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Operating System: An Introduction

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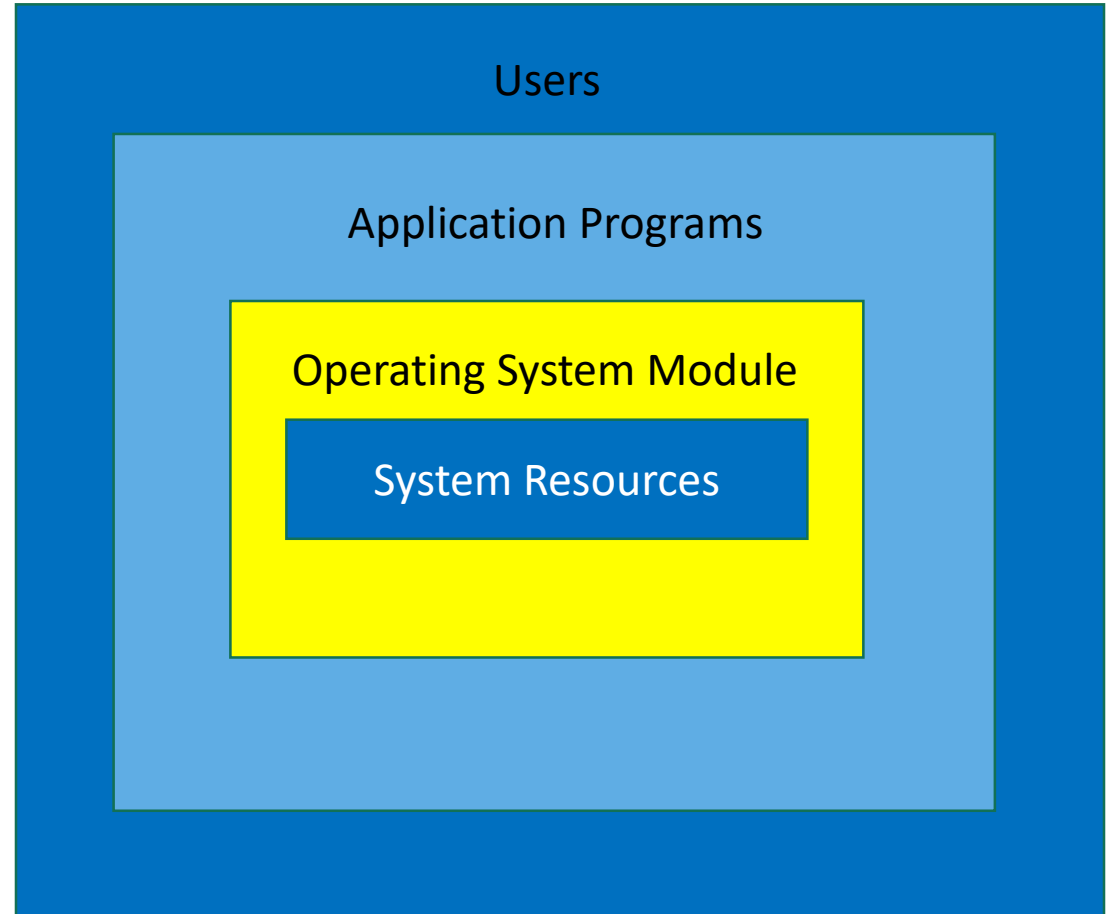
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Agenda

- Definition
- Operating System Overview
- Operating System as resource manager
- Operating System functions
- Operating System services
- Example –Disk Operating System (DOS)
- DOS Commands

