MODULE 2

OPERATING SYSTEMS AND NETWORKING

WHAT IS AN OPERATING SYSTEM

A n operating system (OS) is a software program, but it is different from word processing programs, spreadsheets, and all the other software programs on your computer. OS is an example of system software— software that controls the system's hardware and that interacts with the user and application software. The operating system is the computer's master control program. OS provides you with the tools (commands) that enable you to interact with the PC. The operating system performs the following functions:

» Displays the on-screen elements with which you interact— (the user interface).
» Loads programs (such as word processing and spreadsheet programs) in to the computer's memory so that you can use them.
» Coordinates how programs work with the computer's hardware and other software.
» Manages the way information is stored on and retrieved from disks.

TYPES OF OPERATING SYSTEMS

Real-Time Operating Systems

A real-time operating system is a very fast, relatively small OS. Real-time OS are often called embedded OS. A real-time operating system is needed to run real-time applications. It may support multiple simultaneous tasks, or it may only support single-tasking. A real-time application is an application in that it responds to certain inputs extremely quickly— thousands or millions of a second. Real-time applications are needed to run medical diagnostics equipment, life-support systems, machinery, scientific instruments, and industrial systems

Single-User/Single-Tasking Operating Systems

An operating system that allows a single user to perform just one task a t a time is a single-user/single*tasking operating system. To a user, a "task" is a function such as printing a document, writing a file to disk, editing a file , or downloading a file from a network server. To the operating system, a task is a process, and small and simple OS can only manage a single task at a time.
MS-DOS is one example o f a single-tasking OS,

Single-User/Multitasking Operating Systems

A single-user/multitasking operating system is one that allows a single user to perform two or more functions a t once. It takes a special operating system to keep two or more tasks running at once. The most commonly used personal computers usually run such OS, including Microsoft Window s and the Macintosh Operating System .The multitasking features o f these OS have increased productivity of people in a large variety of jobs because they can accomplish more in a shorter period of time.

Multi-User/Multitasking Operating Systems

A multi-user/multitasking operating system is an operating system that allows multiple users to use programs that are simultaneously running on a single network server; called a terminal server. When a computer is connected to a server to access document files to edit, the client computer performs the processing work locally. So with a multi-user OS, this gives each user a complete environment, called a user session on the server. Each user's applications run with in their user session on the server separate from all other user sessions. The software that makes this possible is called a terminal client. In a multi-user/multitasking operating system environment, all or most o f the computing occurs at the server

DIFFERENT TYPES OF PC OPERATING SYSTEM

I. Windows

Windows is a **graphical operating system** developed by Microsoft. It allows users to view and store files, run the software, play games, watch videos, and provides a way to connect to the internet. It was released for both home computing and professional works. Microsoft introduced the first version as 1.0

It was released for both home computing and professional functions of Windows on **10 November 1983.** There have been many different versions of Windows. The most recent versions are windows10 (released in 2015), **Windows8** (2012), **Windows 7** (2009), and **Windows Vista** (2007).

I. macOS

Mac OS is a line of operating systems created by Apple Inc. It comes preloaded on all new Macintosh computers, or Macs. All of the recent versions are known as **Mac OS X** (pronounced Mac O-S Ten), and their specific version names are **Lion** (released in 2011), **Snow Leopard** (2009) and **Leopard** (2007). Apple also offers a version called **Mac OS X Server**, which is designed to be run on servers.

II. Linux

Linux is a family of **open-source** operating systems, which means they can be modified and distributed by anyone around the world. This is different from **proprietary software** like Windows, which can only be modified by the company that owns it. The advantages of Linux are that it is **free**, and there are many different **distributions**—or versions—you can choose from.

III. Unix

UNIX is an operating system which was first developed in the 1960s, and has been under constant development ever since. By operating system, we mean the suite of

programs which make the computer work. It is a stable, multi-user, multi-tasking system for servers, desktops and laptops.

UNIX systems also have a graphical user interface (GUI) similar to Microsoft Windows which provides an easy to use environment.

IV. Apple iOS

Apple's iOS is a popular operating system for smartphones. It works on Apple hardware, including iPhone's and iPad tablets. iOS features include an application shop where users can buy and download free apps, strong safety and encryption focus to limit what unauthorized users can remove from the phone and a simple, streamlined interface with minimal hardware buttons.

COMPUTER NETWORKS

A network is a set o f technologies—including hardware, software, and media, that can be used to connect computers together, enabling them to communicate, exchange information, and share resources in real-time Networks allow many users to access shared data and programs almost instantly. When data and programs are stored on a network and are shared, individual users can substantially reduce the need for programs on their own computers

Advantages of networks

1. Simultaneous Access

Different users can access the same data at the same time. If the server stores data files for users to access, it is commonly called a file server.

2. Shared Peripheral Devices

The ability to share peripheral devices (especially expensive ones such as high- volume laser printers, which can cost thousands of dollars) is one o f the best reasons for small businesses to set up a network

3. Personal Communications

One of the most far-reaching applications of data communication s is electronic mail (e-mail), a system for exchanging written messages (and, increasingly, voice and video messages) through a network. Teleconference is any kind of multi-way communication carried out in real-time using telecommunications or computer networks and equipment. Sub categories of teleconferencing are

- **Video-conferencing**. Videoconferencing enables real-time communication over a distance by allowing people at two or more sites to communicate with each other by seeing a video picture o f the people at the other sites. Each site has one or more cameras, microphones, loudspeakers, and monitors,
- **Audio-conferencing**. Audio-conferencing provides an audio link similar to that of a conventional telephone, except that it offers much higher-quality audio and enables more than two sites to be liked together
- **Data-conferencing**. Data-conferencing enables participants at two or more sites to have a shared workspace on their computer desktops.

Common Types of Networks

Local Area Networks (LANs)

A Local area network (LAN) is a data communication system consisting o f several devices such as computers and printers. This type o f network contains computers that are relatively near to each other and are physically connected using cables. A LAN can consist of just two or three PC s connected together to share resources, or it can include hundreds of computers of different kinds. Any network that exists within a single building, or even a group of adjacent buildings, is considered a LAN. It is often helpful to connect separate LANs together so they can communicate and exchange data.

Wide Area Networks (WANs)

A WAN (wide area network) is a communications network that spans a large geographic area such as across cities, states, or countries. A wide area network (WAN) is a network that exists over a large-scale geographical area. A WAN connects different smaller networks, including local area networks (LANs) and metro area networks (MANs). This ensures that computers and users in one location can communicate with computers and users in other locations.

An example, a company may have its corporate headquarters and manufacturing plant in one city and its marketing office in another. Each site needs resources, data, and programs locally, but it also needs to share data with the other sites. To accomplish this feat o f data communication, the company can attach devices that connect over public utilities to create a WAN.

Hybrid Networks

Campus Area Networks (CANs)

Campus area network (CAN) is a network of multiple interconnected local area networks (LAN) in a limited geographical area. A CAN is smaller than a wide area network (WAN) or metropolitan area network (MAN). A CAN is also known as a corporate area network (CAN) or Cluster Area Network. A campus area network is used to inter-connect networks in limited geographical locality like university campus, military bases, or organizational campuses etc.

Metropolitan Area Networks (MANs)

The metropolitan area network (M A N) b a large-scale network that connects multiple corporate L A N s together. MAN's are high-speed network that allows for the sharing o f regional resources. **MAN** is a computer network that usually spans a city. A MAN usually interconnects a number of local area networks (LANs) using a high-capacity backbone technology, such as fibre-optical links, and provides up-link services .MAN's are larger than Local Area Network but smaller than the area covered by a wide area network(WAN)

Home Area Networks (HANs)

A home area network (HAN) is a network contained within a user's home which connects a person's digital devices, from multiple computers and their peripheral devices. A home area network (HAN) is a network that is deployed and operated within a small boundary, typically a house or small office/home office. It enables the communication and sharing of resources (like the Internet) between computers, mobile and other devices over a network connection.

HOW NETWORKS ARE STRUCTURED

SERVER BASED NETWORKS

To understand a server-based network, it is important to know the meaning of the term node in a network. A node is a processing location that can be a PC or some other devices such as a networked printer. Usually, server-based networks include many nodes and one o r more servers, which control user access to the network's resources.
A file server network is a fairly simple example o f this kind of nodes-and-server network.

CLIENT/SERVER NETWORKS

One popular type of server-based network is the client/server network, where individual computers share the processing and storage workload with a central server. This arrangement requires special software for the nodes and the server

PEER-TO-PEER NETWORKS

In a peer-to-peer network (abbreviated as "P2PN" and sometimes called a work group), all nodes on the network have equal relationships to all others, and all have similar types of software that support the sharing of resources. In a typical peer-to-peer network, each node has access to at least some of the resources on all other nodes. Here there is server computer, all are peers

SERVICES OF THE INTERNET (FEATURES OF THE INTERNET)

- World Wide Web
- Electronic mail(E-MAIL)
- News
- File transfer protocol(FTP)
- Chat
- Instant messaging
- Online services
- Peer-to-Peer services

World Wide Web

The World Wide Web is the way of accessing information over the medium of internet. The World Wide Web (also known as the Web or WWW) was created in 1989 at the European Particle Physics Laboratory in Geneva. World Wide Web is a collection of billions of documents, all stored in different places, but all linked together in some manner. Web documents can be linked together because they are created in a format known as hypertext. Hypertext systems provide an easy way to manage large collections of data, which can include text files, pictures, sounds, movies, and more.

To support hypertext documents, the Web uses a special protocol, called the hypertext transfer protocol, or HTTP. A hypertext document is a specially encoded file that uses the hypertext markup language, or HTML. This language allows a document's author to embed hypertext links—also called hyperlinks or just links—in the document. HTTP and hypertext links are the foundations of the World Wide Web.

The hypertext documents are called web pages. Collection of related web pages is called website. Websites are housed on web servers. Copying a page onto a server is called publishing a page and the process is called posting or uploading

Electronic mail(E-MAIL)

Electronic mail, or e-mail, is a system for exchanging messages through a computer network. People most commonly use e-mail to send and receive text messages, but depending on the software you use, you may be able to exchange audio or video messages with someone else. e-mail is less expensive than using the telephone because there is no charge for using it,

Email uses multiple protocols within the TCP/IP suite. For example, SMTP is used to send messages, while the POP or IMAP protocols are used to retrieve messages from a mail server.

News

The internet support a form of public bulletin board called news. There are tens of thousands of active news groups. Each devoted to discussion of a particular topic. These newsgroups are part of a system called Usenet.

To participate in a newsgroup, users post articles about the new group's main topic. As users read and respond to one another's articles, they create a thread of linked articles.

The most popular way to participate in news group is by using a news reader program such as newsrover, newsPro, XNews etc. The protocol which support newsgroups is NNTP (Network news transfer Protocol)

FTP (File Transfer protocol)

It is the protocol used to transfer files from one computer to another. An FTP site is a collection of files, including data files that are housed on an FTP server.FTP sites are also called archives.

Internet Relay Chat (IRC) or web based chat

Internet relay chat or chat is a popular way for internet users to communicate in real time with others. Real-time communication means communicating each other in the immediate present. Unlike email, chat does not require a waiting time between the time you send a message and the time the other person receive the message.

Instant messaging

It is a type of chat software that offers real time text transmission over the internet. This software restricts the participation to specific users. Some of the IM are windows massager, AOI instant messenger etc.

Online services

An online service refers to any information and services provided over the internet. These services not only allow subscribers to communicate with each other but they also provide unlimited access to information. Online services can range from simple to complex. Examples in clued e-mail provider, news providers, e-commerce sites etc

Peer-to-Peer services

P2p services are distributed networks that do not require a centralized server to manage files. Instead, special software is created, allowing an individual's computer to communicate with another computer and have access to files or information on that computer.