

FEBRUARY 2022

WEEK	S	M	T	W	T	F	S
6		1	2	3	4	5	
7	6	7	8	9	10	11	12
8	13	14	15	16	17	18	19
9	20	21	22	23	24	25	26
10	27	28					

JANUARY

Thursday

2022

06

## COSS 2022

2nd Week • 006-359

08

09

10

11

12

01

02

03

04

05

06

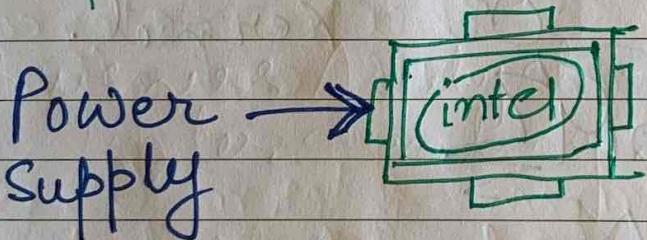
Notes:

Before we dive in lets consider a scenario first.

Suppose we have a desktop / laptop system at our place and we switch on the power key.

What are the things that are running behind the scene??

When the power button goes 'ON', it switches on the microprocessor or what we commonly call the CPU (intel i5, AMD athlon or whichever option we are using).



Now, once the processor is running, some internal connection / bus activates the bootstrap loader on the firmware

(firmware could be a BIOS or UEFI, details not reqd.)

BIOS → Basic Input Output System  
UEFI → Unified Extensible Firmware Interface

07

Friday

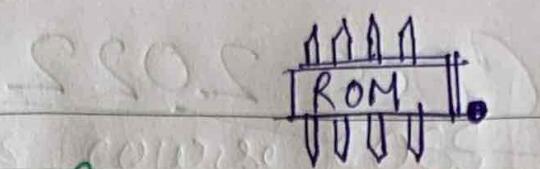
2022

2nd Week • 007-358

JANUARY

JANUARY 2022

WEEK	S	M	T	W	T	F	S
1	1	30	31				1
2	2	2	3	4	5	6	7
3	3	9	10	11	12	13	14
4	4	16	17	18	19	20	21
5	5	23	24	25	26	27	28
							29

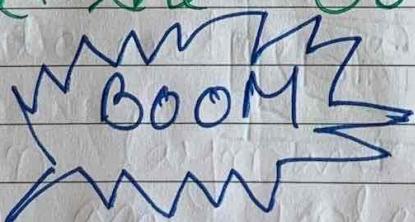


08 The firmware is usually stored  
09 in a system Read Only memory  
chip (ROM).

10 The firmware and other system  
11 background processes (daemons) are  
stored inside the ~~RAM~~ ROM.

12 These system processes and firmware  
01 are responsible for loading the  
core part of our system OS  
(Windows or Unix or Linux etc.) into  
02 the RAM.

03 The core part of OS that gets loaded  
is called the OS Kernel.



06 Now we are good to go, once the  
OS kernel is loaded in the RAM.  
We see the windows welcome  
screen or maybe something  
similar for other OS like linux  
or unix.

Notes:

WEEK	S	M	T	W	T	F	S
FEBRUARY 2022							
6		1	2	3	4	5	
7	6	7	8	9	10	11	12
8	13	14	15	16	17	18	19
9	20	21	22	23	24	25	26
10	27	28					

JANUARY

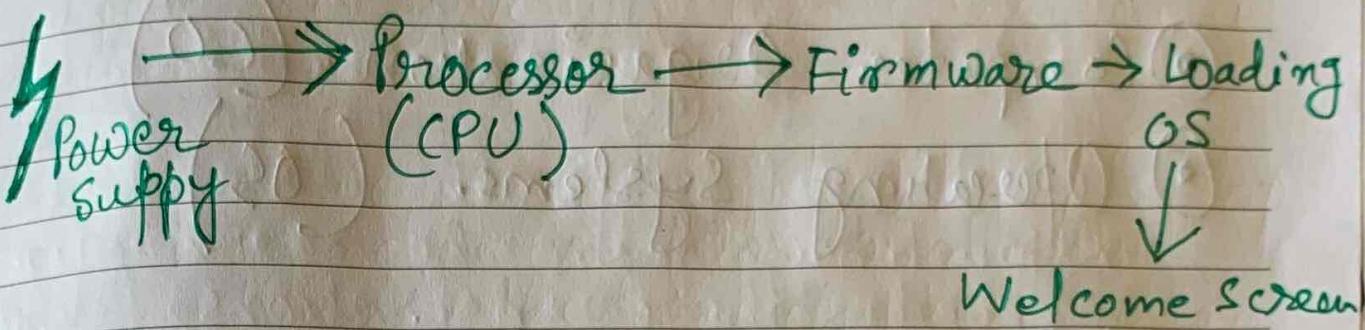
Saturday

2022

08

2nd Week • 008-357

## Sequences of Steps so far.



Note:- The entire OS is stored in the hard disk, just like any other application software, games, or any other user software.

