SNS COLLEGE OF TECHNOLOGY

Coimbatore-35.

An Autonomous Institution

COURSE NAME : 23CSE201 OPERATING SYSTEMS

II YEAR/ IV SEMESTER

UNIT-I OVERVIEW AND PROCESS MANAGEMENT

Topic: Architecture, Operations

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SNS COLLEGE OF TECHNOLOGY

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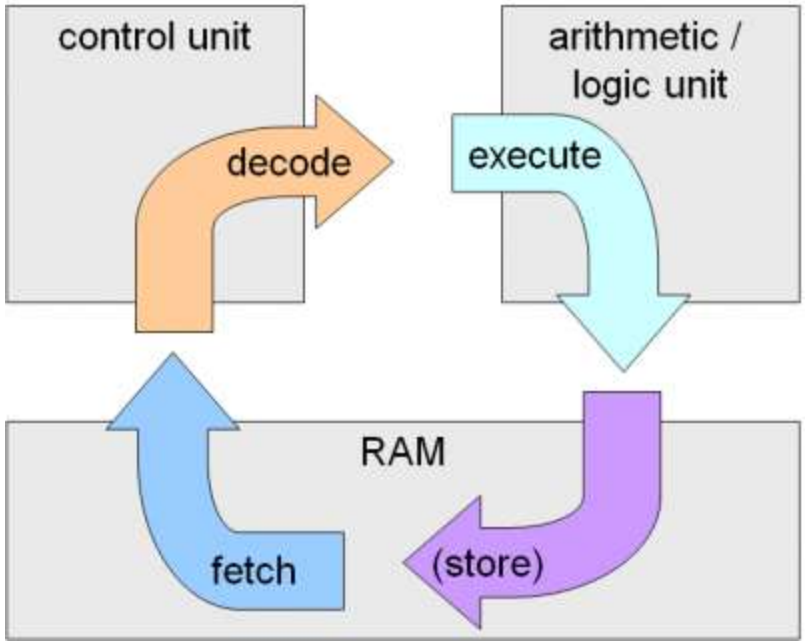
Operating Systems

Introduction-
Storage Structure

- Main Memory(RAM) implemented in Semi Conductor Technology(DRAM)
- Interaction is achieved through ***Load or Store*** instructions

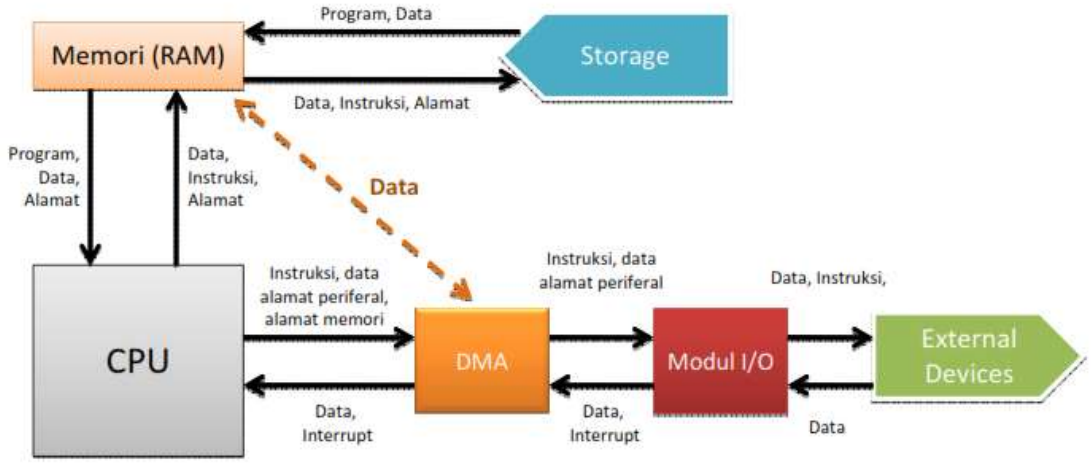


I/O Structure

- After I/O starts, control returns to user program only upon I/O completion
  - Wait instruction idles the CPU until the next interrupt
  - Wait loop (contention for memory access)
  - At most one I/O request is outstanding at a time, no simultaneous I/O processing
- After I/O starts, control returns to user program without waiting for I/O completion
  - System call – request to the operating system to allow user to wait for I/O completion
  - Device-status table contains entry for each I/O device indicating its type, address, and state
  - Operating system indexes into I/O device table to determine device status and to modify table entry to include interrupt

