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Dual Mode Operation and Process Management

Comprehensive Course on Operating System for GATE - 2024/25

Vishvadeep Gothi • Lesson 2 • Apr 15, 2023

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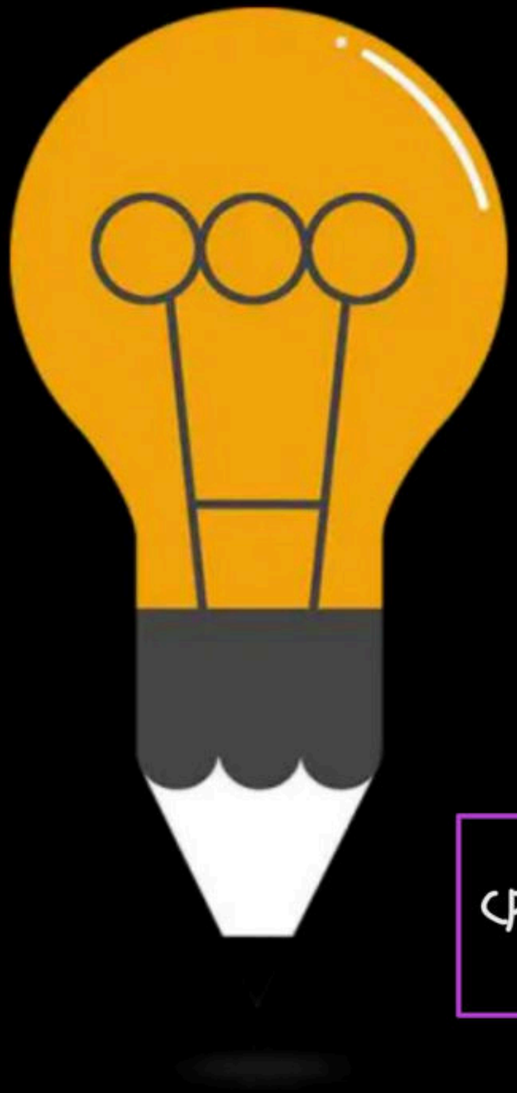
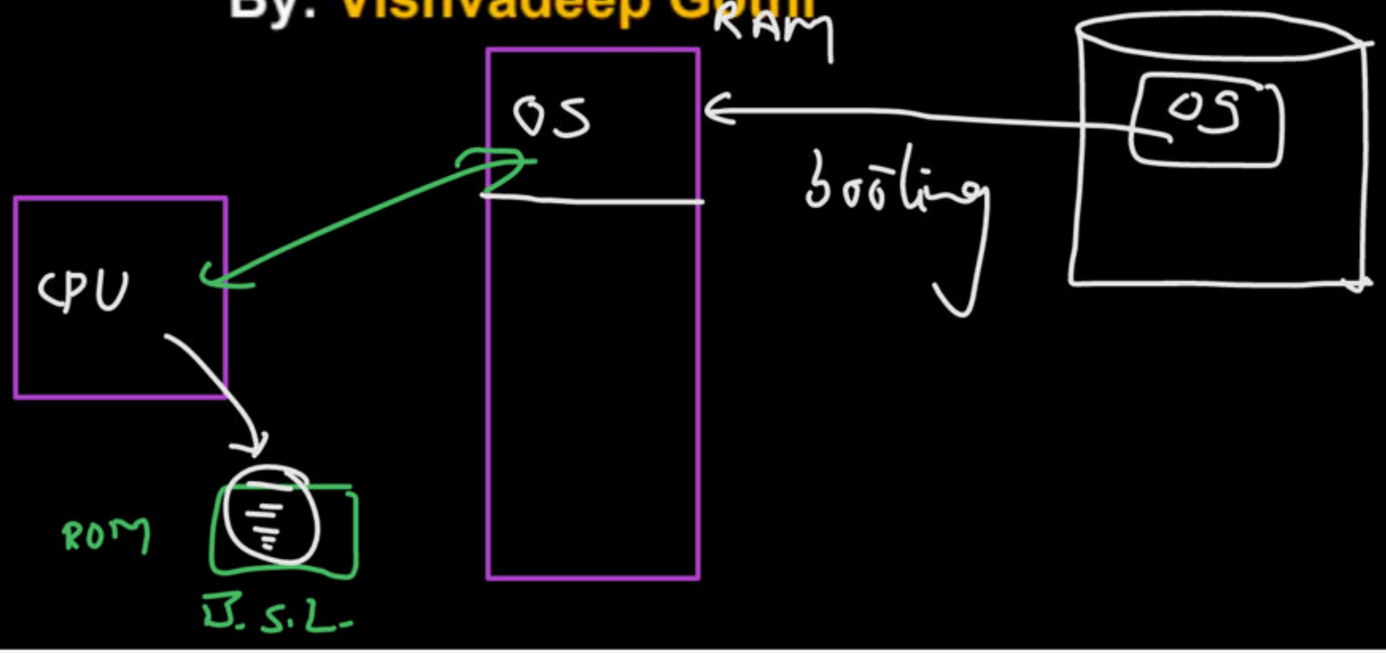


