INFORMATIX
Education with Innovation

INCORPORATES NEP 2020

CODING

CYBERWAVE

Foundations of Information & Communication Technology

Updated to Windows 10 MS Office 2010

COVERS
INFOBITS
EXERCISES
LAB ACTIVITY
PROJECT WORKS

MS Access & Photoshop

8 LEVEL

Download Teacher's Support at www.informatix4u.com

CYBERWAVE

Foundations of Information & Communication Technology

INFORMATIX
computer education

INFORMATIX
computer education

CYBERWAVE : Level - 8

(Foundations of Information & Communication Technology)

Published By :

INFORMATIX
School of Information Technology

- Hyderabad
- Kurnool
- Kakinada
- Visakhapatnam
- Vijayawada

E-mail : informatix4u@gmail.com

Preface

We are living in a world powered by computers. Today, computers are present in all sectors of our society. Thus, knowledge of Computer Science is increasingly becoming an essential skill for staying competitive in the future.

Cyber wave Computers is a series of 10 books for classes 1 to 10. The series introduces concepts in a step-by-step manner using simple language. The content provides the latest facts and figures. The screenshots included in the series are of **Windows 7**, updated to **windows 10** and **Microsoft Office 2010** version.

In Books 1 and 2, the basics of computers, including its various parts, have been introduced. MS Paint software, which will help students to acquire skills for using mouse and keyboard, has been introduced. In Books 3 to10, **programming language** software, **animation software** and **coding** have been introduced in respective classes.

Most of the topics/chapters have been covered in a child-friendly manner along with sufficient definitions, diagrams and tables.

Activities are designed to bring out the joy of learning by discovering. Exercises, Worksheets, lab questions have been developed keeping in mind the learning ability of the students.

We sincerely welcome constructive feedback and suggestions to improve the series which will be incorporated in further publication.

Email:informatix4u@gmail.com

With regards
Informatix & Team

Contents

1 Computer Networking

Computer networks refer to interconnected computing devices that can exchange data and share resources. These networked devices use a system of rules called communication protocols to transmit information via physical or wireless technologies.

The goal of a computer network is to share resources among different devices.

In the field of computer network technology, there are different types of networks, ranging from simple to complex.

A network can further inter connect with each other networks or contain subnetworks. These all sub-networks can make larger network. Ex. : Internet

Advantages of computer network

Computers in a network have the following advantages :

- Cost-effective, as the resource can be used by multiple people.
- Software licenses are likely to be cheaper than buying multiple individual licenses
- Time saving when sharing files.
- No dependence on internet connection or its bandwidth for transferring files.
- All types of files such as text, audio, video and graphics can be shared easily.
- Security is good - unlike standalone computers, users cannot see other users files.

Disadvantages of computer network

Computers on a network have the following disadvantages:

- Managing a large network is complicated, requires training, and requires a network. If the file server malfunctions, users may not be able to run applications. Work then comes to a halt.

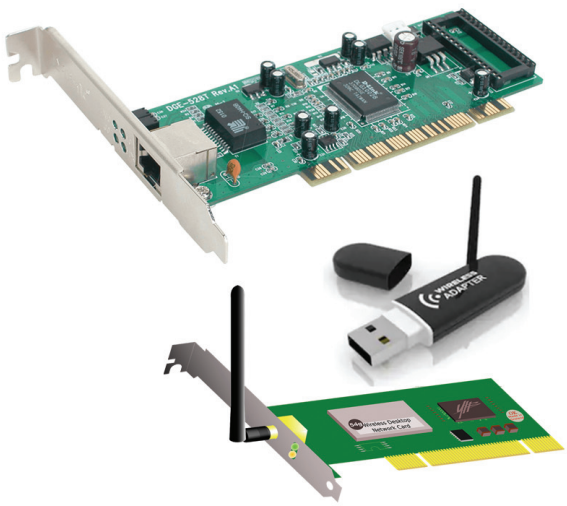
- Purchasing network cabling and file servers can be expensive.
- If there is a problem in a network, then all computers connected to the network cannot be used.
- If the number of users exceeds the specified number, the transfer and sharing of files may become slow.