If is the responsibility of the system daemons and firmware to get the OS loaded into the RAM, thereafter the OS take complete control and manages all the resources.

This is just the introductory part and the basic intuition behind the course COSS.

Let dive deeper to get some more concrete idea on these aspects.

Sunday 09

10

Monday

2022

3rd Week • 010-355

JANUARY

JANUARY 2022

WEEK	S	M	T	W	T	F	S
1	30	31					1
2	2	3	4	5	6	7	8
3	9	10	11	12	13	14	15
4	16	17	18	19	20	21	22
5	23	24	25	26	27	28	29

This course COSS can be decomposed into two parts

① Computer Organisation (CO)

② Operating Systems (OS)

CO :-

It mainly deals with the framework and structural aspects for building a full fledged working computer system.

The main focus is on the hardware components, and their interconnection and interaction with each other.

OS :- In layman's term OS is simply an interface between the end user and the hardware. It can also be looked upon as a resource manager managing all the hardware and software resources in a computer system.

WEEK	S	M	T	W	T	F	S
FEBRUARY 2022							
6		1	2	3	4	5	
7	6	7	8	9	10	11	12
8	13	14	15	16	17	18	19
9	20	21	22	23	24	25	26
10	27	28					

JANUARY

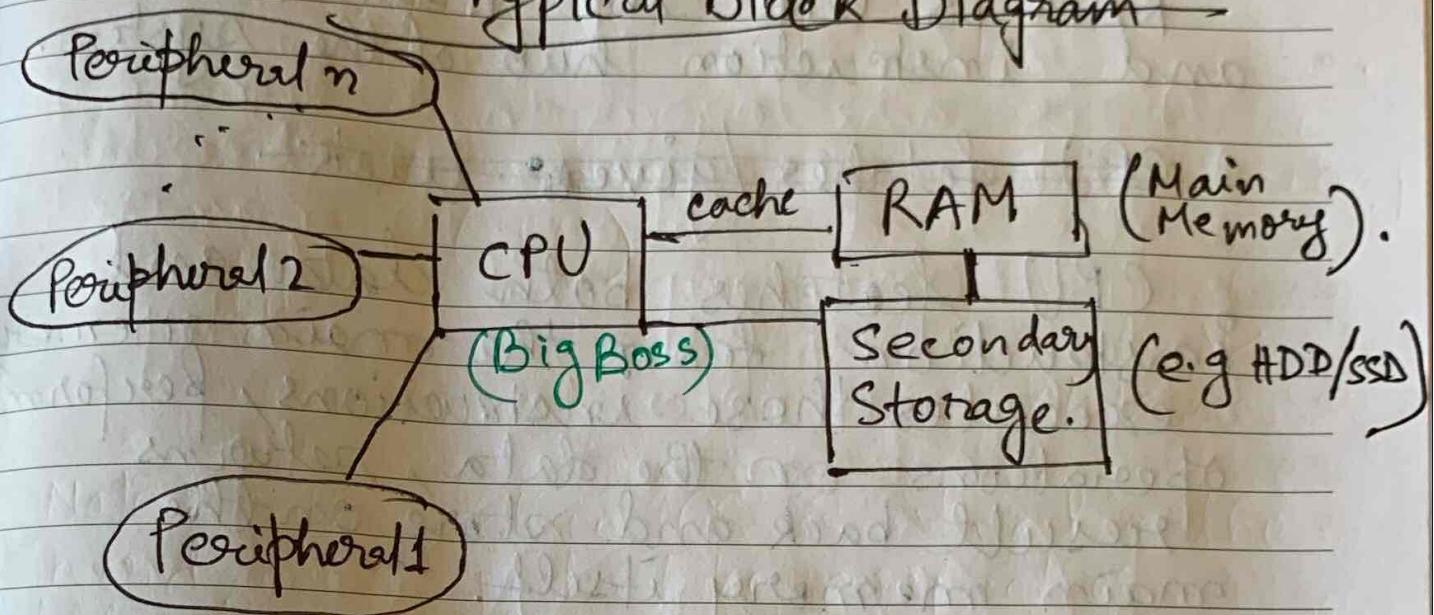
Tuesday

2022

11

3rd Week • 011-354

## Typical Block Diagram →



This is typical block diagram of a general purpose computer system.

CPU is like a big boss here which directly or indirectly take input communication in the form of signal (a sequence of 1's and 0's) and executes the task according, sends response back to the component that triggered the particular input signal.

Notes :

12  
Wednesday  
2022

3rd Week • 012-353

JANUARY

JANUARY 2022

WK	S	M	T	W	T	F
1	30	31				
2	2	3	4	5	6	7
3	9	10	11	12	13	14
4	16	17	18	19	20	21
5	23	24	25	26	27	28

RAM is like the main data and instruction hub of the system.

