Unit-V
Network and Communication Technology

Network and Communication Technology   Chapter: 09

A Network is a collection of interconnected autonomous computers. A Computer which is a part of a network is known as Node or Workstation. The benefits of a network are Resource Sharing, Increased Reliability, Cost Reduction and Effective Communication.

Types of Network: Following types of network exist

1 LAN (Local Area Network) 2. MAN (Metropolitan Area Network 3. WAN (Wide Area Network) 4. PAN (Personal Area Network)

Topology:

It is termed as the physical arrangement of computers in a network viz Bus, Ring, Star, Mesh

Star   Bus   Ring
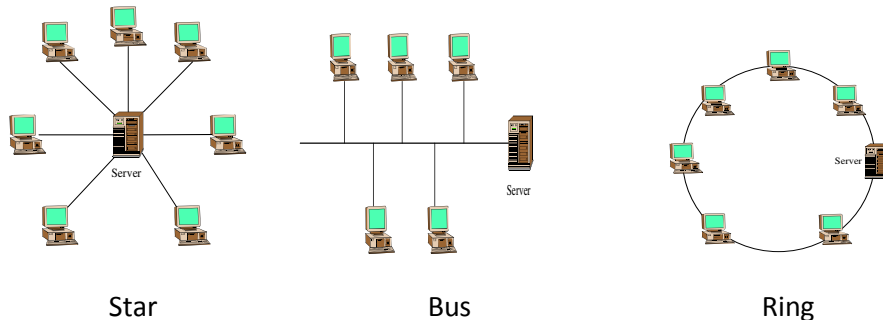
Protocol

Set of rules to govern communication between two computers in a network viz TCP/IP, PPP etc

**DATA COMMUNICATION TERMINOLOGIES**

| Data channel	• The information / data carry from one end to another in the network by channel.
Baud & bits per second (bps)	• It's used to measurement for the information carry of a communication channel**.** • Measurement Units are Kbps (kilobits Per Second), KBPS (Kilo Byte Per Second), and Mbps (Mega bits Per Second)
Bandwidth	• It is amount of information transmitted or receives per unit time.

Transmission Media: The **means or channel** through which we send our data from one place to another.
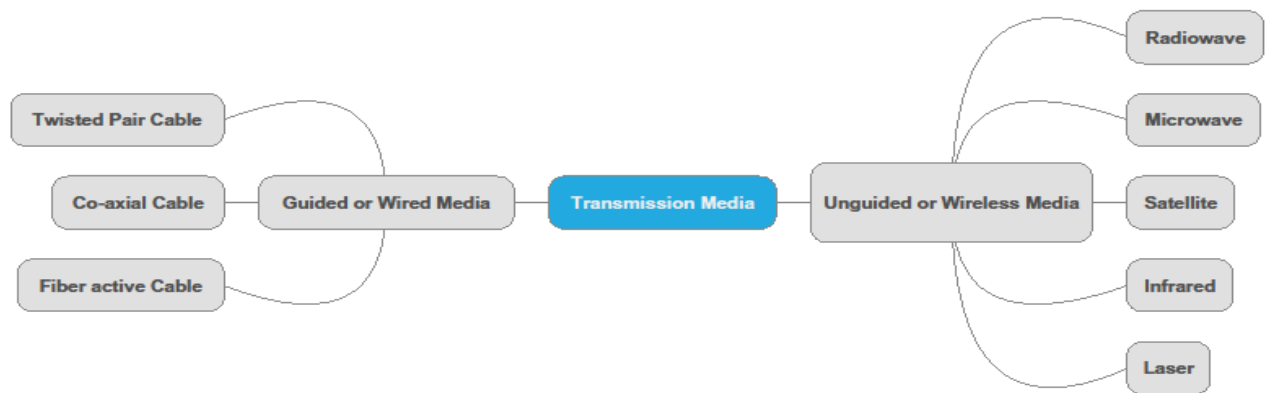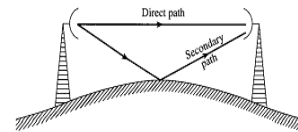
Twisted Pair Cable
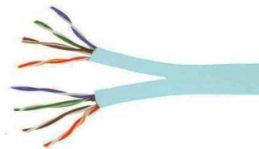
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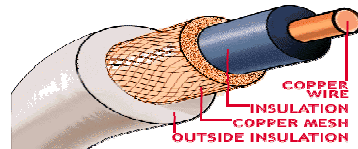
Microwaves

Networking Devices

Modem

A modem is a computer peripheral that allows you to connect and communicate with other computers via telephone lines. Modem means Modulation/ Demodulation. Modem can be Internal and External.