Operating System
Basics & Process

By: Vishvadeep Gothi



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Types of OS

1. Uniprogramming OS
2. Multiprogramming OS
3. Multitasking OS (Time Sharing)
4. Multiprocessing OS
5. Multiuser OS
6. Real Time OS
7. Embedded OS
8. Handheld Device OS

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System Call

A system call is a way for programs to interact with the operating system

Request to OS from user or process to perform any privileged operation.

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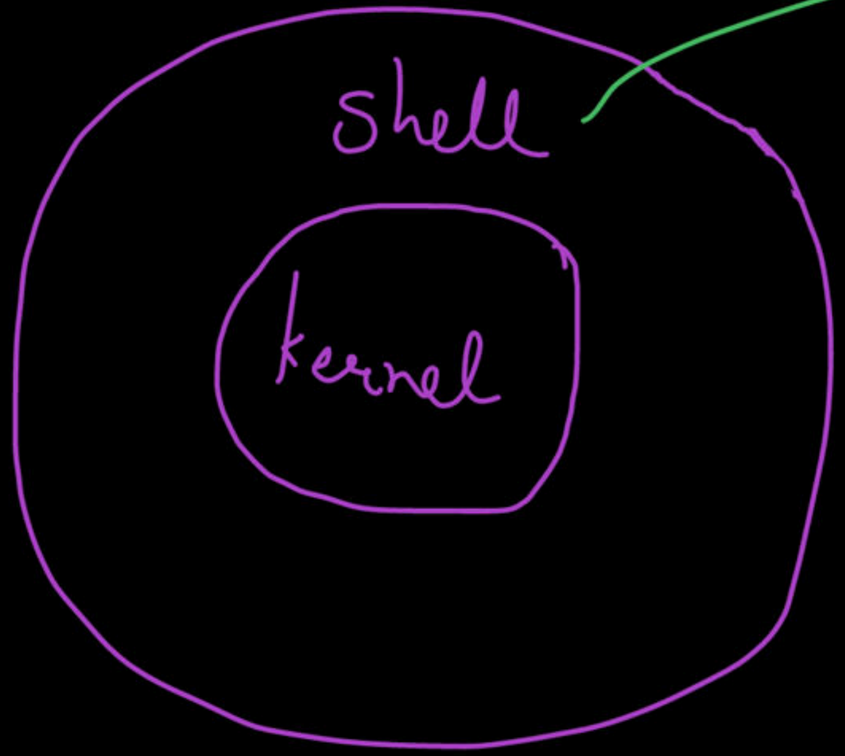
Parts of OS



→ Interface

→ Command line interface

→ Batch Interface

→ Graphical User Interface (GUI)

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Dual Mode of Operation

2 modes:

User Mode (mode bit = 1)

Kernel/System/Supervisor/Privileged Mode (mode bit = 0)