CPU fetches/gives back

CPU fetches both data and instruction from the main memory executes those instructions, performs operations on the data, returns result back and store on the main memory itself.

Secondary Storage is for storing data and information permanently in bulk volume.

Though CPU does not directly fetch anything from secondary storage and this memory is managed by OS through some techniques called VIRTUAL MEMORY MANAGEMENT.

Peripheral devices are any hardware instances connected for any particular purpose. It can be anything like keypad, display screen, printer, webcam etc.

Notes:

W	K	S	M	T	W	T	F	S
6		1	2	3	4	5		
7	6	7	8	9	10	11	12	
8	13	14	15	16	17	18	19	
9	20	21	22	23	24	25	26	
10	27	28						

JANUARY

Thursday

2022

13

3rd Week - 013-352

Each peripheral device have their own device controller, which acts as a local processor or like a local guardian for that particular device.

The device controller for a particular peripheral device sends and receives signals to or from and to the device.

The hardware peripheral functions and communicates with the CPU or DMA Controller (will be discussed later) based on the signals.

To summarize the topic, CO deals mainly with

- Main Memory and data exchange from main memory.
- Instruction and <sup>task specific</sup> commands for CPU.
- Interaction with Peripheral devices.

Notes:

14 Friday  
2022

3rd Week • 014-351

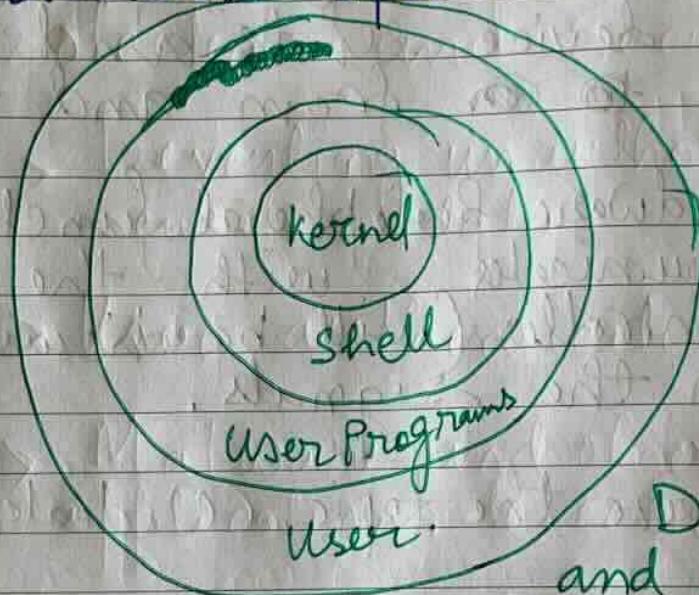
JANUARY

JANUARY 2022

WEEK	S	M	T	W	T	F
1	1	2	3	4	5	6
2	7	8	9	10	11	12
3	13	14	15	16	17	18
4	19	20	21	22	23	24
5	25	26	27	28	29	30

## OS

OS is analogous to a ~~central~~ govt. ~~minister~~ who himself set certain rules and protocols to manage the entire territory and under which several other ministry departments operates.



Bullseye Diagram of OS and its components.

The OS has two principal components the kernel and the shell.

- Kernel is the core logical part of the OS.

- Notes:
- Shell is the interface for users to interact with the kernel.

WKS	S	M	T	W	T	F	S
6		1	2	3	4	5	
7	6	7	8	9	10	11	12
8	13	14	15	16	17	18	19
9	20	21	22	23	24	25	26
10	27	28					

JANUARY

Saturday

2022

15

3rd Week • 015-350

## Responsibilities of OS.

- Process Management :-

→ Process Scheduling :- Managing multiple processes running on the system and the proportion of CPU time each process will get.

→ Process Synchronization :- Ensuring that all the running process, operates in mutually exclusive fashion, i.e. running of one does not disturb the other running processes.

- Memory Management :-

→ Memory Allocation techniques.

→ Virtual Memory Management.

- Disk Management :- Managing various disk related operations and troubleshooting,

→ disk scheduling tasks to determine the disk movement for various read operation.

Notes :

Sunday 16

17 Monday  
2022

4th Week • 017-348

JANUARY

JANUARY 2022

WEEK	S	M	T	W	T	F	S
1		30	31				1
2	2	3	4	5	6	7	8
3	9	10	11	12	13	14	15
4	16	17	18	19	20	21	22
5	23	24	25	26	27	28	29

08

## File System Management:-

- 09 → Managing the file formatting
- 10 → Managing data allocation into files

11

## Protection and Security.

12

- 01 → Preventing unauthorised access to sensitive data.
- 12 → User authentication.
- 3 → Malware and other harmful application detection.
- 1 → Firewall and network security.

Notes: