CS & IT ENGINEERING

Operating System

Process Management

(One Shot)

Recap of Previous Lecture

- **Topic** Operating System Definition
- **Topic** Types of Operating System
- **Topic** Dual Mode of Operation

Topics to be Covered

- Topic: Process
- Topic: Process Representation
- Topic: Process Control Block
- Topic: Process states
- Topic: Types of Schedulers

Topic : Process

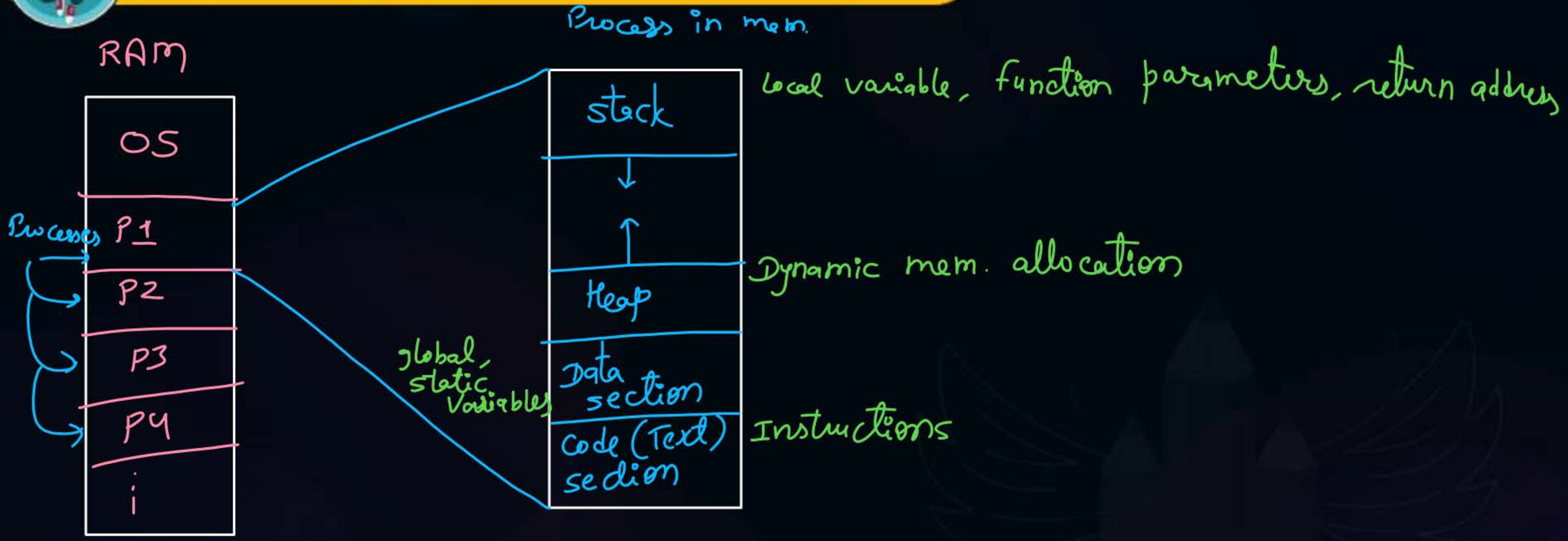
running program

