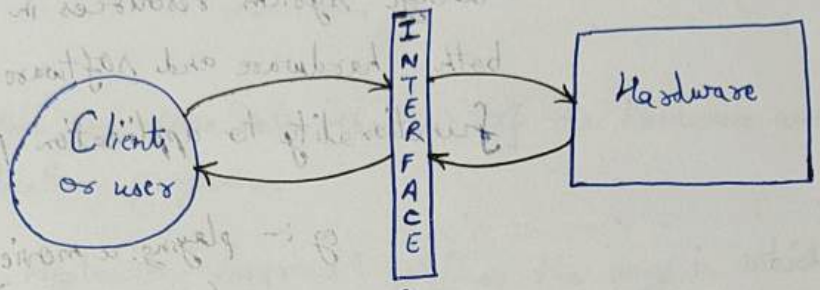
OS

What is operating system?



↑ Can be hardware or software

→ To interact with any hardware device we need an interface it may be hardware and software.

↓

eg:- regulator in a fan

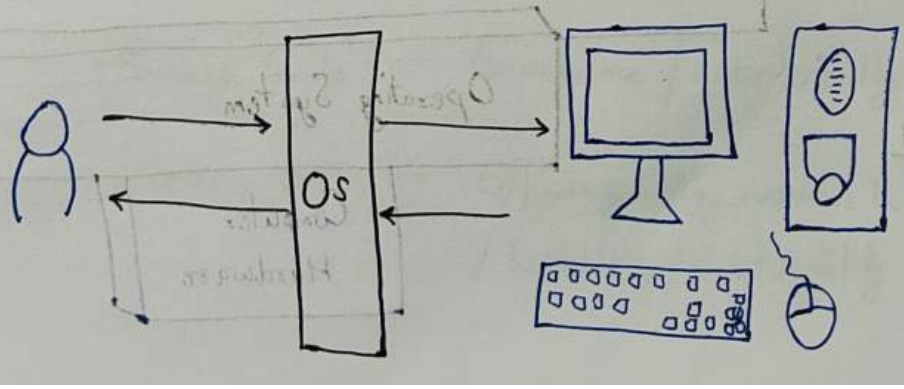
→ So to interact with complex hardware or hardware without any complexity so we need a good interface for it.

eg:- In a microwave all the functionality is given by buttons (interface)

↓

making it convenient to use

→ This interface is type of a operating system (OS)



→ There is no exact or precise definition for OS but we can say, "A program or System software"

→ Which acts as an intermediary between user & hardware.