Directory Memory Access

- Used for high-speed I/O devices able to transmit information at close to memory speeds
- Device controller transfers blocks of data from buffer storage directly to main memory without CPU intervention
- Only one interrupt is generated per block, rather than the one interrupt per byte



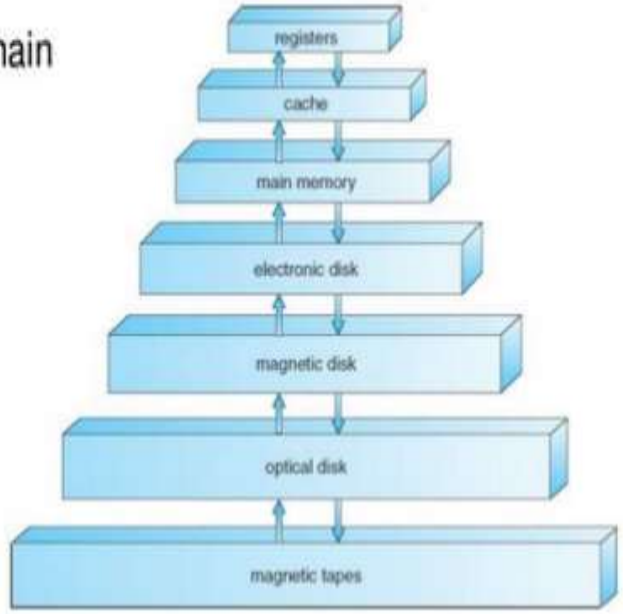
Storage Structure

- Main memory – only large storage media that the CPU can access directly
  - Random access
  - Typically volatile
- Secondary storage – extension of main memory that provides large nonvolatile storage capacity

- Magnetic disks – rigid metal or glass platters covered with magnetic recording material
  - Disk surface is logically divided into tracks, which are subdivided into sectors
  - The disk controller determines the logical interaction between the device and the computer

Storage Hierarchy

- Storage systems organized in hierarchy
  - Speed
  - Cost
  - Volatility
- Caching – copying information into faster storage system; main memory can be viewed as a *cache* for secondary storage