Process = Program + runtime activity

Topic : Process

- **Process:**
  - Program under execution

Topic : Representation of a Process



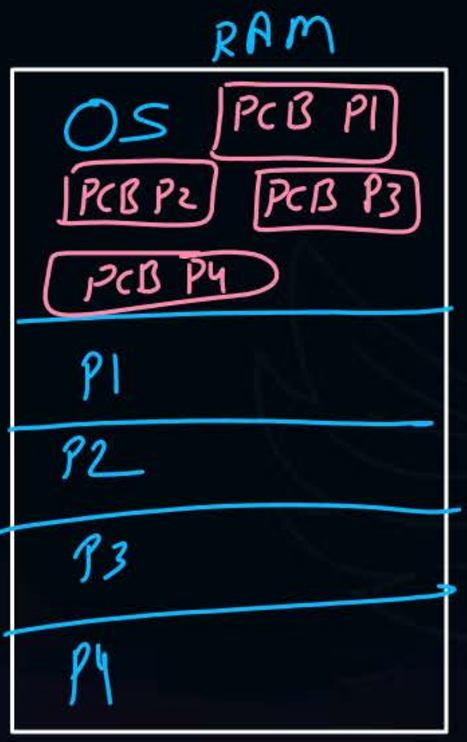
Topic : Operations on a Process

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

Topic : Attributes of a Process

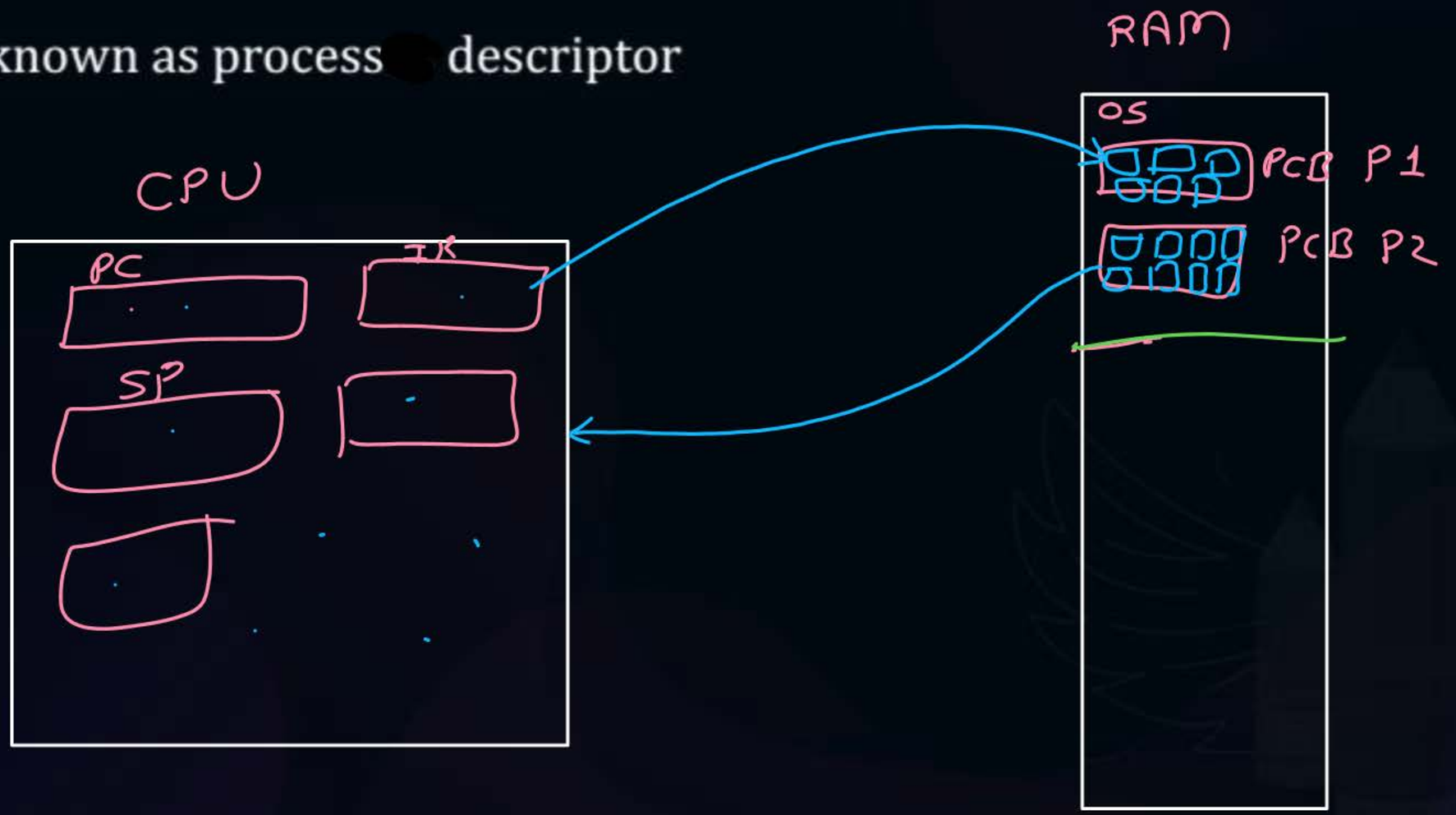
- PID (Process id)
- PC
- GPR, all other regs
- List of Devices
- Type
- Size
- Memory Limits
- Priority
- State
- List of Files

