

OPERATING SYSTEM

Definition: An O.S. is an integrated set of programmes that controls the resources (CPU, memory, I/O device etc) of a computer and provide its user with an interface. It is an important part of almost every computer system.

There are two main primary objective of an O.S.

1. **Making computer system convenient to use:** - A computer system consist of processor, main memory and I/O devices. Writing a programme for using these hardware resources is extremely difficult. This problem can be solved by designing a layer of software on hardware. This layer is used as an interface or virtual machine. This is called operating system.

This O.S layer provides various facilities and services that make the use of the hardware resource convenient, efficient and safe. In effect an O.S hides the details of the hardware from the programmer. It acts as an intermediary between the hardware and the user.

2. **Managing resources of a computer:** - O.S. has to manage the various resources of the computer system. This involves performing such task as keeping track of who is using which resource, granting resource request etc.

Executing a job on a computer system often requires several of its resources such as CPU time, memory space, file storage space, I/O devices etc. the operating system acts as the manager of various resources and allocate them to specific programme.

In such situation, the O.S must decide which requests are allocated resources to operate the computer system efficiently and fairly. The efficient and fair sharing of resources among users and/or programs is a key goal of most O.S.

Function of O.S: -Operating system provides certain services to programmes and to the users of those programme. The service provided will differ from one O.S to another. The mainfunction are:

1. **Process Management:** - A process is a programme in execution. During execution a process need certain resources such as CPU time, memory space, files and I/O devices. At a particular instance of time a computer normally consist of collection of process. The process management module of an O.S take care of the creating and deletion of process, scheduling of various system resource to the different processes requesting them, and providing mechanism for synchronization and communication among processes.

2. **Memory management:** - To execute a programme, it must be loaded together with the data it access in the main memory. Generally computer keeps several programmes in main memory. The

memory management module of an O.S take care of the allocation and deallocation of memory space to the various programmes in need of this resources.

3. File management: - A computer normally stores information in units called files. Processes can read information from files and can create new file storing newly generated information. The file management module of an O.S. takes care of file related activities such as organization, storing retrieval, naming, sharing and protection of files.

4. Device management: - A computer consist of several I/O devices such as terminal printer, disk, and tape. The device management module of an O.s take care of controlling all the devices. It keeps track of I/O request from processes, issues commands to the .O device and ensures correct data transmission to and from an I/O device.

5. Security: - Computer system often store large amount of information, some of which is highly sensitive and valuable to the users. User can trust the system and rely on it only if the various resources and information of a computer system are protected against destruction and unauthorized access. The security module of an O.S ensures this. This module also ensures that when several disjoint processes are being executed simultaneously, one process does not interfere with the others.

6. Command interpreter: - A user communicates with the operating system, for using the various system resources via a set of command provided by the O.S. the O.S also provide a simple language known as command language using which a user can put several command together from command set to describe the resource requirement of the job. The command interpreter module of an O.S. takes care of interpreting user command, supplied individually or in the form of command language and directing the system resource to handle the requirement.

Type of Operating System: -

1. Batch operating system: - the earlies O.S called control programme, where a collection of commonly required utility programmes stored in the main memory. From the memory processor execute the program. After one programme or job is completed, the memory was cleared and then next

2. Multiprogramming O.S: - Multi programming operating system is the name given to the interleaved execution of two or more different and independent programmes by the same computer. Multi programming approach permits more than one job to utilize the CPU time at any moment by applying the scheduling techniques like first come first serve, shortest job first etc.

multi programming has been employed to optimize the resource utilization of a computer system and to support multiple users in interactive manner.

3. Time sharing O.S: -

4. Real time system: - It is a form of operating system that are used in environments where a large number of even mostly external to computer system, must be accomplished and proceed in a short time or within certain deadline. Processing method is one that controls the environment by receiving the data, processing them and taking action or returning results sufficiently quickly to affect the functioning of the environment at that time. Real time systems are basically on-line systems with one specialty in inquiry processing.