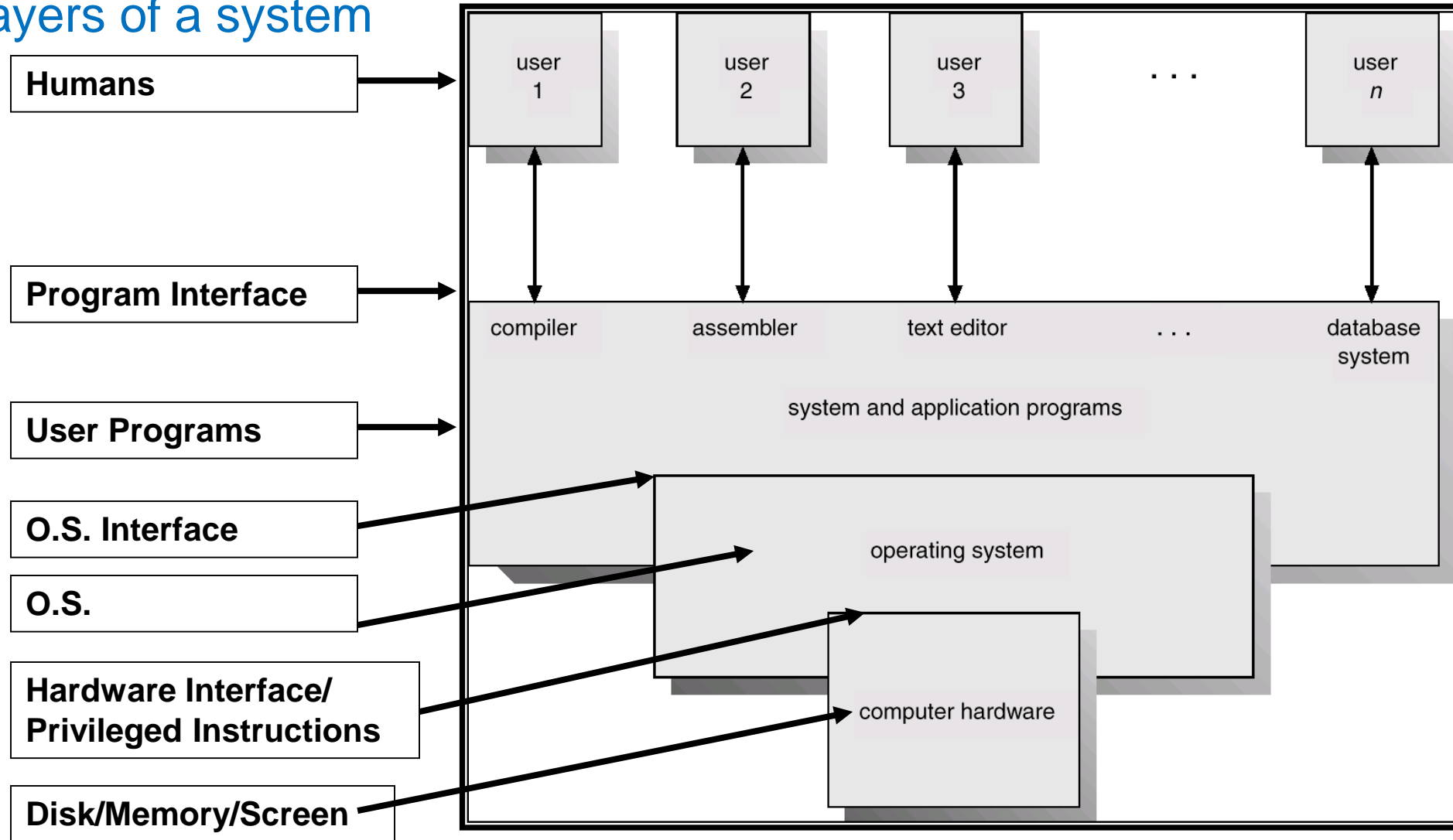
Operating System

- Operating System is a system software that acts as an interface between the user, applications and computer system. It is an organized collection of software modules that provide an effective interface between user and system resources that help the user to perform various application program using as modules.