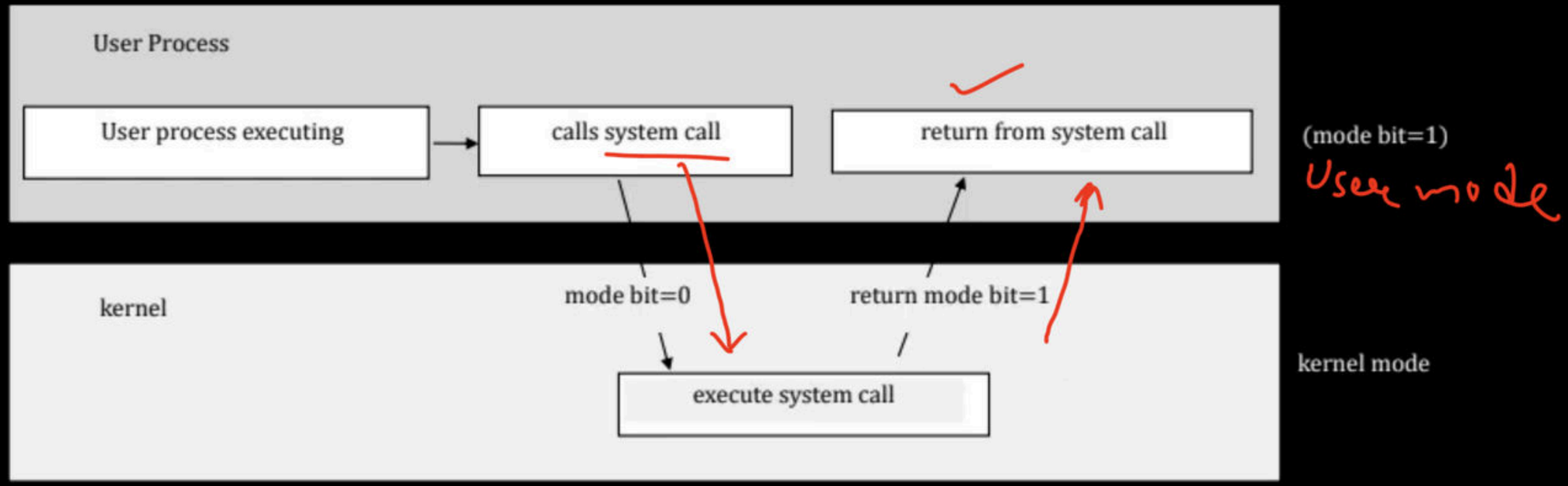
Dual Mode of Operation

↳ for protection

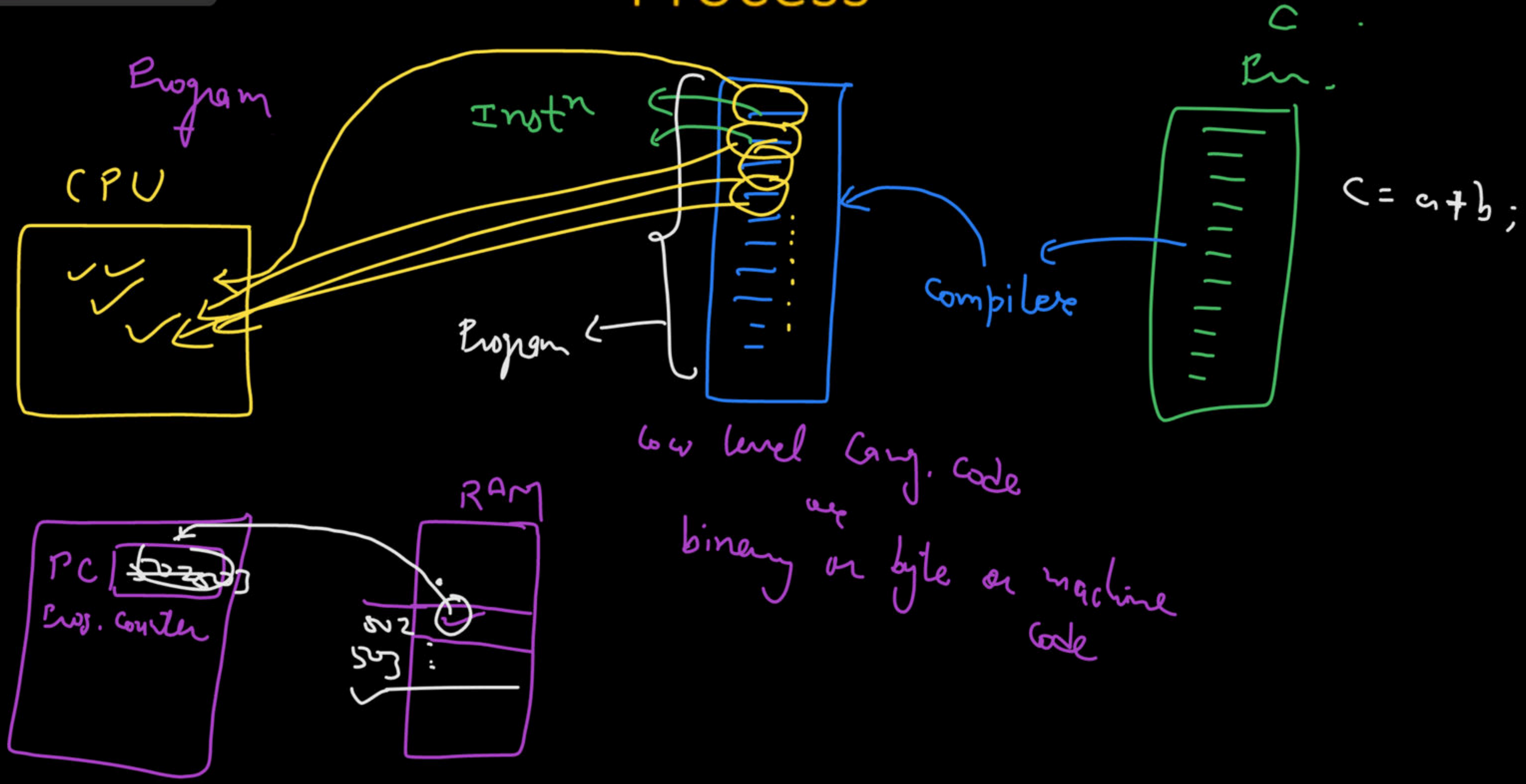
2 modes:

User Mode (mode bit = 1)

Kernel/System/Supervisor/Privileged Mode (mode bit = 0)



Process


Program
CPU
Instn
Program
Compiler
C
Prn.
C= a+b;
low level Lang. code
or
binary or byte or machine
code
RAM
PC
Prog. Counter
002
503

Program => set of instructions

Process = Program + Runtime activity

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Process

- **Process:**
  - Program under execution
  - An instance of a program
  - Schedulable/Dispatchable unit (CPU)
  - Unit of execution (CPU)
  - Locus of control (OS)

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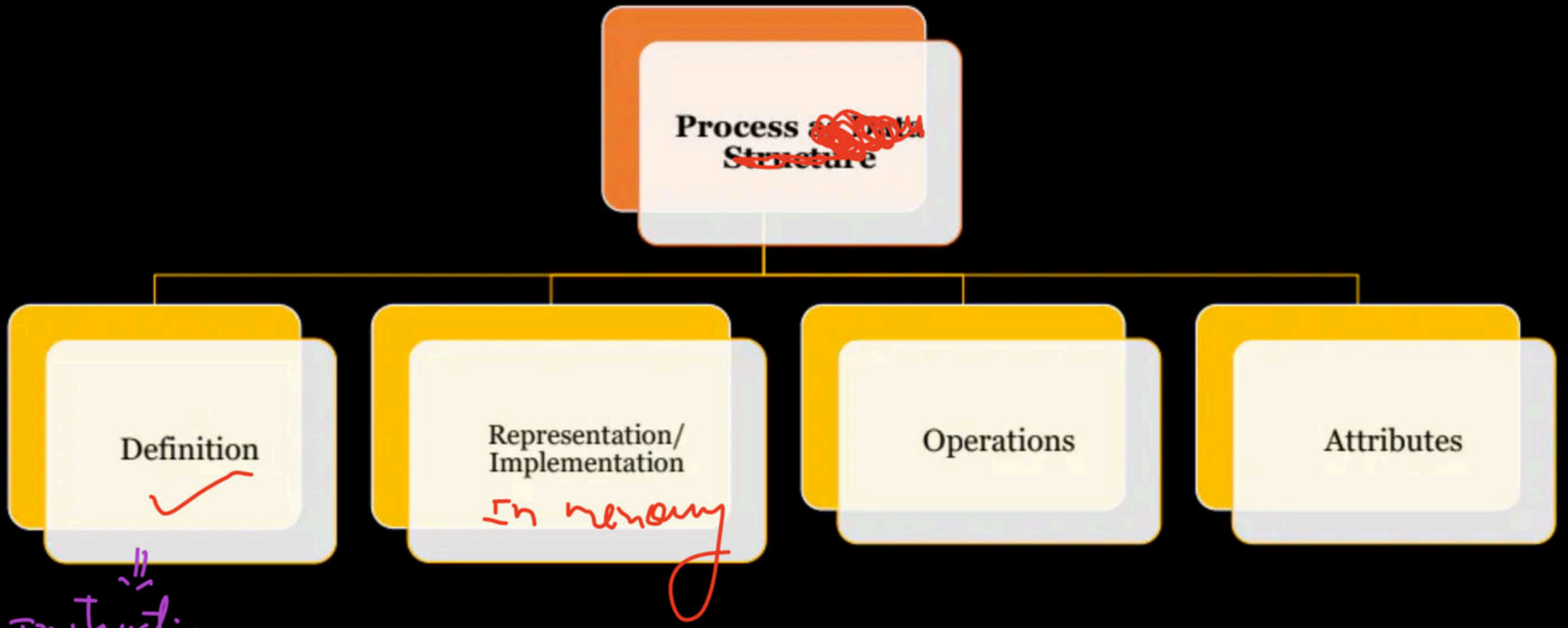
Process



