Operating
Systum -

Operating
System

Operating system :-

Operating system Concept :-

→ An operating system (OS) is software that manage and handle the hardware and software resource of a computer system.

It intraction between user of computer and computer hardware. An operating system is responsible for managing and controlling all activities and sharing of computer resource. An operating system is a low-level software that include all basic

→ The purpose of an operating system is a provide an enviorment in which a user can execute program conveintly and efficiently.

→ An operating system is concerned with the allocation of Resource and service such as memory, processor, device and information.

Characteristic of operating system :-

• Device managment :- The operating system keep track of all device. so, it al

Operating Systum -

1.1 Concept of

→ An operating systum (OS) is systum software that manage computer hardware and software resource and provide common service for computer program.

→ It acts as an intermidiary between user and the computer hardware making it eaiser to execute program and manage resource

Operating systum?

→ A program that acts as an intermidiary between a user of a computer and computer hardware.

→ A operating systum is a collection of systum program that together control the operations of computer systum.

Example of OS: UNIX, Mach, MS-DOS
MS-Window, Chicago
Macos, VMS, VM

Goals of OS?

- Execute user program and make solving user problum eaiser.
- Make the computer systum convenient to use
- Use the computer hardware in an efficient manner.

Component of OS ? → 1. Kernel, 2. Shell

Kernel - The core compoment of os, Resbonsible for managaging systum resowice

- The one program running at all time
- kernel is an active part of an os, It's the part of os running at all time It program which can intract with the hardware

Ex:- Device drivers, dll files, systum files

Shell - is called as a command interpretor It is a set of program used to interact with the application program.

- It is responsible for execution of instructions given to OS (called Command)

Systum software

Device drivers :- specialized software that allow the operation systum to communicate with hardware component like printer, graphic cards

Utilities :- Systum utilities are tool that perform maintain task or provide additional functionality

Ex:- disk cleanup, antivirous program

Firmware :- Low-level software that is embedded into hardware component. It provide control monitoring, data manupulation.

1.2 ## Function of OS:

Program managment :-

Process managment :- A process is a program in execution. A process needs certain resource, including CPU Time memory file, and I/O devices, to accomplish task.

- Process creation and deletion
- Process suspension and resumption
- Provision of Mechnisms for:
  - process synchronization
  - process communication

Memory managment :-

→ Memory is large array of words or bytes, each with it's own address It is a respository of quickly accesible data shared by CPU and I/O devices.

- Keep track of which part of memory are currently being used and by whom
- Decide which process to load when memory space become avaliable

File managment :-

→ A file is a collection of related relation information defined by it's creator. Commonly. file represent program and data.

The operating system is responsible for the following activities in connection with file management

- File creation and deletion
- Directory creation and deletion
- Support of primitive for manupulation file and directories.
- Mapping files onto secondry storage.

Device management :-

→ Facilitates communication b/w the OS and hardware device through drivers.

- Device allocation and deallocation.

→ Manage the allocation of device to process ensuring that resource are use efficiently and released when no longer need.

Security and protection :-

user Authentication - Verifies the identity of user trying to acess the system ensuring that only authorised users can acess system resource.

→ Protection refer to a mechnism for controlling acess by program, process or user to both system and user resource.

- distinguish b/w authorized and unauthorized useges.

1.3 View of OS:

User view:- From the user's point, the OS is designed for one to monopolize its resource to maximize the work that user is performing and for ease to use

System view:- Form the computer point of view, an operating system is a control program that manage the execution to use program to prevet errors and improper use of the computer. It is concerned with the operations and control of I/O devices.

1.4 Types of operating system: their characteristics / Evolution of OS:-

Batch operating system:-
→ This type of OS accept ~~more than~~ one job and these job are batched/grouped together according to their similar requirment. This is done by computer operator. Whenever the computer become available the batched job are sent for execution are gradually the output is sent back to the user.
→ It allowed only one program at a time
→ This OS is responsible for scheduling the jobs according to priority and their resource required.

spooling
→ speed miss match.

Multiprogramming operating system:-

⇝ This type of OS is execute more than one job simultaneously by a single processor It increase CPU utilization by orgizanation jobs so that the CPU always has one job to execute.