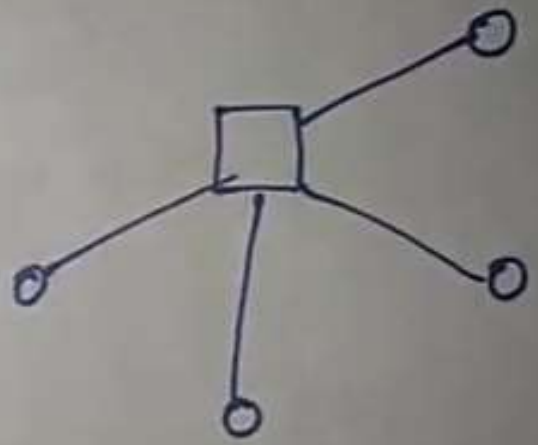
Introduction-User View

OS ⇒ User-view

PC ⇒ conviniece

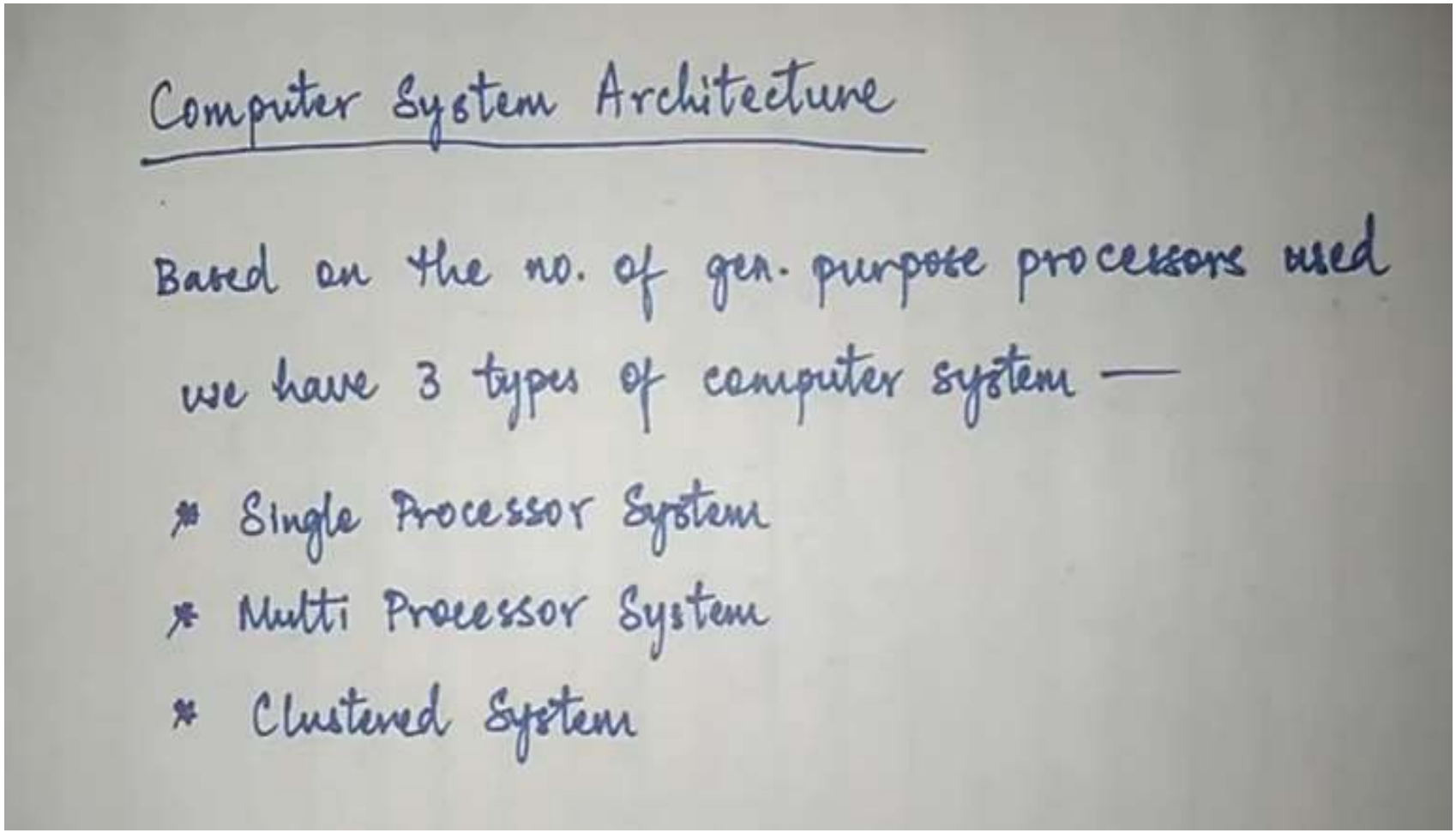
Mainframe

⇒ effective utilization of H/w.



Handheld ⇒ convinience + efficiency.

Introduction
Computer System Architecture



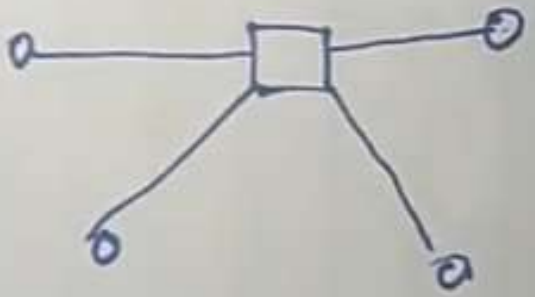
Introduction

* Single Processor System ⇒ 1 GPP
* Multi Processor System ⇒ >1 GPP
* Clustered System ⇒ >1 GPP.

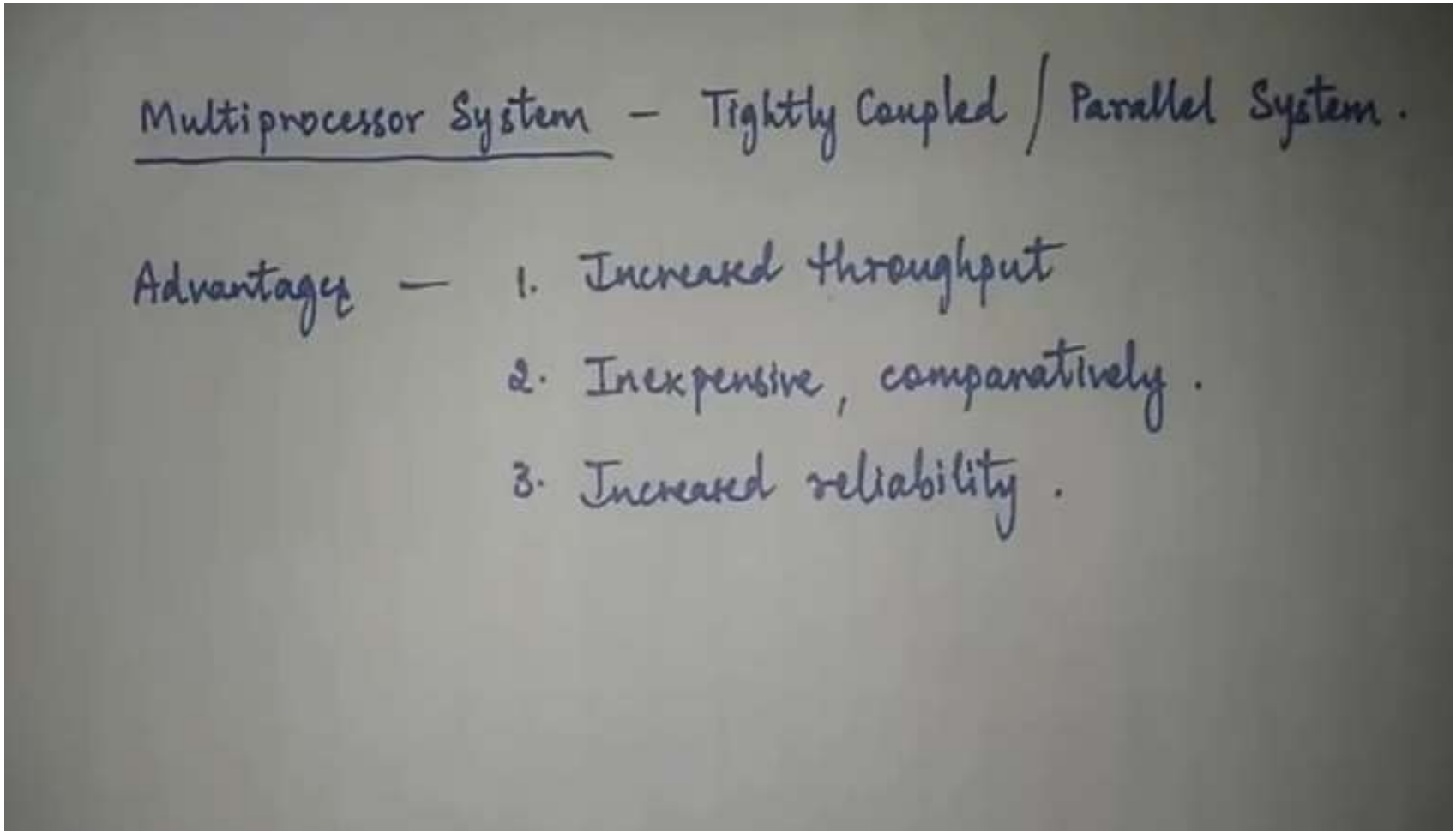
Spl purpose processor } GPU

1 computer with multiple processor

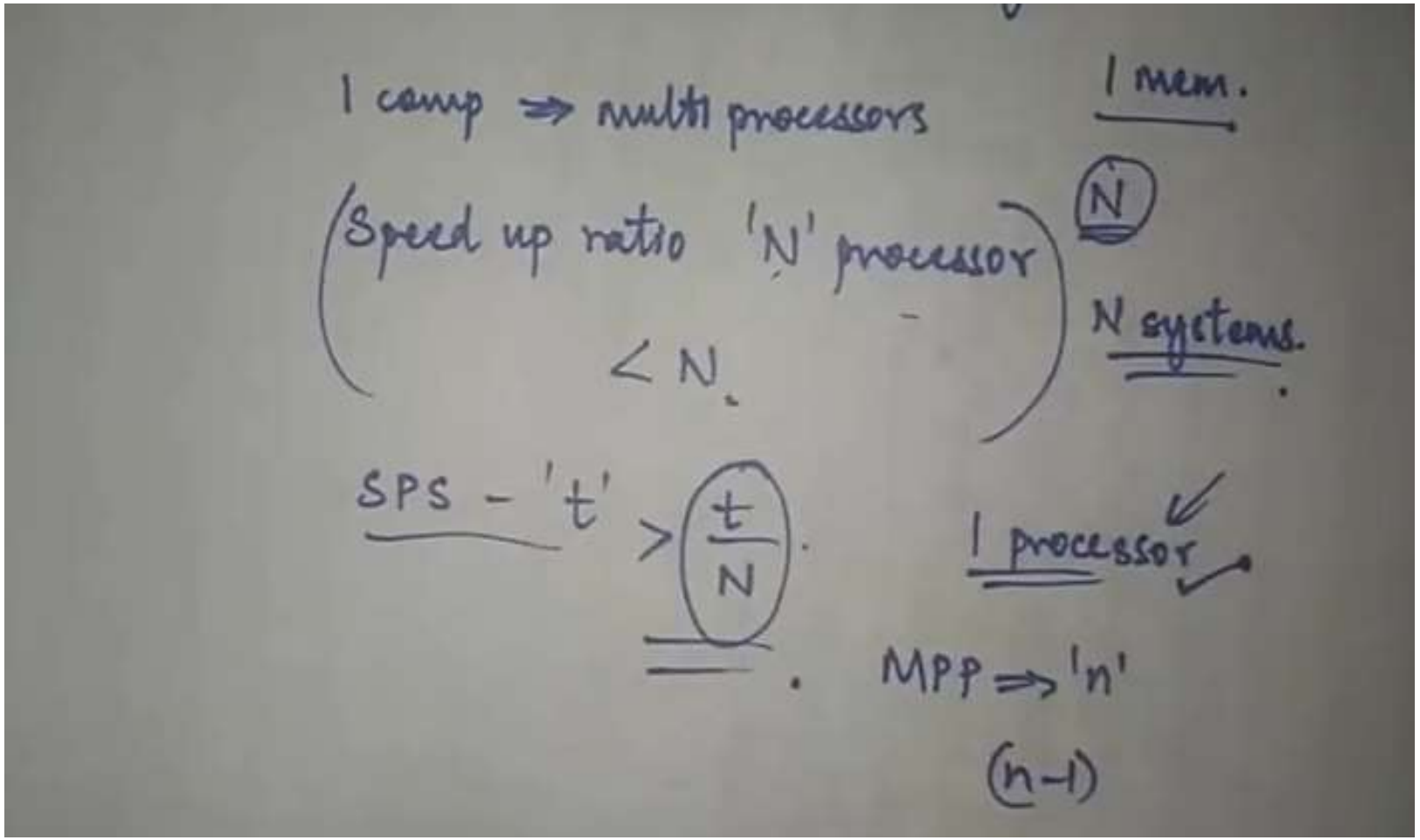
Server – client



Computer System Architecture
Multiprocessor Systems



Computer System Architecture
Multiprocessor Systems



Computer System Architecture
Multiprocessor Systems

Graceful degradation. ⇒ Catastrophic failure.