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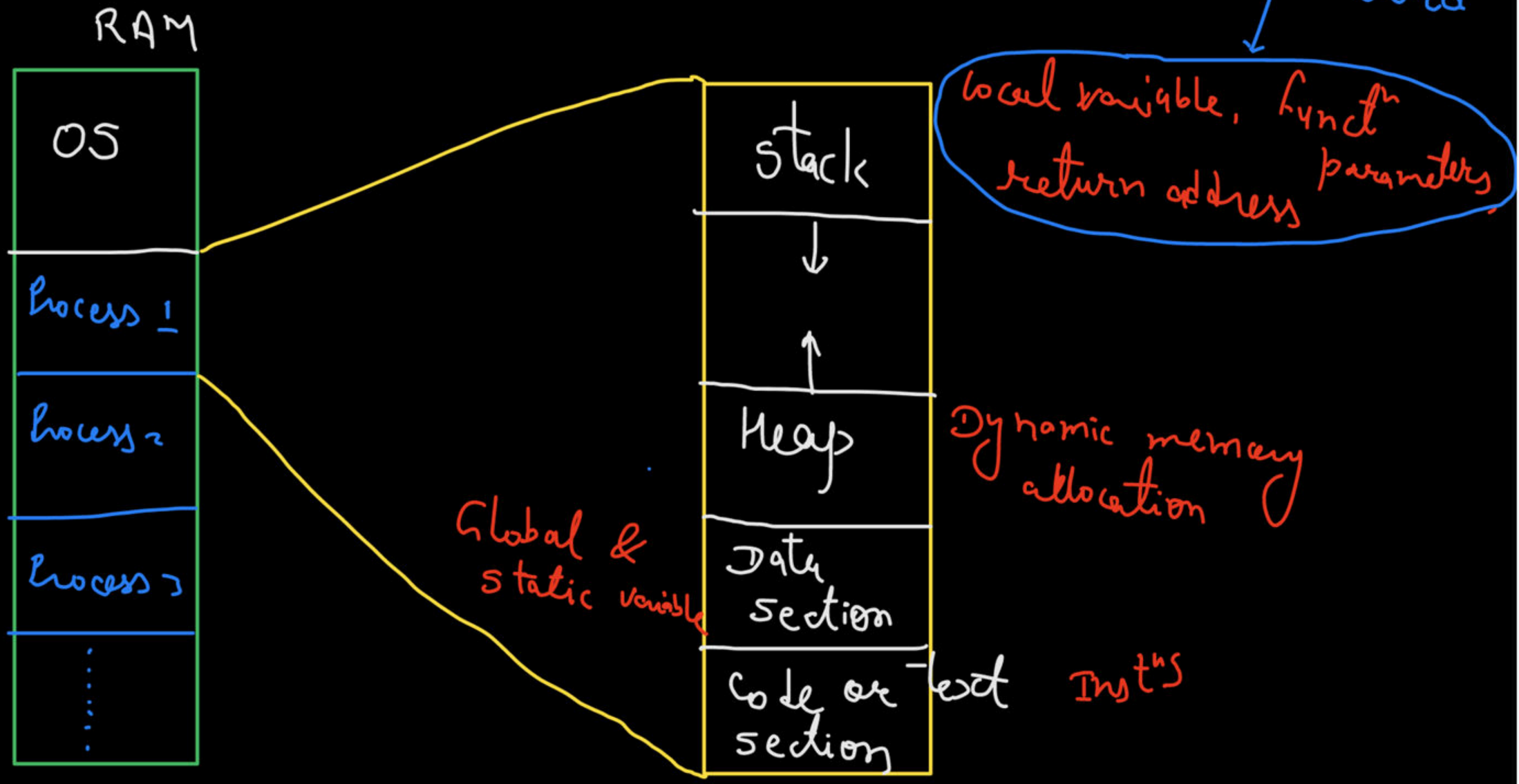
Representation of a Process



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Operations on a Process

- Create (Resource Allocation)
- Schedule, Run
- Wait/Block
- Suspend, Resume
- Terminate (Resource Deallocation)

Attributes of a Process

Process control block (PCB)