Operating System Overview

Layers of a system



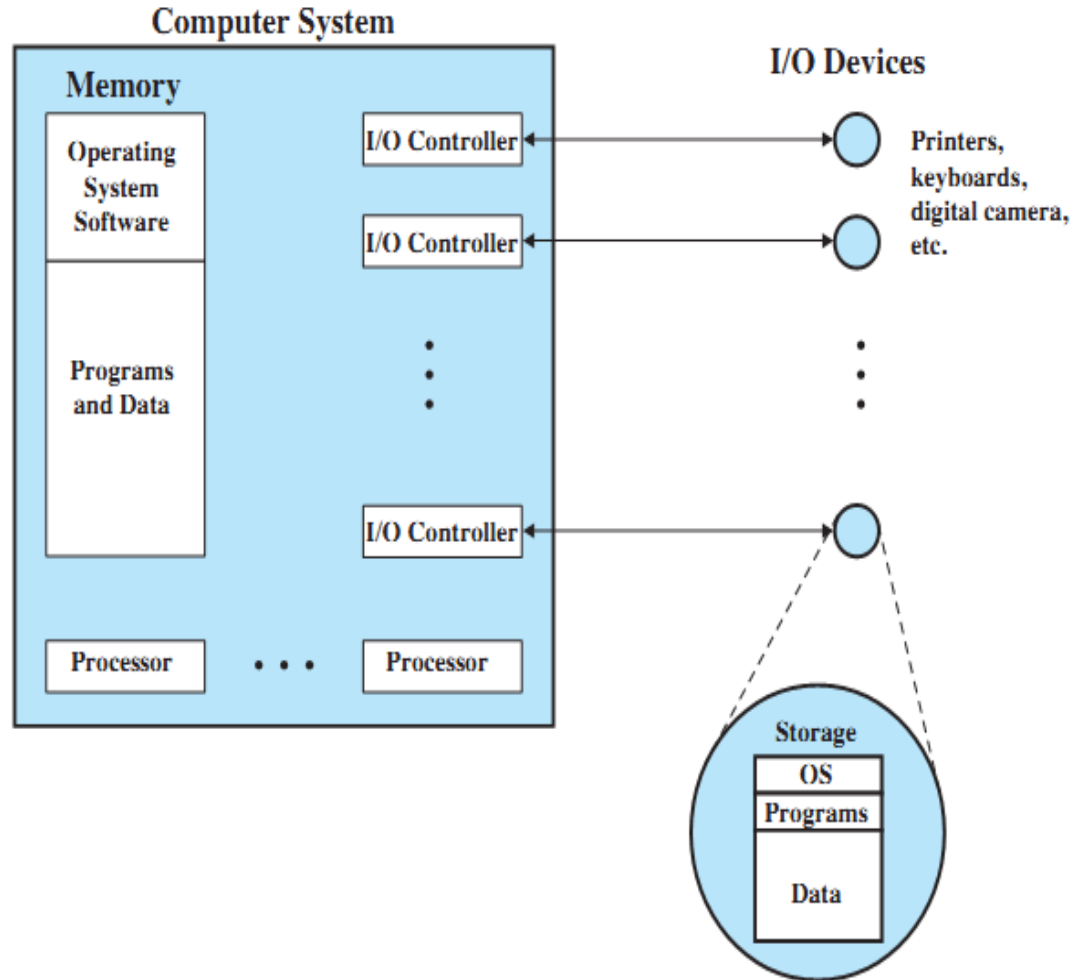
Operating Systems Overview

Operating System as a resource manager

Operating System is called as the resource manager of a system since it manages all the available system resources optimally. Resources are the physical or virtual components of limited availability within a computer system. Every device connected to a computer system is a resource. As a resource manager it..

- Manages and protects multiple computer resources: CPU, Processes, Internal/External memory, Tasks, Applications, Users, Communication channels, etc...
- Handles and allocates resources to multiple users or multiple programs running at the same time and space (e.g., processor time, memory, I/O devices).
- Decides between conflicting requests for efficient and fair resource use (e.g., maximize throughput, minimize response time).

Operating System as a resource manager(Contd..)



Few Operating Systems

- MS-Windows
- Ubuntu
- Mac OS
- Solaris
- Chrome OS
- CentOS
- AIX
- AmigaOS
- Android OS
- AMX RTOS
- CP/M
- BeOS
- CP/M, DR-DOS
- Darwin
- MS-DOS
- HP-UX
- IRIX
- QNX
- Linux
- Mac OS
- Minix
- Cisco IOS

Historical evolution of Operating System

- Bare Machine Approach
- Serial Processing
- Batch Processing
- Multi Programming
- Interacting Time Sharing

Bare Machine Approach

- Machines having no Operating System at all.