### RJ- 45 Connector

RJ-45 is short for Registered Jack-45. It is an eight wire connector which is commonly used to connect computers on the local area networks i.e., LAN.

Network Interface Cards (Ethernet Card)

A network card, network adapter or NIC (network interface card) or NIU is a piece of computer hardware designed to allow computers to communicate over a **computer network**.

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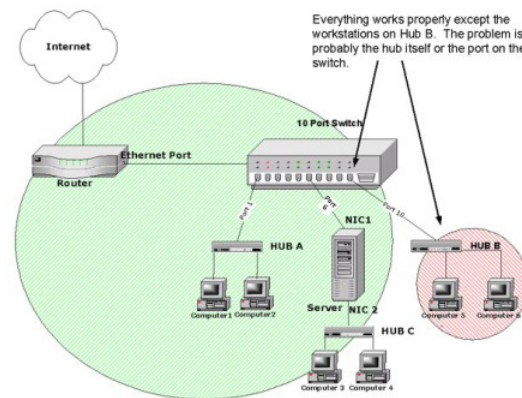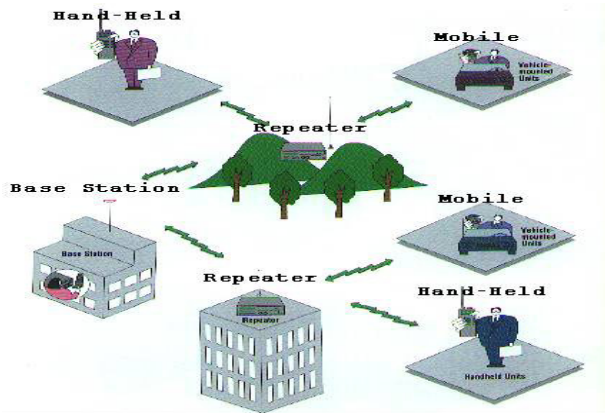
Repeaters:

A repeater is an electronic device that receives a signal and retransmits it at a higher level or higher power, or onto the other side of an obstruction, so that the signal can cover longer distances without degradation.

Hub

A hub contains multiple ports. When a packet arrives at one port, it is copied to all the ports of the hub (i.e. in broadcast manner).

Switch: Switch is a device that performs switching. It forwards chunk of data communication between ports (connected cables) based on the Mac-Addresses in the packets. This is distinct from a hub in that it only forwards the data to the ports involved in the communications rather than all ports connected. The network can be connected directly to a switch, or another switch that is in turn connected to a switch.

iDifference between Bridges, Routers and Gateway

All these network devices are used to connect two or more network or network segments with the following conditions

Bridge	Router	Gateway
Similar Topology and similar protocol	Similar Topology and Different protocol	Different Topology and Different protocol

Common Networking Terms and their expansion

Term	Expansion
TCP/IP	Transmission Control Protocol/Internet Protocol
FTP	File Transfer Protocol
SLIP	Serial Line Internet Protocol
POP	Post Office Protocol
PPP	Point to Point Protocol
SMTP	Simple Mail Transfer Protocol
VoIP	Voice over Internet Protocol
HTTP	Hyper Text Transfer Protocol
URL	Uniform Resource Locator