- PID (Process id)
- PC (Prog. counter)
- GPR (General purpose)
- List of Devices
- Type ⟶
- Size
- Memory Limits — from which add. to which add. process is stored in mem
- Priority
- State
- List of Files

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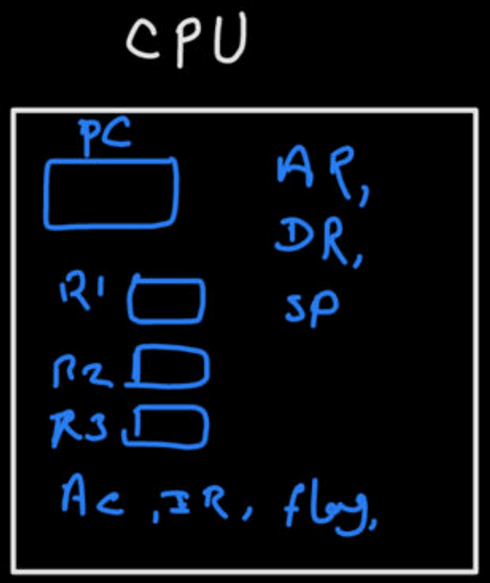
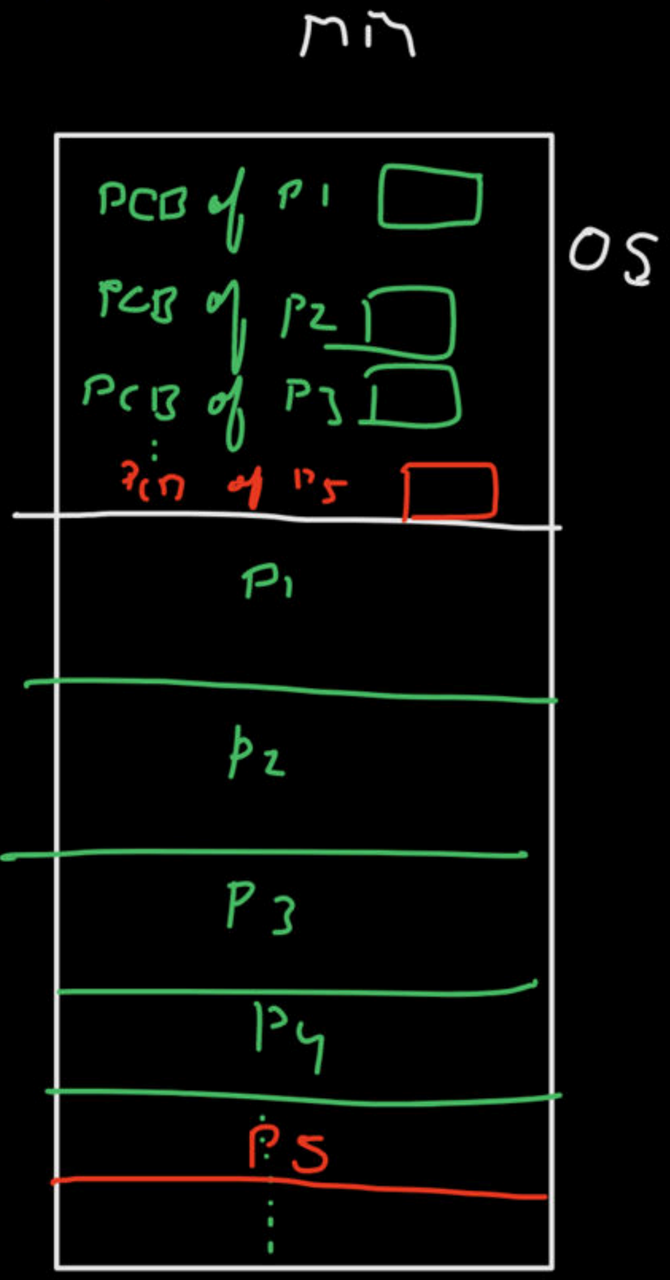
PCB

Also known as process descriptor





Context

The content of PCB of a process are collectively know as ‘Context’ of that process

Context Switch

Context save

Context of current running process is saved from CPU to it's PCB.

and

Context of another process is loaded to CPU from it's PCB.

Context load

Context switch

Taking out current process from CPU & sending another process in CPU to run.

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Question

While running a process can access its PCB from main memory? false

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Question

A process in the context of computing is:

a) A set of instructions to be executed on a computer

b) A program in execution

c) A piece of hardware that executes a set of instructions

d) The main procedure of a program

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Happy Learning.!

@Vdeep10