Speed ∝ surviving components.

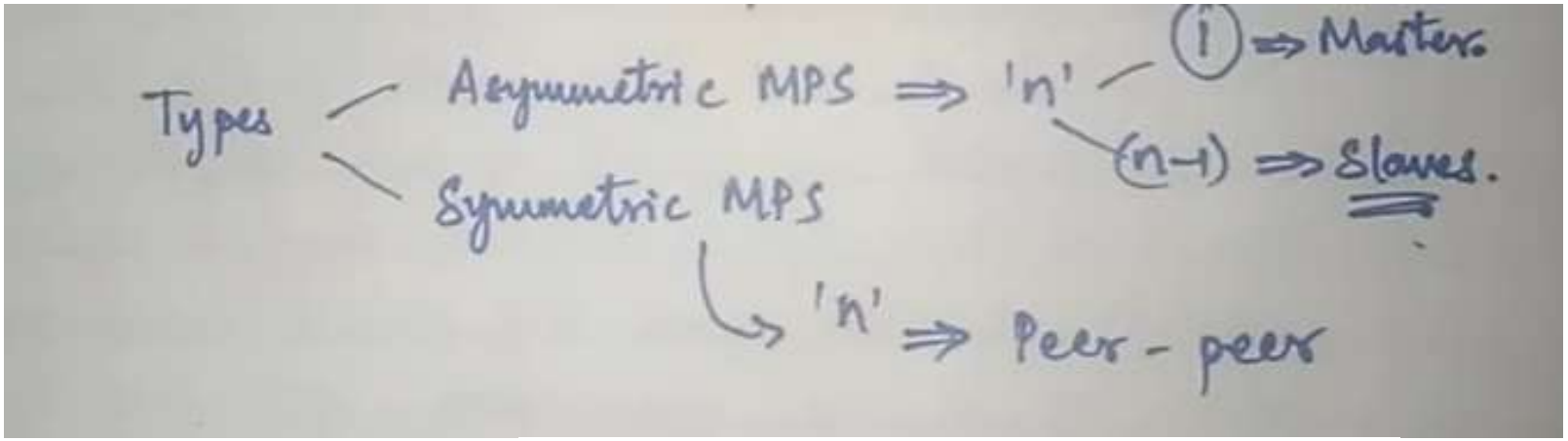
ex: Tandem System (HP Non System) stop.

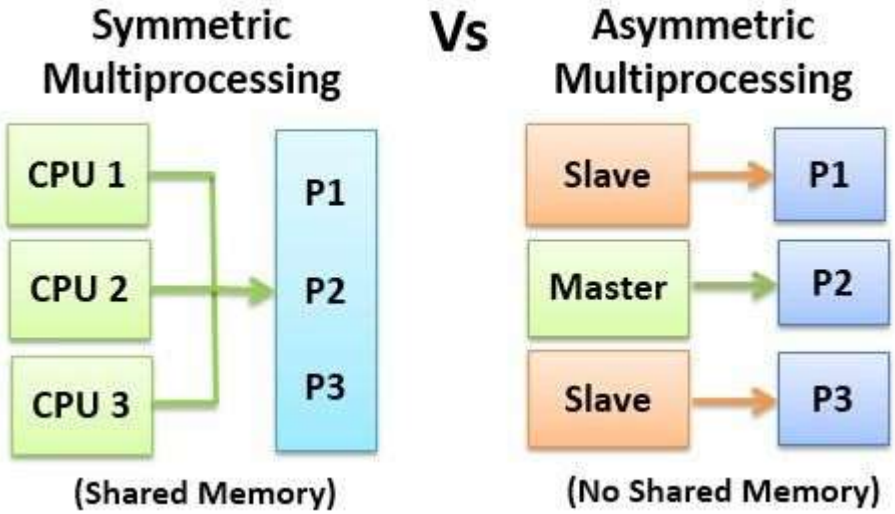
n processors — duplicates.