Components of Network

To establish wired or wireless network, we require components

Network Interface card (NIC)

It is a physical connection of a computer to a network that supports network communication. NIC (Ethernet card) is the most commonly used network card.



Wireless network interface card (WNIC)

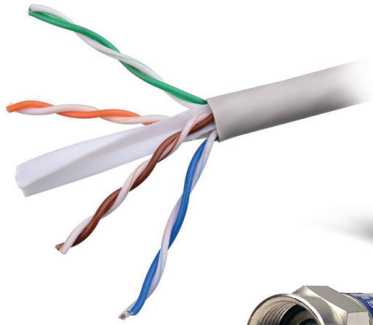
It is used to connect devices without use of cables or wires.

Network Cables

Twisted pair cables and coaxial cables are commonly used to establish network.

Twisted pair cable

It contains 8 wires, commonly used in telephone lines. These are connected through RJ 45 connector.



Co-axial cable

These cables are used to connect network device like modem, router and adaptors etc.

Fiber optical cable

These cables are transmitting light instead on electrical signals. Its common used to transmit large amount of data to long distance.

Network Drivers Software

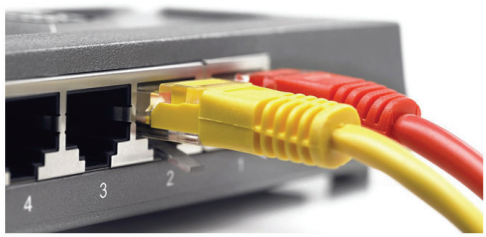
It is necessary to install the network driver software that allows the network card to work in network computers.

Hub

A hub is a network device that contains multiple ports to connect other devices. It serves as a central connection point. When data is sent from a computer, it is first received by the hub. The hub then transmits the data to the entire network, each computer in that network then decides whether the data is intended for it or not.

Switch

A switch is a special form of a hub. Unlike an ordinary hub, a switch transmits data to only one or more ports on a network that need to receive it. The devices that use switches are called switched nodes.



Repeater

When signals in a network are transmitted over long distances, their strength decreases and they are destroyed. A repeater in a network connects two segments of a network cable. It is used to increase the strength of the signals. It regenerates the signals and sends them to their destination.

Bridge

A bridge is a network device used to connect segments of a LAN that use the same protocol. It is similar to a router, but only forwards the data without analyzing and redirecting it.

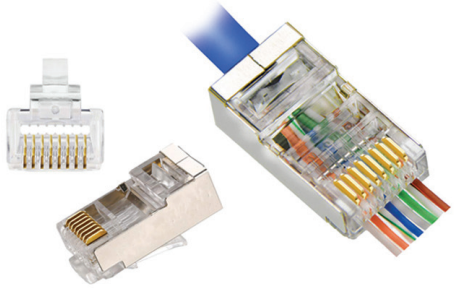
Router

This network device is used to route the data across the different parts of the network when computers are connected in WAN.

Modem

A Modem is a device that converts digital signals to analog signals and analog signals to digital signals. Modem also known as modulator or Demodulator.

RJ - 45



RJ - 45(Registered Jack-45) also known as Cat-45, is a cable that is used to connect two different networks.

Types of Network

Computer networks are spreading all over the world. The number of computers connected to each other in a network can be classified as follows.

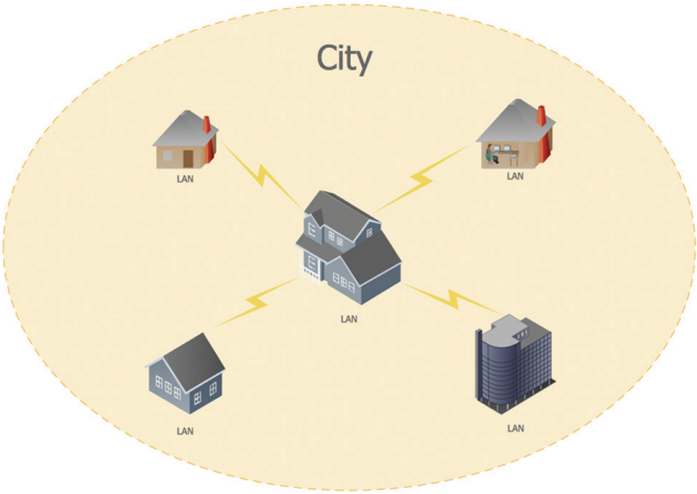
Personal Area Network (PAN)

PAN is a computer network used by a single person. It connects to devices such as printers, scanners, cell phones, tablets, and cameras, etc. A PAN can be used to transfer files such as emails, digital images, audio and video files from one device to another.