PCB (Process control block



Topic : PCB

Also known as process descriptor



Topic : Context

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

Topic : Context Switch

storing reg. values of current running process into it's PCB from CPU and loading reg. values of next process from its PCB to CPU.

→ Context switch takes time. ⟹ Context switch time ∝ context size

→ Dispatcher performs context switch

[NAT]

#Q. While running, a process can access its own PCB from main memory?

[MCQ]

#Q. A process in the context of computing is:

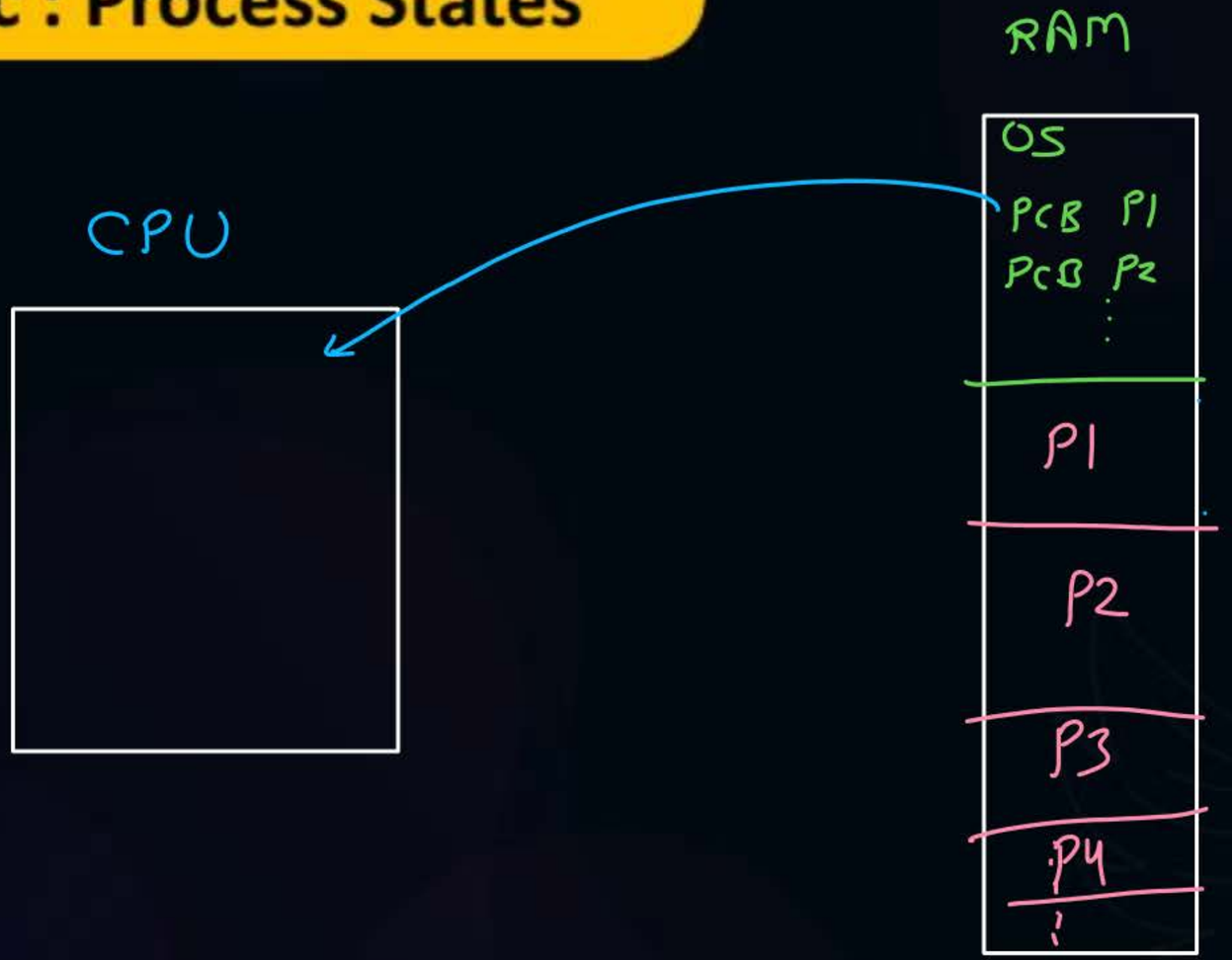
A. A set of instructions to be executed on a computer → Program