'2n'

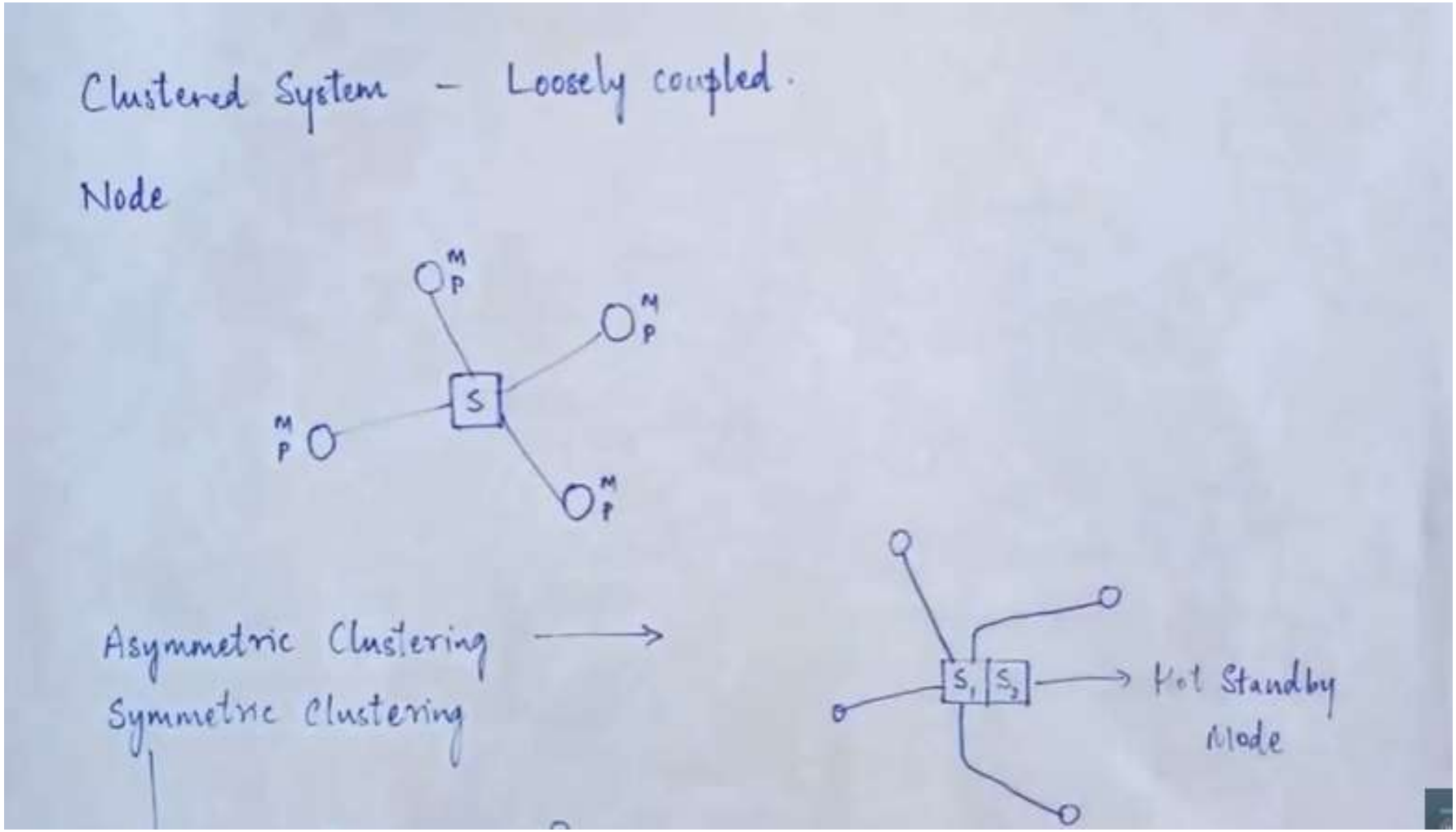
⇒ each pair same perform task

Computer System Architecture