Local Area Connection (LAN)

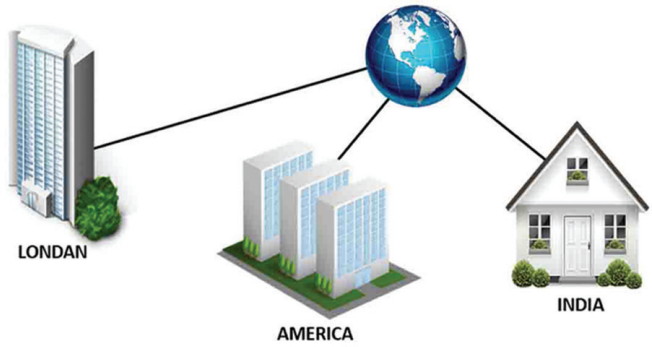
LAN is a network where devices are connected to each other in a closed geographical area such as a room or an office building. LAN is a small network that connects only a few computers. LAN is a network that is connected by cables or wireless links for communication. Generally, it spans a range of 0 to 10 km.

Metropolitan Area Network (MAN)



MAN is a larger network than LAN. It covers a larger area than LAN. It covers an area from 5 to 50 km. MAN is used to connect the smaller networks of an organization that are spread across the city. MAN they are characterized by very fast connections. Ex: schools and cables TV.

Wide area Network (WAN)



A WAN spans a large geographic area, across a country or continent. A WAN is usually established by an organization that has offices throughout the country or in different countries.

A WAN combines several LAN, which are spread across the globe. The example of a WAN is the Internet. Rail reservation systems, airline reservation systems, and ATMs.

Intranet

Intranet means within the network. It is a private computer network that can be accessed only by the company's employees. The information available on this network may be of a general or confidential nature and may only be shared with authorized users.

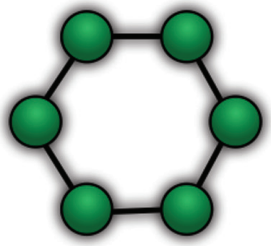
Internet

It (inter-network) is a network of networks distributed and interconnected across the globe. It connects many small networks together and allows all computers to exchange information with each other. The Internet has become an integral part of our daily lives.

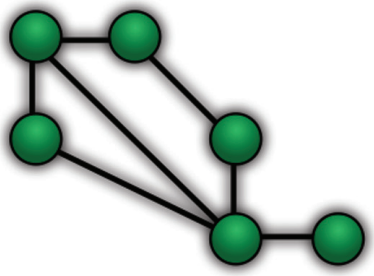
Network Topology

Topology is the physical arrangement of connected devices with cabling, nodes and links, etc. within the network that are interconnected.

Some commonly used network topologies are:

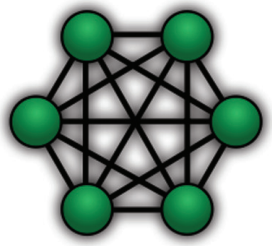


Ring Topology



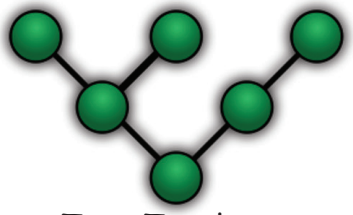
Mesh Topology

Star Topology

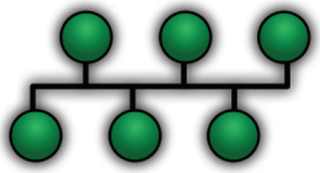


Hybrid Topology

Linear Topology



Tree Topology



Bus Topology

Info Bits

- *Network : A group of systems those are interconnected.*
- *Node : Each computer on a network is called a node.*
- *Hub : The central point of a network.*
- *Switch : A device that receives data packets and forwards them to the destination it is looking for.*
- *Router : A device that determines the best route for data packets.*
- *Repeater : A device that increases the strength of signals.*
- *Bridge : A device that connects a LAN to another LAN that uses the same protocol.*