B. A program in execution ✓

C. A piece of hardware that executes a set of instructions → CPU

D. The main procedure of a program → main()

Topic : Process States



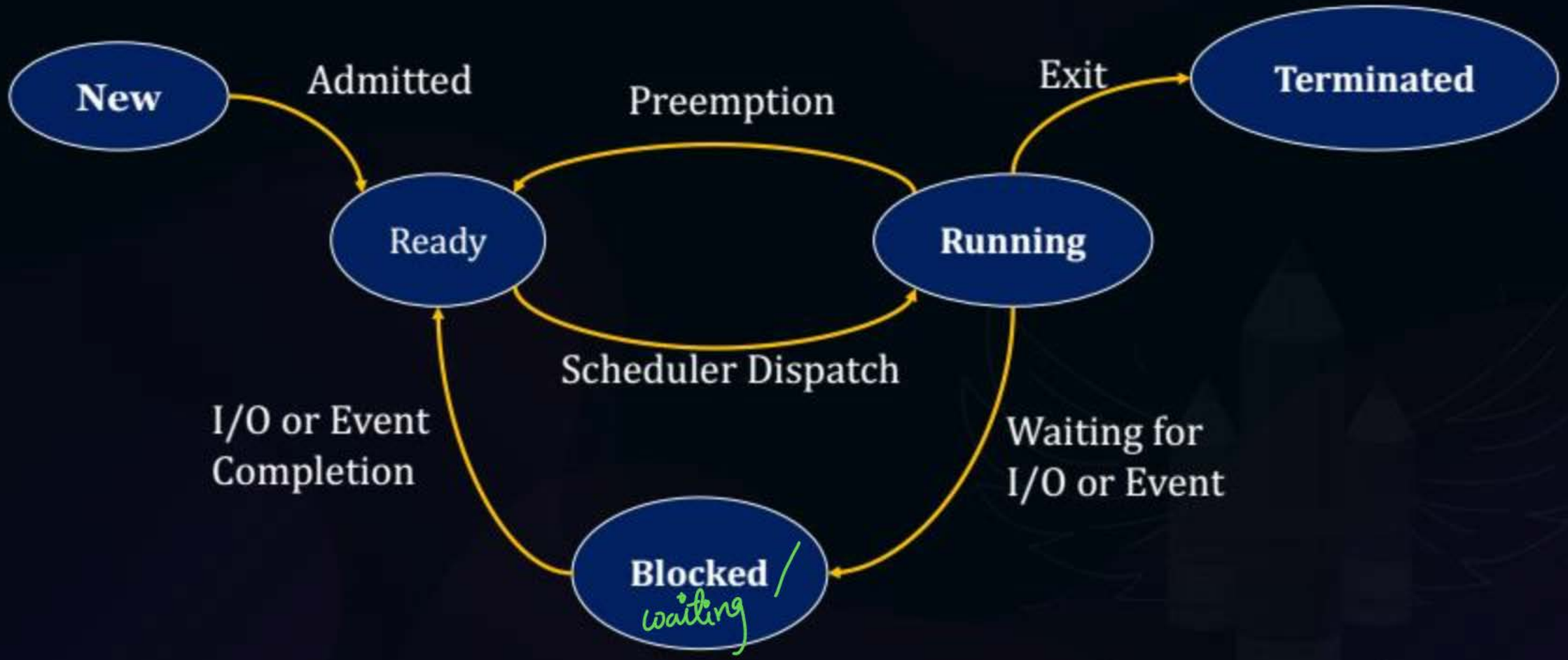
Process in MM when it is in

→ Ready state

→ Running state

→ Blocked state

Topic : Process States



Topic : Process States

New:- All installed processes are in known to be in new state

Ready:-All processes which are waiting to run on CPU are known to be in ready state

Running:- A process which is running on CPU has its state as running