HTML	Hyper Text Markup Language
DHTML	Dynamic Hyper Text Markup Language
WLL	Wireless in Local loop
GSM	Global System for Mobile Communication
CDMA	Code Division Multiple Access
TDMA	Time Division Multiple Access
SIM	Subscriber's Identity Module
SMS	Short Messaging Service
MMS	Multimedia Messaging Service
EDGE	Enhanced Data rates for Global Evolution
IMAP	Internet Message Access Protocol
Wi-Fi	Wireless Fidelity
IPR	Intellectual Property Rights
WWW	World Wide Web
XML	eXtensible Markup Language
PHP	Hyper Text Preprocessor
ASP	Active Server Pages
JSP	Java Server Pages
FLOSS	Free Libre and Open Source Software
GNU	**G**NU's **N**ot **U**nix
OSI	Open Source Initiative
FSF	Free Software Foundation
W3C	World Wide Web Consortium

Some Definitions:-

Hacker:- A Hacker is a programmer who intrudes in a secure network just for gaining knowledge or playful pranks.

Cracker:-A cracker is a malicious programmer who breaks into a secure system with a malafide intention.

Cookies:-Cookies are messages sent by web server to keep track of user's activity.

Web Server:- A web server is a computer system that processes requests of the client via HTTP.

Web Browser:- A web browser (commonly referred to as a browser) is a software application for retrieving, presenting, and traversing information resources on the World Wide Web. e.g. Internet Explorer, Mozila Firefox, Google Chrome etc.

Firewall:- A firewall is a network security system designed to prevent unauthorized access to or from a private network. Firewalls can be implemented in both hardware and software, or a combination of both.

Cyber Crime:- Criminal activities carried out by means of computer or Internet. All such crime are dealt with Indian IT Act 2000.

CyberLaw:- Cyberlaw is a generic term used to refer rules for preventing crime on Internet.

Cloud computing:- Cloud Computing is a kind of Internet-based computing that provides shared processing resources and data to computers and other devices on demand. The cloud aims to cut costs, and helps the users focus on their core business instead of being impeded by IT obstacles.

Spam:- Irrelevant or unsolicited messages sent over the Internet, typically to large numbers of users, for the purposes of advertising, phishing, spreading malware, etc.

Virus:- A computer virus is a program that, when executed, replicates itself or infecting other programs by modifying them. Infecting computer programs can include data files, or the boot sector of the hard drive.

Antivirus:- Antivirus or anti-virus software, is computer software used to prevent, detect and remove malicious software. Some common example of Antivirus Software are Norton, Quickheal, Kaspersky etc.

OPEN SOURCE TERMINOLOGIES

TERMINOLOGY & DEFINITIONS:
- **Free Software:** They are freely accessible and can be freely used, changed, improved, copied and distributed by all and payments are not needed for free Software.
- **Open Source Software:** Software whose source code is available to the user and it can be modified and redistributed without any limitation .OSS may come free of cost but nominal charges have to be paidfor support of Software and development of Software.
- **Proprietary Software:** Proprietary Software is neither open nor freely available, normally the source code of the Proprietary Software is not available but further distribution and modification is possible by special permission by the developer.
- **Freeware:** Freeware are the software freely available , which permit redistribution but not modification (their source code is not available). Freeware is distributed in *Binary Form* (ready to run)without any licensing fees.
- **Shareware:** Software for which license fee is payable after some time limit, its source code is not available and modification to the software are not allowed.

OPEN SOURCE / FREE SOFTWARE
- **Linux :** Linux is a famous computer operating system . Popular Linux server set of program – LAMP(Linux, Apache, MySQL, PHP)
- **Mozilla :** Mozilla is a free internet software that includes
  - a web browser
  - an email client
  - an HTML editor
  - IRC client
- **Apache server:** Apache web server is an open source web server available for many platforms such as BSD, Linux, and Microsoft Windows etc.
  - Apache Web server is maintained by open community of developers of Apache software foundation.
- **MYSQL :** MYSQL is one of the most popular open source database system.
- **OpenOffice :** OpenOffice is an office applications suite. It is intended to compatible and directly compete with Microsoft office.
  It includes:
  - Writer (word processor)
  - Calc(spreadsheet)
  - Draw(graphics program)
- **Python: Python** is an interactive programming language originally as scripting language for Amoeba OS capable of making system calls.