Let us Practice

I. Answer the following questions.

1. What is a computer network ?

2. What are the advantages and disadvantages of a computer network ?

3. What is the difference between a switch and a hub ?

4. Describe the different types of network cables.

5. Describe the different types of networks.

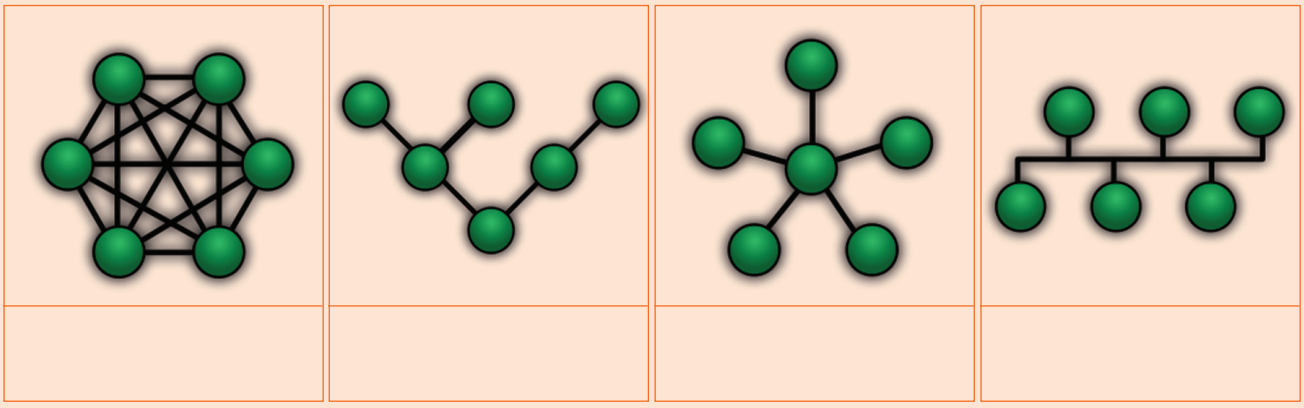
II. Fill in the blanks with the given hints.

1. _____ is a computer network used by a single person.
2. _____ is a collection of two or more computers connected together to exchange information.
3. Each computer on a network is called a _____
4. A _____ is a network device used to connect segments of a LAN that use the same protocol.
5. _____ is used to increase the strength of the signals.
6. _____ cables transmit the light instead of electrical signals.

Node, Computer Networking, Repeater, PAN, Optical fibre, Bridge

Activity Zone

I. Identify the following network topology diagrams and write their names in the space provided.



2 Data Base Management System

Data is a collection of characters and symbols which has no meaning. It is also called raw data. This data can be converted into meaningful information after analyzing and processing.

Ex : Our mobile contact list, an address, phone number, an email id etc. are the best examples of data in our day-to-day life.

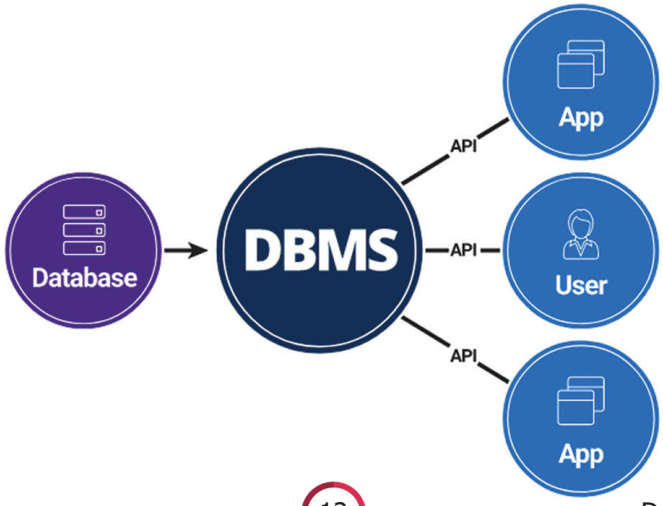
However managing large amount of data manually is a difficult task. If you required any specific data, it takes a lot of time. In such situation a computerized record system will help in easiest manner for database, data is stored in fields, records and files.

