# SOS

## lec 1 - Intro to OS. (Part 1)

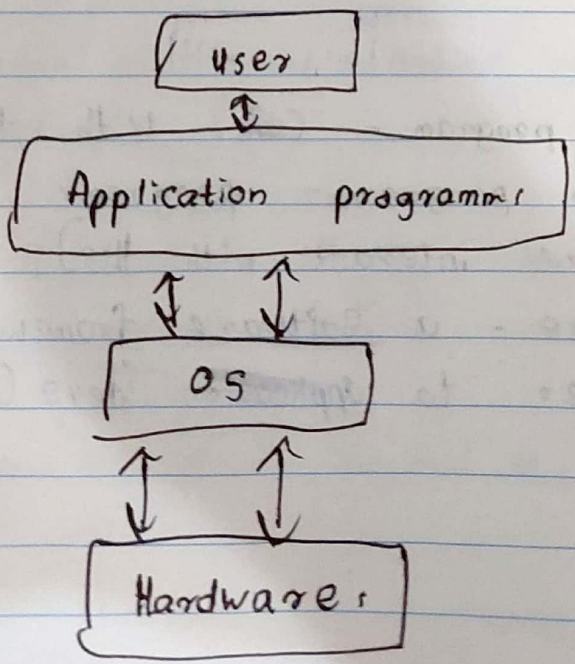
- A program that act between user and Computer hardware is called OS.

goals of OS.

- execute user programms.
- Make system easy to use.
- Provide an interface (graphical)
- use computer's hardwares in efficient way.

Computer System Structure
- main 4 parts.

- Hardware - cpu, memory, Ilo devices
- Operating System.
- Application program. - browser, apps, games.
- Users - those who using the computer.



What os Do,

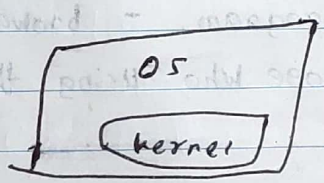
User view,

- easy to interact with System
- good performance
- if System connected to network should manage individual usage and sharing of resources.
- if device is a remote like mobile battery capacity and speed should be enough to long last.

System's view,

- Allocate resources respectively to the processes.
- Control programs.
- Make sure I/o devices work in proper manner.
- handle all application programs.

- The program always running in the Computer is kernel. (part of os)




- System program - Coms with the os (not kernel)
- Application program - programs not associated with os (users interact with this).
- middleware - a Software framework that provide additional services to application devs ( DB, graphics, etc)

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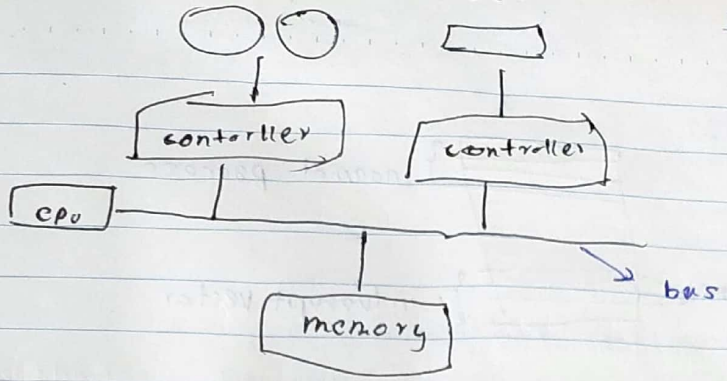
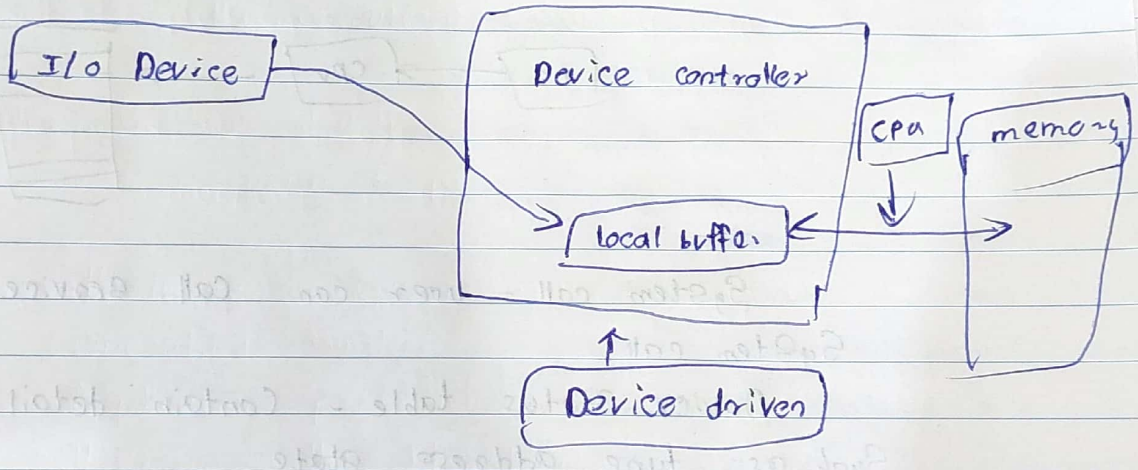



- all I/o devices has a separate device controller
- Connected to cpu using a bus.
- Memory is shared.