Long Answer Questions(4 marks question: 1 mark each)

Q1. Knowledge Supplement Organization has set up its new center at Mangalore for its office and web based activities. It has 4 blocks of buildings as shown in the diagram below:

Block C

Block A
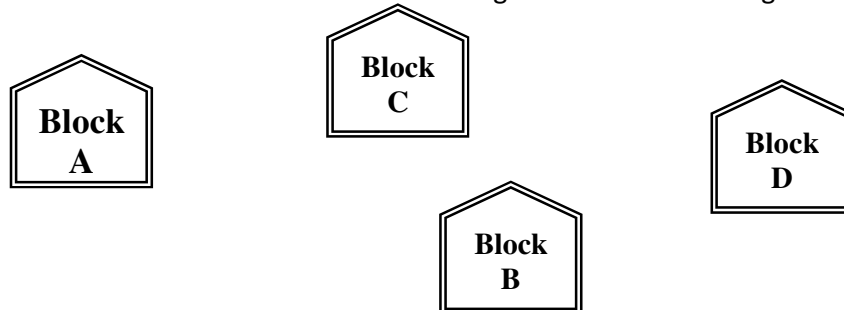
Block D

Block B

Centre to centre distances between various blocks

Black A to Block B	50 m
Block B to Block C	150 m
Block C to Block D	25 m
Block A to Block D	170 m
Block B to Block D	125 m
Block A to Block C	90 m

Number of Computers

Black A	25
Block B	50
Block C	125
Block D	10

(a) Suggest a cable layout of connections between the blocks.

(b) Suggest the most suitable place (i.e. block) to house the server of this organisation with a suitable reason.

(c) Suggest the placement of the following devices with justification
   (i) Repeater
   (ii) Hub/Switch

(d) The organization is planning to link its front office situated in the city in a hilly region where cable connection is not feasible, suggest an economic way to connect it with reasonably high speed?

Q2. Ravya Industries has set up its new center at Kaka Nagar for its office and web based activities. The company compound has 4 buildings as shown in the diagram below:

Raj Building

Fazz Building

Jazz Building
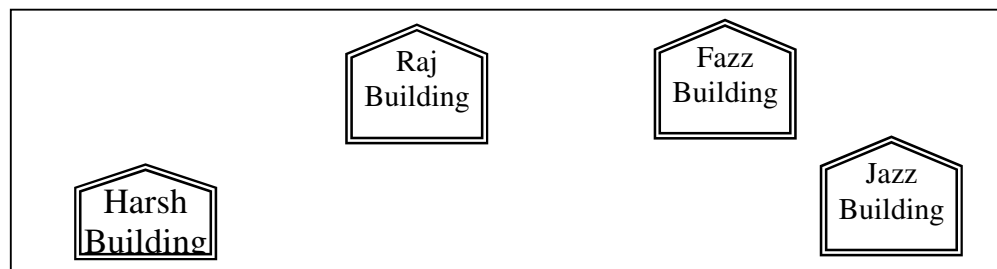
Harsh Building

Centre to centre distances between various buildings

Harsh Building to Raj Building	50 m
Raz Building to Fazz Building	60 m
Fazz Building to Jazz Building	25 m
Jazz Building to Harsh Building	170 m
Harsh Building to Fazz Building	125 m
Raj Building to Jazz Building	90 m

Number of Computers

Harsh Building	15
Raj Building	150
Fazz Building	15
Jazz Bulding	25

(a) Suggest a cable layout of connections between the buildings.

(b) Suggest the most suitable place (i.e. building) to house the server of this organisation with a suitable reason.

(c) Suggest the placement of the following devices with justification:
   (i) Internet Connecting Device/Modem
   (ii) Switch

(d) The organization is planning to link its sale counter situated in various parts of the same city, which type of network out of LAN, MAN or WAN will be formed? Justify your answer.

Very short Answer Questions (1 mark question)

1. Differentiate between hackers and crackers.
2. What is cookies?
3. Define Firewall.
4. Name some open source software.
5. Differentiate between Freeware and free software.
6. How proprietary software is different from shareware?
7. What is cyber law?
8. Define spam.
9. What is Cloud computing?
10. Differentiate between hub and switch.
11. What is web 2.0?
12. Differentiate between worms and virus.
13. Name two client side scripting.