→ Resource Manager/Allocation

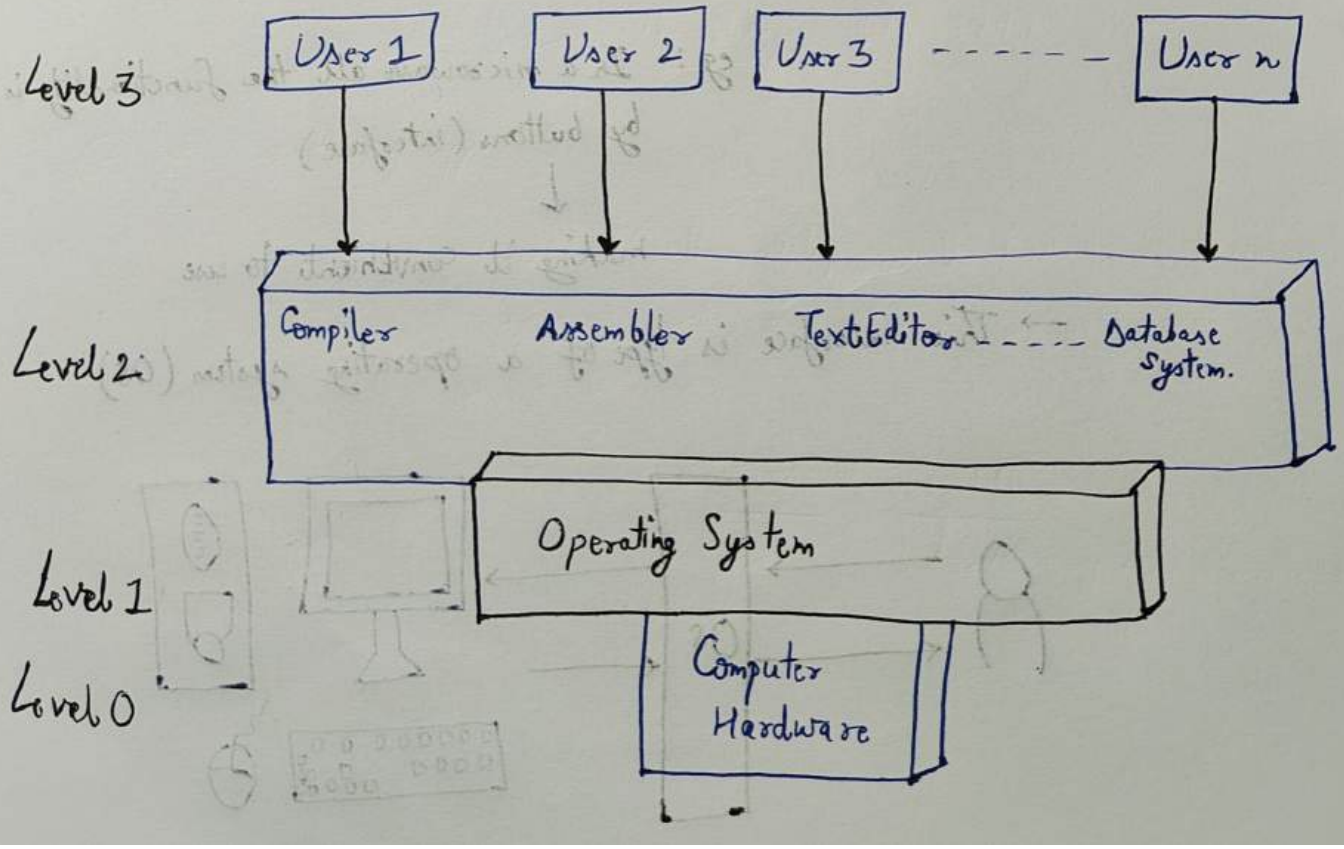
- Manage system resources in an unbiased fashion both hardware and software and provide functionality to application programs.

eg :- playing a movie

- handling output devices
- playing the movie continuously

- OS controls and coordinates the use of resources among various application programs.

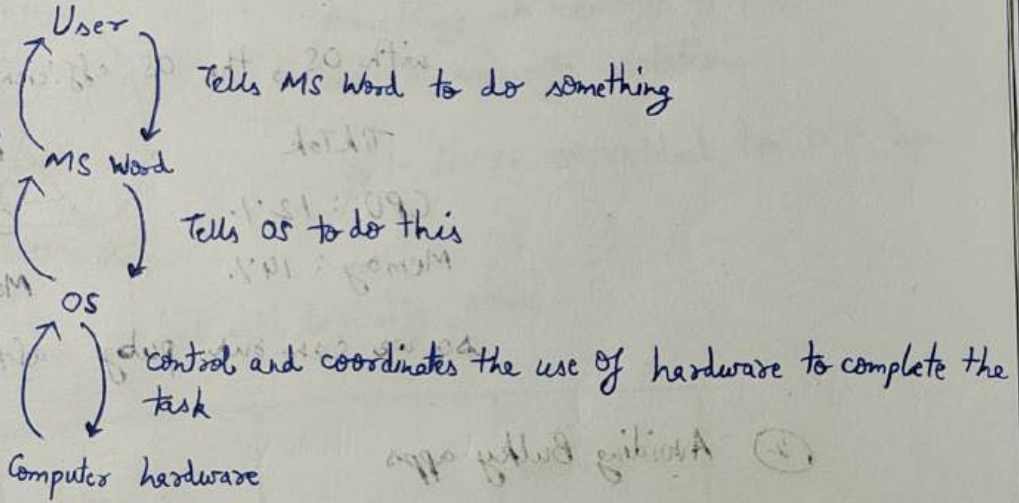
→ OS provides platform on which other application programs can be installed, provides the environment within which programs are executed.



We always want to design something that is convenient for user to use without any knowledge or technicality as if user needs to have knowledge then why would anyone use it.

- Computer hardware : CPU, memory units, etc. provides the basic computing resources.
- OS : Control and coordinates the use of the hardware among the various applications programs.
- System and Applications programs : Defines the way in which these resources are used to solve the computing problems of the user.
- User

eg :-



⇒ User cannot directly access resources

Goals & Functions of OS

- Primary Goals → Convenience / user friendly
- Secondary Goals → Efficiency (Using resources in efficient manner) / Reliability / Maintainability

eg:- DSLR ↑ gives more control & good photos

But not everyone can use it as they don't know shutter speed, frame rate, etc.

(there is some technicality)

Mobile phones ↑ weaker to DSLR but easy to use or convenient.

{ DRY ⇐ Don't Repeat Yourself principle }

Functions

① Resource Management

eg:- without if we run Tiktok it will hijack all the resources but then if we run Pubg we cannot run it as all the resources are hijacked by Tiktok

with OS, the OS efficiently manages resources

TikTok	Pubg
CPU : 12%	CPU : 50%
Memory : 14%	Memory : 60%

So we can run pubg after tiktok

② Avoiding Bulky apps

eg:- without OS the developer will have to write memory management and all code along with how the applications work.

Tiktok → 50MB + 700 MB

50MB → application code

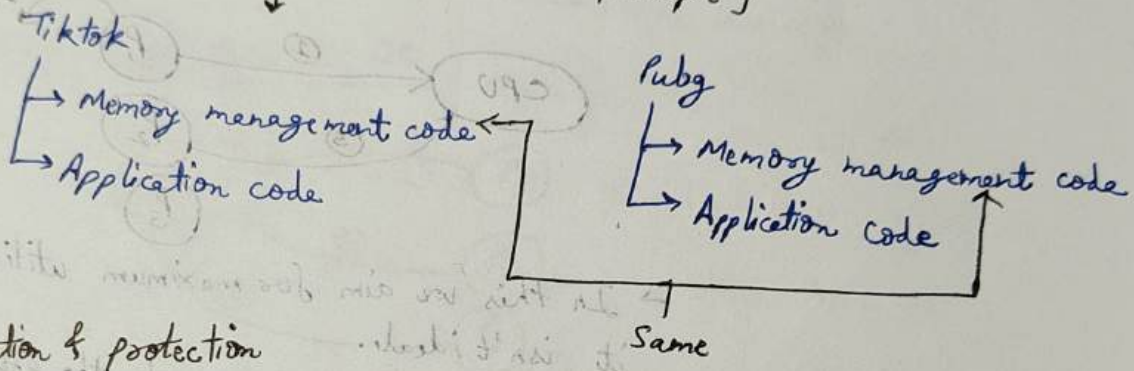
700 MB → Memory management and other codes.

with operating system the developer only needs to work about how will the application work and no need to know anything about how memory is managed, etc. as it is all handled by OS.

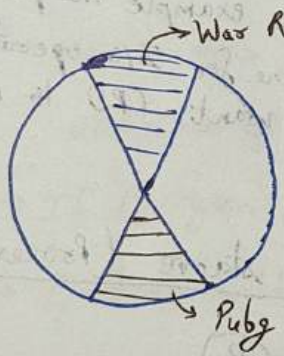
Tiktok → 50 MB

application code

{ without OS here also violates DRY principle }



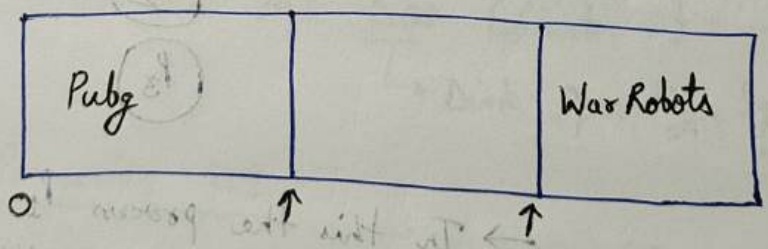
③ Isolation & protection



without OS war robots might write something in memory of pubg which can lead to security violations

eg :- 100% overrided to 0% hp.

with OS it will logically store



memory protection and isolation

Functions

- Access to the computer hardware.
- Interface between the user and the computer hardware.
- Resource management (Aka, Arbitration)
- Hides the underlying complexity of the hardware (Aka, Abstraction)
  ↳ eg :- Bulky apps

- Facilitates execution of application programs by providing isolation and protection.