Disk Operating System (DOS)

Disk Operating System: - DOS is an interpreter, which creates an interface between hardware and software. It is a programme loaded into the memory before execution of any application. It creates an environment for managing the resources and execution of any programme having extension .Exe, .Com Bat.

DOS commands are written in simple English language and response messages are also displayed in simple English. When DOS is loaded into the memory, it displays the DOS Prompt. It is a single user operating system.

Main file of DOS: - DOS software is divided into three parts stored in three different parts stored in three different files on a disk. These three files are IO.SYS, MSDOS.SYS and COMMAND.COM.

1. IO.SYS: - This file has two main parts. In first part device drivers for various devices are configured by the file. Second part is called SYS.INI, which loads the file MSDOS.SYS from the hard disk.

2. MSDOS.SYS : - This file is also called DOS kernel. It is a link between the BIOS and user's application programmes which provides the logical interface for the application programme.

3. COMMAND.COM: - This file contains command processor or command executor and has all memory resident programmes that is it has all internal commands in it. It is the user's interface to the operating system. COMMAND.COM file has two parts – Resident part and Transient part.

DOS Command: - DOS command are entered at the DOS system prompt. The system prompt is usually a letter on the screen that correspond to the currently active disk drive , e.g. A, C,D... DOS commands are invoked by entering the command name. a number of parameter can be included with the command name

The maximum length of a DOS command including optional parameter is 127 character.

Types of command: - DOS has two types of command – External and Internal

1. External command: - External commands are actually small, separate utility programme that accompany the O.S and expand its usefulness. There is an external file with extension .EXE, .COM, .BAT against every external command. For example XCOPY, EDIT, SCANDISK

2. Internal command: - The internal commands are those commands that are automatically loaded in the memory when the operating system DOS is loaded into the memory. They are loaded during booting process. . For example DIR, CD, MD etc.

Batch file: - Batch file is the group of internal and external commands stored in a single file and all commands are executed automatically with file name only. Batch file has extension .BAT. A special batch file named as AUTOEXEC.BAT file is executed automatically when user boots the computer. Other than DOS commands the batch file has their own command like – Rem, Pause, Echo, Call etc.

Config.sys: - Config.sys file is used for adjusting the various setting of system after the booting. It contains various commands related to the configuration of the system. Some commonly used commands are – Device, Buffer, Files, Install etc.

Autoexec.bat: - *same as batch file in above*

MS-WINDOWS

An overview of different version of windows: - MS windows is a software tool that allows to perform many of the tasks according to user need. It is powerful operating system that can control the overall activity of the computer.

The first version of windows was Windows-1.0. There were no applications of any consequence to run on it and its GUI used a tiled window presentation instead of the overlapped windows.

In October 1987, Microsoft announced Windows-2.0 and a companion product named Windows-386 which ran only on 80386 machines. An advanced version of Windows2.0 was shipped in January 1988 which was Windows-2.03

Windows-3.0 was announced in May 1990. This version offered minimum workstation support for networks and an improved user interface PC with sufficient speed and memory had become widely available to support this platform

In April 1991, Microsoft announced Windows-3.1 at the windows world conference in Chicago. It had added True type font, further improvements to the user interface and object linking and embedding facility.

In 1992 Microsoft also announced the Windows NT advanced networking software. It was a 32-bit, protected mode, pre-emptive multitasking threaded operating system with a GUI shell.

In 1993, Microsoft introduced Windows for workstation (Windows 3.11). Its product was Windows-3.1 with the addition of peer-to-peer connected in a network can share resources such as file and printers.

Further advanced version of windows based operating system are Windows-97 launched in March 1997, Windows-98 was launched in January 1998. There are three networking based windows. There are Windows-NT, Windows-2000 and Windows XP. On 17 February 2000, Windows-2000 was launched. Windows-XP was launched in October 2001.

Basic windows elements: -

1. My Computer: - It shows the resource of the computer. It is a special type of folder and one of the integral part of the windows. It has the following items – Drive C, Drive D, Control Panel, Printer, Schedule tasks, Dial-up Networking
2. Recycle Bin: - This folder contains all deleted files. It is a reserved space on the hard disk to store the deleted data. We can recover the deleted file from the recycle bin.
3. Control Panel: - This folder contains several applications and accessories that we need to configure our computer.
4. Printer: - This folder contains an object for each of the printers attached to our computer. when we add or delete printers, this folder is used.
5. Dial-up Networking: - This folder contains the resources that we need to use windows based operating system remote access services features. It is used to connect our computer to other computers or computer networks from remote locations.

File management through windows: -

Windows accessories: - Accessories play a major part in windows. They are so called additional programmes which are there along with the main programme called windows. These are small programme which we would need while working under windows. It contains word processor like Notepad, WordPad, drawing packages like Paintbrush, Calculator, System tools, Entertainment etc.

Windows explorer: - The windows explorer provides a consistent mechanism for file, folder, printer and Network operations and provides a hierarchical view of all the resources of computer. actually it is the main tool for viewing the files and folders on hard disk. We can run explorer from many places.

Entertainment: - It contains different application to run audio or video files. For example Windows Media Player, Sound recorder, Volume control.

System tools: - It contains different application which enhance the working of the computer, speed up the computer and also keeps the system clean of any unwanted elements. For example Disk cleanup, Disk defragmenter, Schedule task, System restore etc.

Understanding OLE: - It is an application available in windows based software. By using OLE user can easily create comprehensive documents combining information from several different application programme. This made it easy to incorporate graphs, charts, music, video, clipart, etc into our word-processing documents.

Linux Operating System

Introduction to Linux: - Linux is a free operating system that was created by Linus Torvalds in 1991. Torvalds started Linux by writing a kernel partly from scratch and partly by using publicly available software. Torvalds then release the system to his friends and on the Internet and asked them to work with it, fix it, and enhance it.

Today, there are thousands of software developers around the world contributing software to the open source community that feeds the Linux initiative. Because the source code for the software is freely available, anyone can work on it, change it, or enhance it.

Features of Linux: -

- a) Multiuser b) Multitasking c) Graphical user interface
- d) Hardware support e) Networking connectivity f) Network servers
- g) Application support

Advantage of Linux: -

- i) Free of cost ii) Reliable iii) Source code is available
- iv) Help is always available on the Internet.

Files and directories: - Linux treats everything as a file. Therefore, there are three different types of file maintained by the Linux system.

1. Ordinary file: - It consists of a stream of data resident on some permanent magnetic media. We can put anything we want into this type of file. All text files also belong to this type.
2. Directory file: - A directory can be defined as a storehouse where other program and sub-directories reside. A directory contains no data, but keeps an account of all the files and sub-directories that it contains.
3. Device file: - This type of file represents physical devices like printers, tapes etc.

Architecture

Kernel: - The kernel is the heart of the system. it is a collection of programmes mostly written in C. It communicates with the hardware directly. There is only one kernel for a system. it is that part of the Linux system that is loaded into memory when the system is booted. It manages the system resources, allocates time between users and processes, decides process priorities and performs all the other tasks. Because the kernel isolates itself from the user programme and these programmes are independent of the hardware they use.

Shells: - The shell is the interpreter of user requests. It takes the command from the user, deciphers it, and by exchanging information, communicates with the kernel to execute the command. It is actually the interface between the user and the kernel. It insulates the user from the knowledge of kernel functions. It also has a programming capability of its own. Every user get a copy of shell when login to the system.

Utilities

Linux commands

1. pwd command: - To find out present working directory. Syntax is \$ pwd
2. mkdir: - To create a new directory. Syntax is \$ mkdir directoryname
3. cd: - To change the current working directory. The syntax is \$ cd directoryname
4. rmdir: - To remove directory. The syntax is \$ rmdir directoryname
5. cat: - To display the content of a file. The syntax is \$ cat filename
6. cat >: - To create a new file. The syntax is \$ cat > filename
7. rm: - To remove a file. The syntax is \$ rm filename
8. mv: - To rename a file. The syntax is \$ mv oldfilename newfilename
9. chmod: - It is used to set the three permissions for all the three categories of users of a file. The syntax is \$ chmod category operation permission filename. The category are

u – user/owner

g – group

o – others

a – all

Operations are + to assign permission and – to remove permission

Permissions are r for read operation

w for write operation

x for executable permission.