Serial Processing

- In it, the program were strictly executed in a serial manner one after the other and the program sources code written in program assembly language of high level language on a pack of punch cards could be entered into the computers by using punch card reader.

Batch Processing

- With the invention of hardware drives, the jobs are loaded through a card reader which are stored on a disk, thus creating a pool of jobs on the disk. The OS commands written in a control language used to be embedded in the job stream together with the user program and data.

Multi Programming

- In it, more than one program used to be activated concurrently. One of the active program, being in 'run mode' utilizing the CPU and other utilizing I/O devices at the same time or being in the wait stage.

Interacting Time Sharing

- In it, the user programs can be entered and executed in an interactive mode. Each interactive user is assigned a time slice of a CPU time.
- During the assigned time slice, if the processor does not complete the computation, the running is preempted.

Functions of Operating System

- ❖ Process Management
- ❖ Main Memory Management
- ❖ Input-Output Device Management
- ❖ File Management
- ❖ Secondary Storage Management
- ❖ Network Management
- ❖ System Protection
- ❖ Command Interpretation

PROCESS MANAGEMENT

As a process manager, the OS handles the creation and deletion of processes, suspension and resumption of processes and scheduling and synchronization of processes.

MAIN MEMORY MANAGEMENT

As a memory manager, the OS handles allocation and reallocation of memory space as required by various programs. In a multi-programming environment, multi programs are maintained in memory simultaneously.

Input-Output Device Management

The OS provides I/O subsystem between process and device driver. It handles the device cache, buffers and interrupts. OS also detects device failure and notifies the same to the user.

File Management

The OS is responsible for creation and deletion of files and directories. It also take care of other file related activities each such as organizing, storing, retrieving, naming and protecting the files.

Secondary Storage Management

It is utilized or stored in both program and data stored in computer. The system utility program like compilers, editors, linkers, debuggers are kept stored on it and these are loaded into RAM as and when required because it is used frequently.

Network Management

The access to shared resources permits increased speed, increased functionality and enhanced reliability. As a network manager, OS supports various networking protocols such as TCP/IP, VDP/IP, FTP, HTTP and NFS.

System Protection

It refers to the mechanism of controlling the access through the computer resources by various users and processes. If a computer system has multiple users, the OS ensures the contending, process can get access to shared resources only through OS that too within well-defined parameters.

Command Interpretation

It is the interface between user and OS. When a user logs onto a time-shared system, the command and interpreter is executed automatically. It reads and interprets the control statements.

Components of Operating System

- Program Execution
- Input/Output Operation
- File Manipulation
- Inter-Process Communication
- Error Detection and Recovery
- Resource Allocation
- Accounting
- System Protection

Disk Operating System (DOS)

An example of Operating System

DOS (Disk Operating System)

- DOS is a non-graphical command line operating system. It is also known as Command User Interface
- It provides interface between user, hardware and other software.
- It was developed by IBM and the Version was PC-DOS
- Later on it was taken over by Microsoft and now the version are MS-DOS.

Features of MS-DOS

- Entering Commands
- Using Batch Files
- Protecting and Recovering Users Data
- Managing Memory Efficiently
- Speeding up Users System
- Managing Users Hardware
- Looking at
 - Disk Management
 - Data Management

DOS Commands

DIR:

- Syntax-C:\>DIR
- Displays a list of files and subdirectories in a directory.
- DIR[drive:][path][filename][/A[:] attributes]] [/B][/C][/D][/L][/N] [/O[:]sortorder]][/P][/Q] [/R] [/S][/T[:]timefield]][/W][/X][/4]

MKDIR/MD:

- Syntax-C:\>MKDIR Director_name
- Creates a directory.
- MKDIR[drive:]path
- MD[drive:]path

DOS Commands (Contd...)