→ All the jobs that entery the system are stored in the job pool (in disc). The OS loads a set of job from job pool into main memory and being to execute.

→ During execution, the job may have to wait for some task. such as an I/O OS In a multiprogramming system, the operating system simply switches to another job and execute.

→ When the first job finish waiting and it get CPU back

Time shared OS / Multitasking OS

⇝ Time sharing (or multitasking) OS is a logical extension of multiprogramming It provide extra facilities

→ Fastery switching b/w multiple job to make processing fastery.

→ Allow multiple usery to share computery system simultanesouly.

→ The usery can interact with each job while it is running.

Multiprocessor operating system.

↝ Multiprocessor OS are know as parallel OS or tightly coupled OS. such operating system have more than one processor in close communication that sharing the computer bus, the clock and sometime memory and peripheral devices it execute multiple job at same time and make the processing faster.

— multiprocessor system have three main adv.

- Increased throughput :- By increasing the number of processor, the system perform more work in less time. The speed-up ratio with N processor is less than N
- Economy of scale :- Multiprocessor system can save more money that multiple single processor system, because they can share peripheral, mass storage, power supplies.
- Increased reliability :- If one processor fails to done it's task, than each of the remaining processors

Classified by - (ii)

(i) Symmetric multiprocessing.
(ii) Asymmetric multiprocessing.

Distributed operating system:-

→ In distributed system the different machine are connected in a Network each machine has it own processor and own local memory.

→ In the system, the operating system on all machines work together to manage to collective Network resource.

→ It classified in two categories.

1. Client-server mode
2. Peer-to-Peer system

Advantages:-

- Resource sharing
- Computation speed up - load sharing
- Reliability
- Communicatores
- Require Network infrastructure
- Lan/Wan

Real-Time operating system:-

→ It is devlop for real time application where data should be processed in a fixed, small duration of time. It is used in an enviorment where multiple process are supposed to be accepted and processed in a short time. RTOS requires quick input and immediate responce eg. petroleum refinery

Mobile os

Mobile os refers to the software that manage the hardware and software resource of Mobile device like smartphone, tablet, and wearable device. Mobile os provide a platform for running application, managning device setting and interfacing with network service.

Operating system service

(os) service Reffer to the basic task os handle to manage the hardware and software resource. Even simple device like calculator, digital watch embedded system need more form of control for smooth functioning.

1. Process managment :- Control which task or operating the device is running at any given time.

2. Memory managment :- Allocation and manage memory to diffrent task, enswring the device doesn't run out of space.

3. Input/output managment :- Manage interaction with external input (like buttom) and output (like displayes or sound)

4. File systum managment.
on device that store data, that os organise and keep track of files (if presented)

5. Security Managment.
Provide basic operation, such as preventing unauthorized access or controlling simple permission.

SYSTEM CALL

Are the Mechanism that allow user-level application to request service from the os kernal.

Concept of system call

- Bridge between user mode and kernal mode.
→ Application run in user mode, which has limitless acess to systum resource. The os Run in kernal mode, which as full access.

- Controlled acess
→ system call allow application to perform hardware-related task without directly interaction with the hardware, enswring that only safe and controlled operations are performed.

Types of System call

1. Process control system call
→ These handle the creation execution, and Termination of process.

>fork(): Create a new process
>exec(): Replace the current process image with new one
>exit(): Terminate a process

2. File managment system call:
→ These manage files and directories, opening closing reading, writing, and deletion files.

>open(): Open the file
>read(): Read data from file
>write(): Write data to a file
>close(): Close a file

3. Device managment system call.
→ These are used to request or released device read/write data to device, or handeled device operations.

>ioctl(): Controls a device
>read(): Reads data from a device
>write(): Write data to a device

4. Information maintance system calls.
→ These provide system information or manage the operating system it'self.

>getpid() Return the process ID of the current process
>alarm() sets a timer for the process
>gettimeofday(): Retrieve the system call.

5. Communication system calls:

→ These handle inter-process communication (IPC) allowing process to communicate with each other.

> pipe(): Create communication skill

> Shmget(): Allocate shared memory

> send(), rec(): send and recive msg.