Computer system operation.

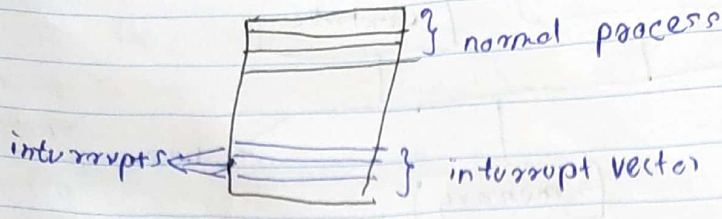



(Read lectur slide 1.16 for details)

- interrupt vector - a table containing starting location of all interrupts.

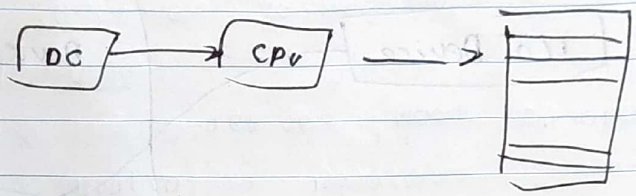
OS notes state of cpu by storing registers and the program counter before executing the next proces.

- Program counter - Stored the address of next proces




I/O handling (2 methods)

- Control returns to user program only if I/O completed.
- Control return to user program without Whaiting for I/O Completion.

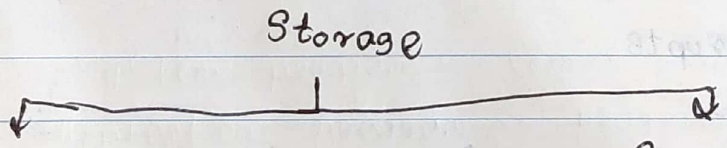



System call - user can call Serviceses using System call.

Device status table - Contain details of I/O device Such as type, address, state.

(Read lecture Slide 1.22 for more)

1.23.




main memory (volatile)

- Random access
- RAM
- DRAM
- CPU can directy access

Secondary Storage. (non-volatile)

- HDD
- USB
- CPU can't access directly

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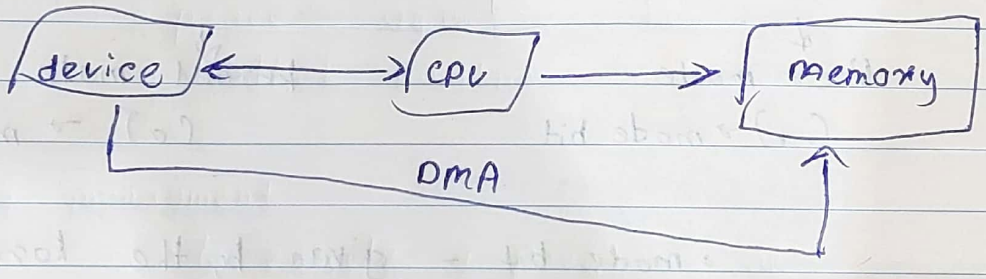
HDD - hard disk drive.


Storage Hierarchy

Categorized using
Speed
Cost,
Volatility,
(Refer lecture slide 1.28 / P.29)

Modern computer




- has a DMA (Direct memory access)
- Can access memory without using cpu.
- DC send data as blocks to memory direct
- Also refered as Von Neuman architecture.

NO.

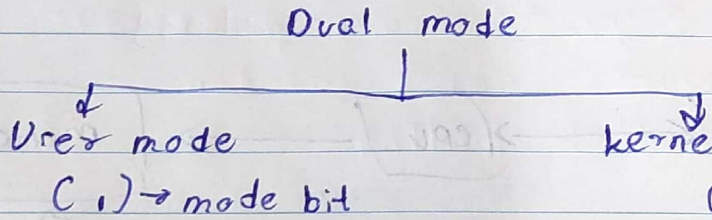
## Multiprogramming (Batch)

- Always keep list of programs to be executed in the memory, cpu always has a process.
- Jobs selected by job Scheduling

## Multitasking. (Timesharing)

- Cpu switches between processes frequently
- Several programs ready to run at the same time (cpu Scheduling),
- if Process doesn't have enough Space in memo - ry Swap to virtual memory.

## Dual mode operation.




- mode bit - given by the hardware.

Timer - used to prevent from infinite loop . each process given a time to be executed.

(lecture slide , 38 for more)

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## Process managment

- Process is a program in executions
  - program → passive entity.
  - Process → active entity

process need - cpu, memory, I/O, files, data

Process

Single threaded
- one pc
- one program at a time

Multi - threaded
- one pc per thread
- multiple programs at a time.

Process managment activities
- Create / delete processes.
- Suspend / resume processes.
- process synchronization.
- deadlock handling.

## Memory managment.

- to execute a program all intructions must be loaded to memory.

Memory managment activities.
- Keep track of which part of memory being used.
- Allocating / deallocating memory space
- Decicding which data and processes should be in the memory

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File - system managment.

- files organized into directories

Activities,

- Create / delete files.
- manipulate files and directories
- mapping files into secondary storage
- Backup files.

Mass - Storage Managment

- used to store data for kept 'long'.

Activities:

Mounting / unmounting
storage allocation
partitioning
protection.