COPY:

- Syntax-C:\>COPY Source
Destination
- Copies one or more files to another location.
- COPY[/D][/V][/N][/Y:/-Y][/Z][/L][/A:/B]
[+source[/A:/B][+.....][destination[/A:/B]

PROMPT:

- Syntax-C:\>PROMPT \$P\$G
- Changes the cmd.exe command prompt.
- PROMPT[text]

DOS Commands (Contd...)

CLS:

- Syntax-C:\>CLS
- Clears the screen.

FORMAT:

- Syntax-C:\>FORMAT drivename:
- Formats a disk for use with windows.

DOS Commands (Contd...)

DOSKEY:

- Syntax-C:\>DOSKEY
- Edits commands lines, recalls windows commands and create macros.

TREE:

- Syntax-C:\>TREE
- Graphically displays the folder structure of a drive or path.
- TREE[drive:][path][/F][/A]

DOS Commands (Contd...)

XCOPY:

- Syntax-C:\>XCOPY
- Copies files and directories.

ATTRIB:

- Syntax-C:\>ATTRIB
- Displays or changes file attributes.
- ATTRIB[+R:-R][+A:-A][+S:-S][+H:-H] [+I:-I][drive:][path][filename] [/S[/D]][/L]

DOS Commands (Contd...)

VER:

- Syntax-C:\>VER
- Displays the windows version.

LABEL:

- Syntax-C:\>LABEL
- Creates, changes or deletes the volume label of a disk.
- LABEL[drive:][label]
- LABEL[/MP][volume][label]

DOS Commands (Contd...)

DEL:

- Syntax-C:\>DEL a.*
- Deletes one or more files.
- DEL[/P][/F][/S][/Q][/A[:]attributes]

RENAME:

- Syntax-C:\>RENAME
- Rename a file or files.
- RENAME[drive:][path]filename1filename2

DOS Commands (Contd...)

TYPE:

- Syntax-C:\>TYPE
- Displays the contents of a text file or files.
- TYPE[drive;][path]filename

DATE:

- Syntax-C:\>DATE
- Displays or sets the date.
- DATE[/T:date]

DOS Commands (Contd...)

TIME:

- Syntax-C:\>TIME
- Displays or sets the system time.
- TIME[/T:time]

CHKDSK:

- Syntax-C:\>CHKDSK
- Checks a disk and displays a status reports.
- CHKDSK[volume[[path]filename]][/F]/V]/R]/X] [/I]/C]/I[:size]]/B]

DOS Commands (Contd...)

PATH:

- Syntax-C:\>PATH
- Displays or sets a search path for executable files.

DISKCOPY:

- Syntax-C:\>DISKCOPY
- Copies the contents of one floppy disk to another.
- DISKCOPY[drive1:[drive2:]][/V]

DOS Commands (Contd...)

CHDIR/CD:

- Syntax-C: />CD Directory_name
- Displays the name of changes the current directory.
- CD[/D][drive:][path]
- CD[..]

RMDIR/RD:

- Syntax-C:\>RD Directory_name
- Removes <delete> a directory.
- RD[/S][/Q][drive:]path

DOS Commands (Contd...)

EDIT:

- Syntax-C:\>EDIT
- MS-DOS Editor
Version 2.0.026
- EDIT[/B][/H][/R][/S][/<nnn>][/?]
[file<s>]

VOL:

- Syntax-C:\>VOL
- Displays the disk volume label and serial number, if they exist.

DOS Commands (Contd...)

MOVE:

- Syntax-C:\>MOVE
- Moves files and renames files and directories.
- To move one or more file-
- MOVE[/Y:/Y][drive:][path]filename 1[,...]destination
- To rename a directory-
- MOVE[/Y:/- Y][drive:][path]dirname1dirname2

ECHO:

- Syntax-C:\>ECHO
- Displays messages or turns command-echoing on or off.
- ECHO[ON:OFF]
- ECHO[message]

DOS Commands (Contd...)

PAUSE:

- Syntax-C:\>PAUSE
- Suspends processing of a batch program and displays the message. Press any key to continue.....

REM:

- Syntax-C:\>REM
- Records comments <remarks> in a batch file or CONFIG.SYS.
- REM[comment]