What is database ?

A database is a collection of data or information. This information is organized in such a way that the computer program can quickly retrieve the data you want.It can be easily accessed, managed and updated. It helps to store and retrieve a large amount of data efficiently. The concept of database is one of the oldest ways to maintain records in a conventional file-oriented data collection system.

Ex 1 : One of the best examples of a database is the attendance register of your class in which your teacher maintains attendance record of every month.

Ex 2 : Another example of a database is the train reservation system in which all the information about trains and passengers is stored.



- *Database combines and process as data in different ways.*
- *A field is a single piece of data.*
- *Record is a set of fields.*
- *File is a collection of records.*

Advantages of DBMS

- Database stores huge amount of data.
- Database facilitates quick and easy management and storing of data.
- It allows us to share and collect data in effective manner.
- Database will manage centrally. This controls inconsistency and duplication of data.
- The files can be easily updated whenever any changes are being made.
- Database provides various techniques to recover and backup data.
- Database provides security to important and confidential data.

Disadvantages of using DBMS

- Some applications of DBMS are very slow.
- It is expensive and occupies a large storage space in hard disk.
- DBMS is very complex to understand.

Types of Databases

There are mainly two types of databases :

Flat File Database : It is a type of database that contains records having small number of fields without any structured relationship between them. The most popular example of flat file database is MS Excel 2010.

Relational Database : It is a type of database that stores data in several tables and links those tables together to get a common piece of information. This type of database system is called Relational Database Management System (RDBMS). Commonly used relational database systems are MS Access, Microsoft SQL Server, ORACLE, etc.

- *Database acts as a communication link between user and the database.*
- *The first commercial RDBMS was Oracle.*

Structure of a Database

The main components of a database are table, field and records. A table is the basic building blocks of a database. Table contains data in the form of rows and columns and looks similar to a spreadsheet. A column in a table is called a Field. A row in a table is called Record or Tuple.

Data is stored in the table of a database, as shown in the below diagram.

Reg. No	Name	Father's Name	Date of Birth	Class
125/12	Ravi	Mr. MS Kanth	15/08/2007	VIII
117/11	Veerasuryam	Mr. NK Sharma	16/09/2007	IX
185/12	Srinivas	Mr. CH. V Ramana	03/11/2007	VIII

Records

Fields

Database Objects

MS-Access allows you to create objects. The various database objects are:

- Tables
- Primary key
- Queries
- Forms
- Reports

Tables

Table is a collection of related information. A database can consist of one or more co-related tables to store the complete information. In MS-Access, rows are referred as Records and columns are referred as Fields.

Primary Key

It is a unique field by which the records are uniquely identified in a table. A table can have only one primary key. For example, in a student's record the Register No/ can be called a primary key.

Queries

Queries represent the information from the tables that satisfies certain condition using queries, you can add, delete and compare the data.

Forms

Form is a convenient interface used to add, modify or search the information in the database tables / queries, you can directly enter the data in tables. It is similar to application form. The data you entered in the form is automatically saved to the table you create.

Reports

Reports are the systematic representation of information stored in tables or queries It is designed to take hard copy of data.

Let us Practice

I. Answer the following questions.

1. What is a database ?

_____

2. What are the advantages and disadvantages of DBMS ?

_____

3. Explain the terms flat file and relational database.

_____

4. What are database objects ?

_____

II. Fill in the blanks with the given hints.

1. _____ is a collection of related information.
2. _____ is a unique field that uniquely identifies records in a table.
3. _____ is similar to an application form.
4. _____ is the systematic representation of information stored in tables or queries.

Table, primarykey, reports, forms