Terminated:-A completed process has its state as terminated

Blocked:-All processes which are waiting for any IO or event

Topic : Process States

New To Ready: When process is admitted by OS

Ready to Running: When a process is dispatched to CPU

Running to Terminated: When a process is completed

Running to Blocked: When a process goes for IO or event

Running to Ready: When a process is preempted

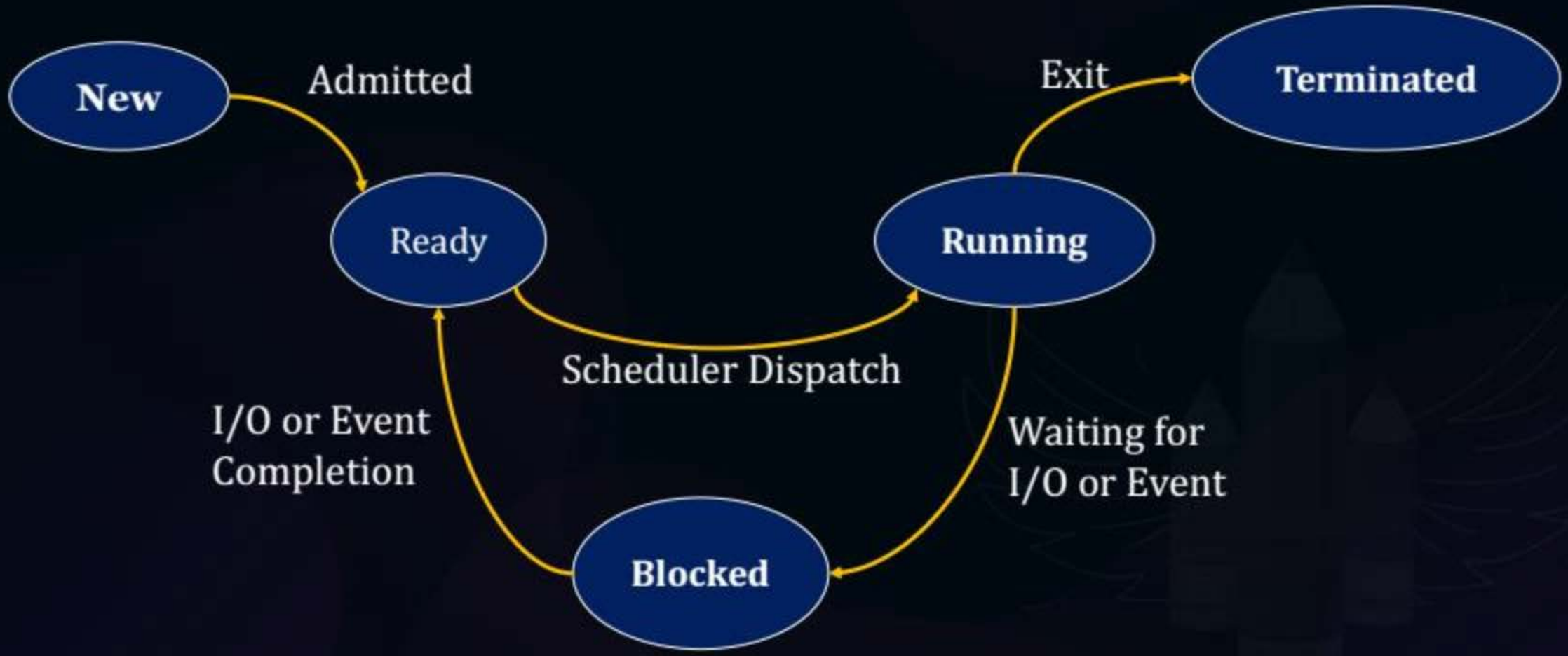
Blocked to Ready: When a process completes IO or event