10. ls : - To display list of all files in the current directory. It has different options

i) -x to display multicolumnar output

ii) -r to sorts files in reverse order

iii) -l to display in long listing showing seven attributes of a file

iv) -d to display directory only

11. wc : - To count number of character, word and line in a file. The syntax is \$ wc filename

12. cmp : - To compare to files. The syntax is \$ cmp FirstFileName SecondFileName

13. date : - To display current date and time. The syntax is \$ date

14.

File manipulations

Redirection and filters

Editors

Vi Editor: - vi is a full-screen editor available with all Linux system. It is one of the most powerful editor available in any environment. It offer cryptic, and sometimes mnemonic, commands for editing work.

There are three different mode of vi editor. These are

1. Input mode: - In this mode when we press a key that will be entered as text to a file.
2. Command mode: - In this mode when we press a key that will be used as command to the text of the file.
3. ex mode: - In this mode when we press a key that will be used as a command on the file.

Ed

Concept of process: - A process is simply an instance of a running program. When any programme is executed, it gives rise to a process. The process is said to be born when the programme starts execution, and remains alive as long as the programme is active. After the execution of the programme is completed, the process is said to die.

Every process also has a name, usually the name of the programme being executed.

Since the Linux is a multi-tasking system, more than one process can run at a time. Typically, hundreds or even thousands of processes can run in a large system. each process is uniquely identified by a number called the PID(process identifier). It is allotted by the kernel when it is born.

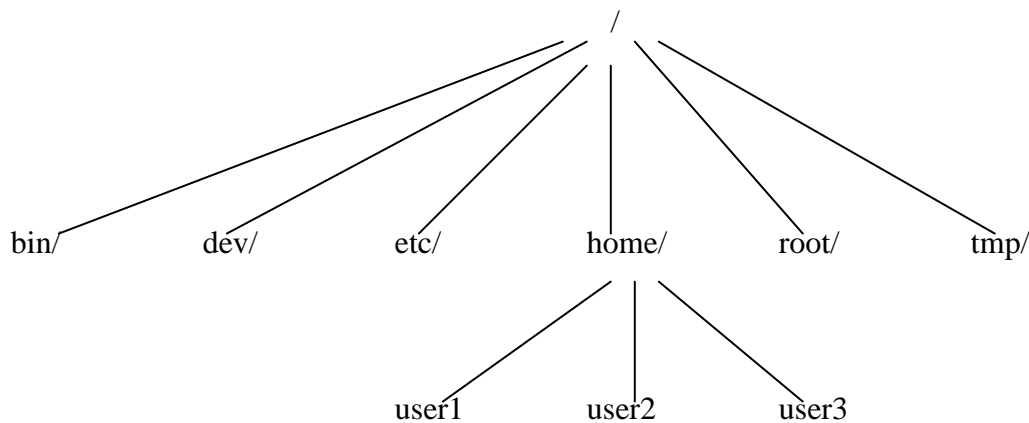
Every process has its own creator. The process responsible for giving birth to another is called the parent process and the born process created thus is called its child.

Shell programming

System administration

File system: - The Linux file system is the structure in which all the information on our computer is stored. Files are organized within a hierarchy of directories. Each directory can contain files, as well as other directories.

If we were to map out the files and directories in Linux, it would look like a upside-down tree. At the top is the root directory, which is represented by a single slash (/). Below that is a set of common directories in the Linux system. such as bin, dev, etc, home, lib and tmp.



Some of the Linux directories include the following:

1. bin: - It contains common Linux user commands like ls, sort, data etc
2. dev: - It contains files representing access points to devices on the computer system
3. etc: - It contains administrative configuration files.
4. home: - It contains directories assigned to each user with a login account.

