Monday, October 18, 2021 11:13 AM

Operating Systems ---- OS

Define OS

Program = set of instructions
Software = set of programs

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System Software = linux windows, loader, OSes , Compiler, Interpreter , Kernel , linker, BIOS, Device Drivers
System software helps the application software to use the system
Application Software = facebook , whatsapp , telegram, browser, games, ppt, insta, media player, MS office
Add.c , calculator.c }}} The software that solves some problem of the USER = application software!!!

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OS is a System Software
That acts as an interface between

a. END User(people) and System }}}} CLI or GUI
b. Program User (Application Software) and System }}} API calls - System Calls

That acts as a Resource Manager

a. Process Management
b. Memory Management
c. IO management
d. Security (Authorization , Authentication)

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System ---

IO Devices = [Keyboard , mouse, monitor]
SSD HDD = IO Device = Hard Disk
MotherBoard that has Microprocessor Mounted on It
RAM
ROM
GRAPHICS CARD, Network CARD , SOUND CARD
POWER SUPPLY
Cache memory

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Add.c

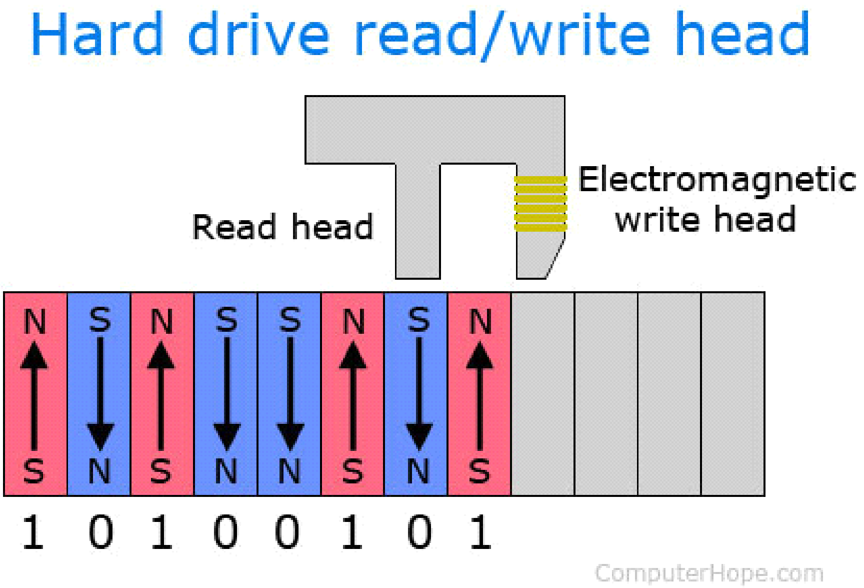
          Printf  enter two numbers
          Scanf  %d %d  , &x,&y
          Sum = x+y
          Printf  the sum is %d , x
```

add.c ============> folder on hard disk (HLL)
add.c ========COMPILER =====> add.exe (LLL) =====> folder on the Hard disk

Hard Disk

Disc made up of circular plates = Aluminium
Coated with magnetic material =   Fe

Data is saved on the magnetic material !!!   Data is saved in terms of 0 and 1 = Binary Digits = Bits



A   = ASCII VALUE = 65 = 01000001

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SSD = SOLID STATE DRIVE
FLASH STORAGE

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HARD DISK -------

ACCESS TIME --- READ or WRITE time is **slow**
