information between two places using entirely optical (light-based) technology. Suppose you want to send information from your computer to a friend's house down the street using fiber optics. You could hook your computer up to a laser, which would convert electrical information from the computer into a series of light pulses. Then you'd fire the laser down the fiber-optic cable. After traveling down the cable, the light beams would emerge at the other end. Your friend would need a photoelectric cell (light-detecting component) to turn the pulses of light back into electrical information his or her computer could understand.
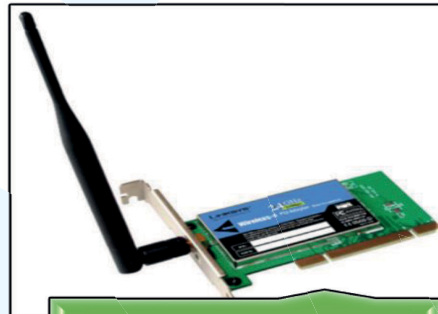
Networks devices

Network devices are components used to connect computers or other electronic devices together so that they can share files or resources like printers or fax machines. Devices used to setup a Local Area Network (LAN) are the most common type of network devices used by the public. A LAN requires different types of networking devices. The most types of network devices are: network cards, Hub, Switches, Router, and radio technology.

1. Network Card:

Network cards also known as Network Interface Cards (NICs) are hardware devices that connect a computer with the network. They are installed on the motherboard.
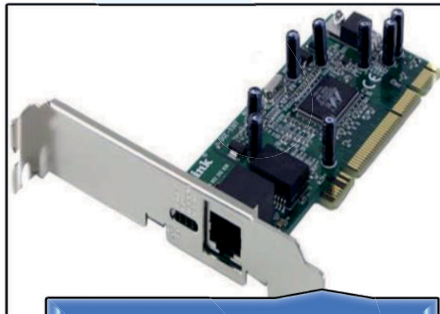
Wired card

Wireless card

Hub

The hub is a hardware device that contains multiple ports that match the cable type of the network. Hubs are fundamentally used in networks that use twisted pair cabling to connect devices.

Switche

Is a computer networking device that connects devices together on a computer network, by using packet switching to receive, process and forward data to the destination device.

Router

Small electronic device that join multiple computer networks together via either wired or wireless connections.

Case study

Home Network

A home network is two or more computers interconnected to form a local area network (LAN) within the home. A home network allows computer owners to interconnect multiple computers so that each can share files, programs and printers or fax machine, and Internet access with all computer, laptop, cell phones and tablets.
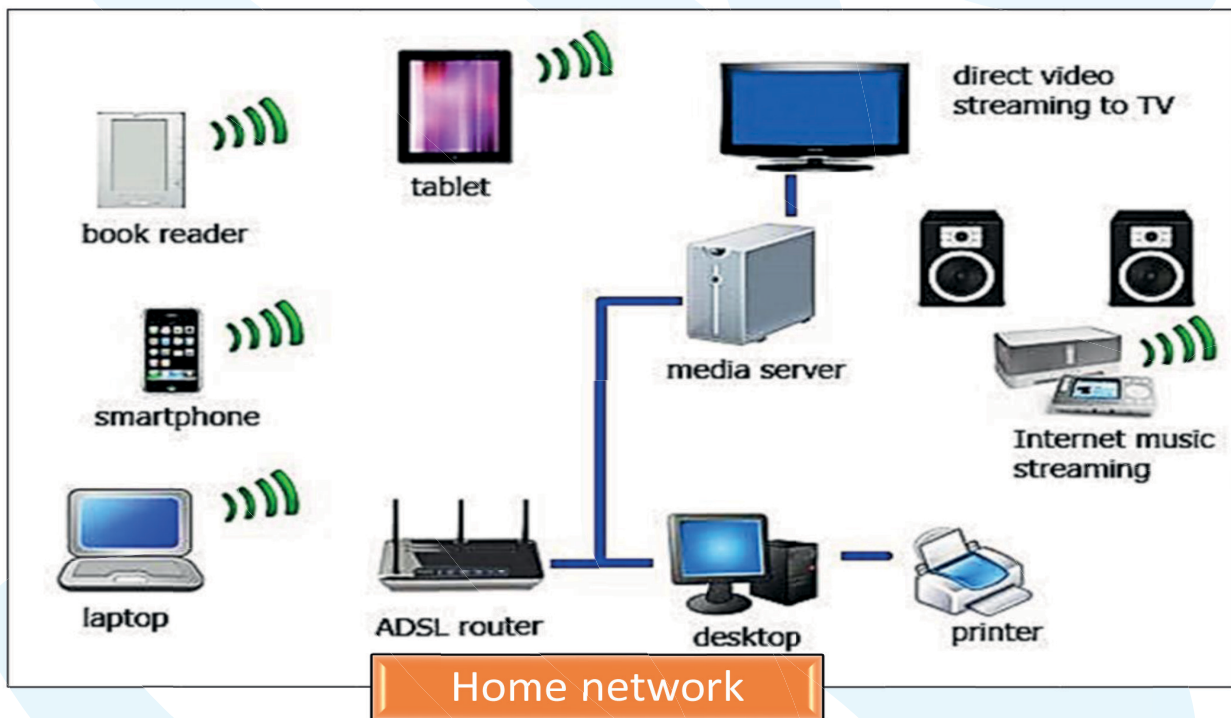
Network Plan:

1- Connect desktop computer to the internet "Server"
2- Connect to the internet in everywhere at home.
3- Connect all laptops, cell phones and tablets with the internet "client".

Network Devices requirements:

1- Desktop computers has a network card act as a server
2- Twisted pair cable with suitable length.
3- Router device have wired ports and wireless ports
4- Splitter "used for dividing telephone line comes from wall into two line, one for telephone and other to access the internet"
5- Telephone line.

Steps:

1- Connect the line of splitter with telephone line comes from wall.
2- On the other side connect two other telephone lines, one between the port "TEL" and Telephone devices, and the other from splitter to router device.
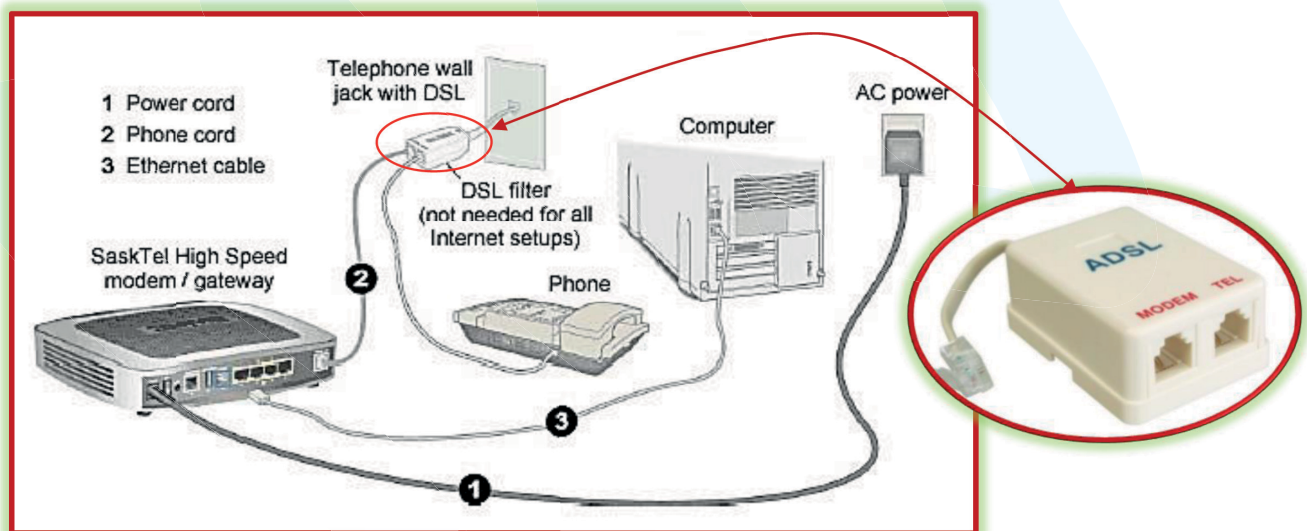
3- Link network cable between router and desktop computer.
4- Connect the power card to AC power.
5- Now, Desktop computer can access the internet.
6- Turn on laptops, smart phones and tablets. It all can access the internet wireless.