5. root: - It represents the root user's home directory
6. tmp: - It contains temporary files used by application.

System administration commands

Q: What do you mean by word processor?

A: Word Processor is an application software mainly concern with writing of text documents. By using word processor, user can easily change and correct text in a document. It also provides grammar and spelling checking, adding graph, merge address list with letters for group mailings, creating table.

Q: What do you mean by spread sheet? Give an example. How can you move around on excel sheet

A: A spread sheet software displays a large grid of columns and rows and user can view one portion at a time. The areas where columns and rows meet are called cells. User can put text, numbers, or formulas into cells to create a worksheet. User can input different numbers into a spread sheets to generate graphs and charts.

Example of spread sheet software is MS-Excel,

We can move around on excel sheet by clicking left button of mouse on the name of the sheet display at bottom left part of the screen.

Q: What do you mean by animation? Write down the steps for applying an animation effect.

A: Animation means movement of text, pictures or diagram. In presentation software we can apply animation on object.

Q: What do you mean by presentation tools?

A:

Q: What is mail merge? What are the documents required for mail merge? Explain

A: The mail merge is a process of merging some form of address database with a form of letter to create a group of individual letters. It is used to print letters, envelops mailing labels etc.

Actually mail merging means to combine two different files in one at a time of printing.

The documents required for mail merge are the main document (letter) and data source (address list).

Q: Define the following

- a) **Menu Bar:** Menu bar contains a number of menus. Each menu has sub menus. By using menu we can perform different types of operations. For example File menu has submenus like New, Open, Save, Save As etc.

Structured Design: - Structured design is a data-flow-based methodology. The approach begins with a system specification that identifies inputs and outputs and describes the functional aspects of the system. The system specifications, then, are used as a basis for the graphic representation – data flow diagram. From the DFD, the next step is the definition of the modules and their relationships to one another in a form called a structure chart, using a data dictionary and other structured tools.

Structured design partitions a program into small, independent modules. They are arranged in a hierarchy that approximates a model of the business area and is organized in a top-down manner. Thus structured design is an attempt to minimize complexity and make a problem manageable by subdividing it into smaller segments, which is called modularization or decomposition.

- b) **Title bar:** The title bar displays the name of the program currently running. It also displays the name of the document, which is currently opened. In title bar there are three buttons. These are Minimize button, Maximize button and Close button.
- c) Requirement specification
- d) **Recycle bin:** Recycle bin is a folder contains all the deleted files. We can restore deleted file to its origin location by using Restore option.

Decision Tables: - A decision table is a table of contingencies for defining a problem and the actions to be taken. It is a single representation of the relationships between conditions and actions.

A decision table consists of two parts: stub and entry. The stub part is divided into an upper quadrant called the condition stub and a lower quadrant called the action stub. The entry part is also divided into an upper quadrant, called the condition entry and a lower quadrant called the action entry.

Rules: -

1. A decision should be given a name
2. The logic of the decision table is independent of the sequence in which the condition rules are written, but action takes place in the order in which the events occur.
3. Standardized language must be used consistently
4. Duplication of terms or meaning should be eliminated.

Condition Stub	Condition entry
Action stub	Action entry

- e) Tool bar: Each office application comes with a set of tool bars. Each tool bar has a set of tools that are appropriate for a particular type of task. By default standard and formatting toolbars are displayed, but we can display other toolbars at any time.

Q: Explain the following features of word

- a) Auto correct: Auto correct button can be used to correct misspelled word in a document. There is a list where we can set a number of words. If actual word of a misspelled word is available in the list then it will be corrected automatically.
- b) Spelling checking: Word processor provides a facility to check and correct the spelling and grammar in the document. There is a built-in dictionary named custom dictionary having the custom.dic file. It has every word about all the living and non-living things including grammar techniques to remove grammatical error. The spell checker also gives suggestions about the different worlds if any error occurs in these.