STORAGE CAPACITY ---- 1 TB to 10 TB
NON VOLATILE STORAGE

HARD DISK ==== **LOADER** ======> RAM

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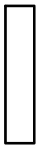
RAM is made up of WHAT ?   Semiconductor materials --- resistors, capacitors



CAPACITORS -------------
Full CHARGED   = 1
Partial CHARGE = 0

RAM can hold the data only while POWER is ON }}}}} VOLATILE MEMORY
ACCESS time of RAM is faster than Hard disk
Storage space ---- 1GB to 32 GB

RAM holds a program in the process space

Code	Data	Stack	Heap
LLL code	Global , Static Variable	Local variables	Dynamic variables

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HDD and RAM are Storage SPACES !!!

WHO EXECUTES the CODE ?

MICROPROCESSOR = CPU

ALU = Arithmetic and Logic Unit = Logical Gates

These Gates can execute Arithmetic and Logical Instructions
And relational instructions }}}} **CPU Instructions**

Arithmetic Instructions	+ - * / %
Logical Instructions	And or not nor exor exnor nand
Relational instructions	=, ==, < ,> ,<=, >= , !=

Registers = STORAGE , FASTER than RAM
SMALL = 32 bit or 64 bit , 128 bit

At a time a register can hold only ONE Instruction!

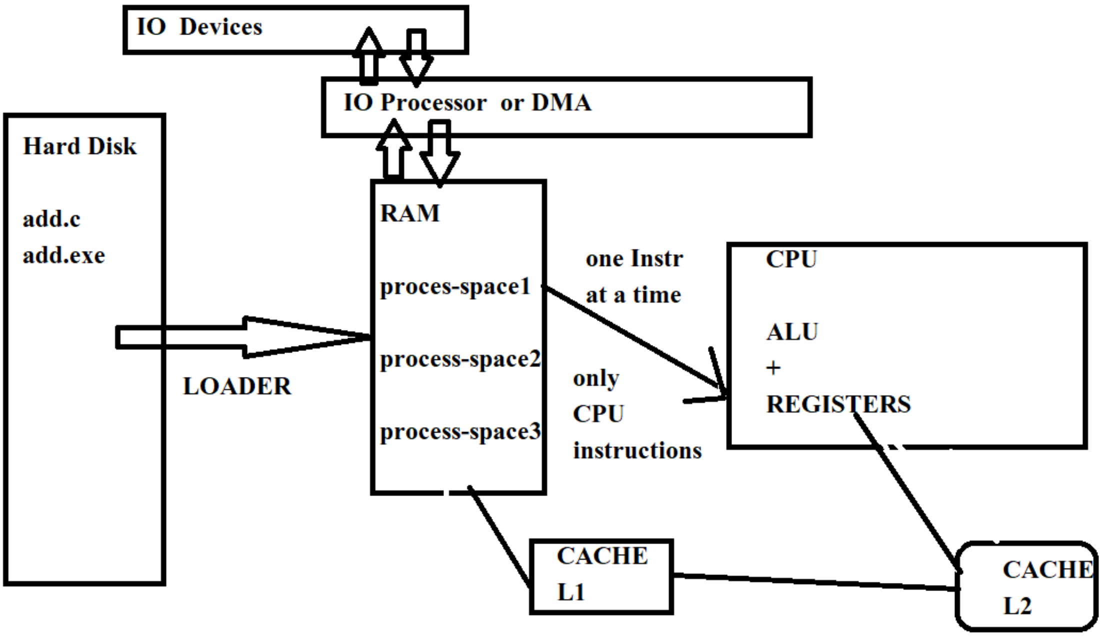
Types of Registers

IR	Instruction Register	Current instruction
PC	Program Counter	Address of the next instruction in the code segment in RAM
DR0, DR1	Data Registers 0 and 1	OPERANDS of the instruction
ADRO,ADR1	Address of Data	Address of the Data operands in the data, stack, heap in RAM
Accumulator		Store the Result of Operation

My Code is made up of TWO types of Instructions

1	CPU Instructions	ALU executed them
2	IO instructions	IO Co Processor / DMA controller = **D**irect **M**emory **A**ccess

DMA = sends the data between IO devices and the RAM !!! Without using CPU (that's why DIRECT !!!)



CACHE HIT !!! Instruction is FOUND in the CACHE

CACHE MISS !!! Instruction is NOT FOUND in CACHE --- SLOW

Load required instruction in the cache from RAM

LAB!! ---- Linux commands , shell scripts and C programs !!