Topic : Process States

- 2 Transitions are voluntary:
  - Running to Terminated
  - Running to Blocked

Topic : Process States

Non-Preemptive



Topic : CPU vs IO Bound Process

intensive / extensive

CPU Bound: If the process is intensive in terms of CPU operations

IO Bound: If the process is intensive in terms of IO operations

a good mix both types of processes utilize system resources.

Topic : Process Scheduling

Needed Because?

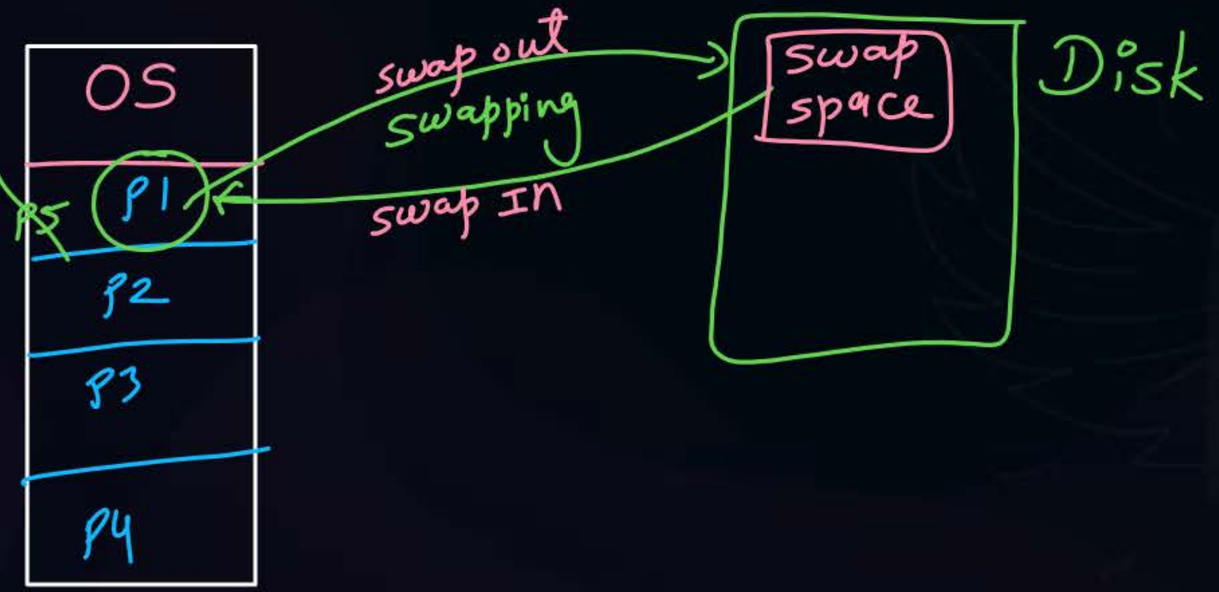
for better performance

Topic : Scheduling Queues

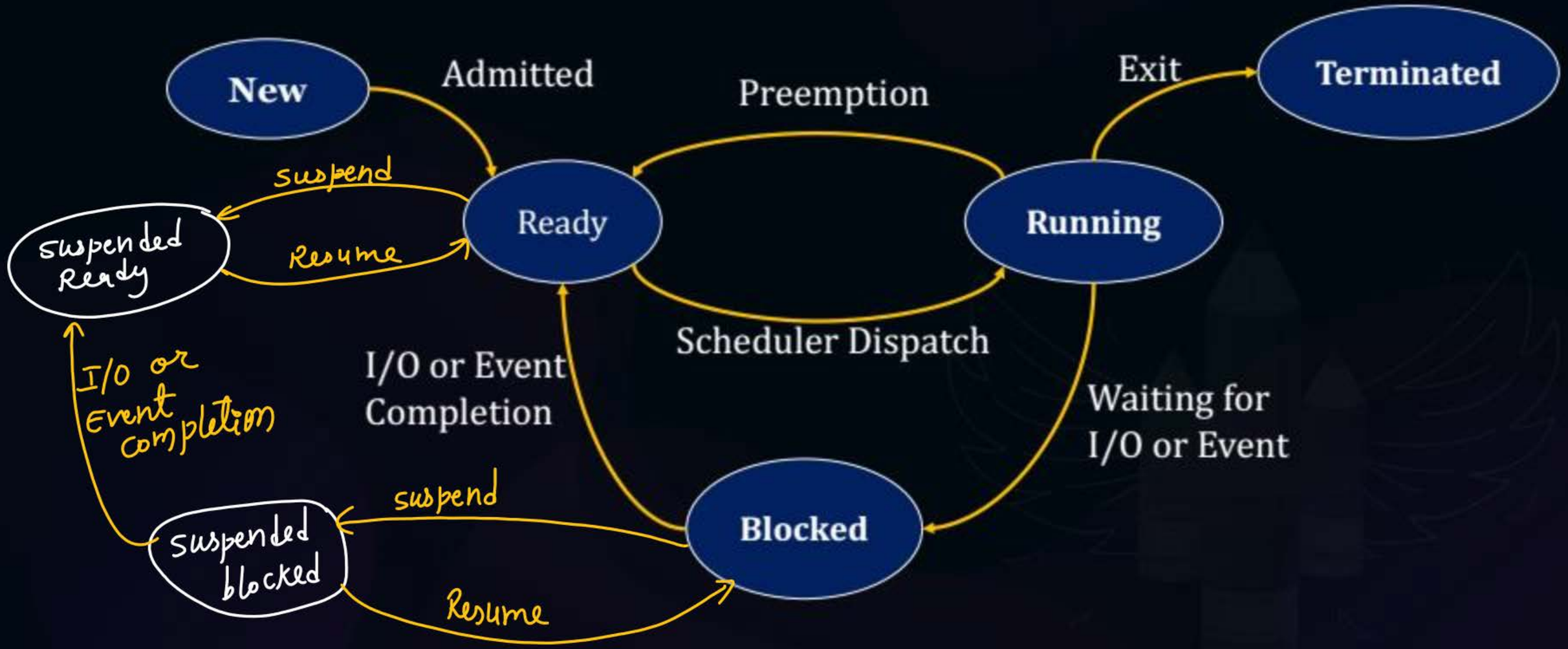
- Job Queue → all new processes kept in job Queue. (only one)
- Ready Queue → all the processes which are in ready state, kept in it. (only one)
- Device Queue → all processes waiting for a device are kept in it. (one for each device)

Topic : Types of Schedulers

- Long-Term Scheduler (Job) → it controls degree of multiprogramming → it schedules one of new processes into ready state.
- Short-Term Scheduler (CPU) → it selects one of ready processes to run next on CPU.
- Mid-Term Scheduler (Medium-term) → It performs swapping



Topic : Process States



[MCQ]

#Q. Which of the following scheduler reduces the degree of multiprogramming?

A Short-Term

B Long-Term

C Mid-Term

D Long-Term and Mid-Term both

2 mins Summary

Topic Process

Topic Process Representation

Topic Process Control Block

Topic Process states

Topic Types of Schedulers

Happy Learning

THANK - YOU