Multiprocessor Systems

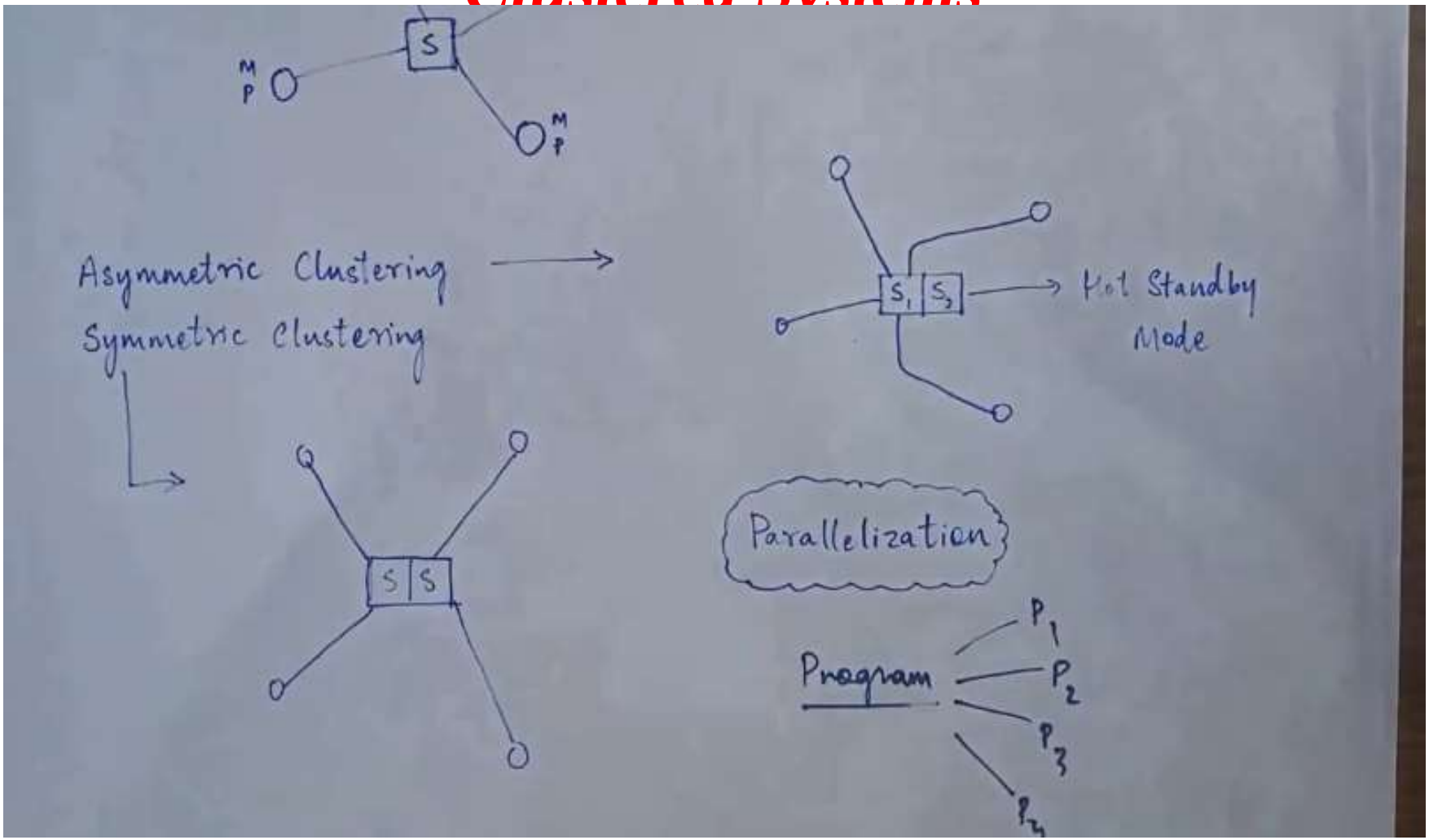




Computer System Architecture
Clustered Systems



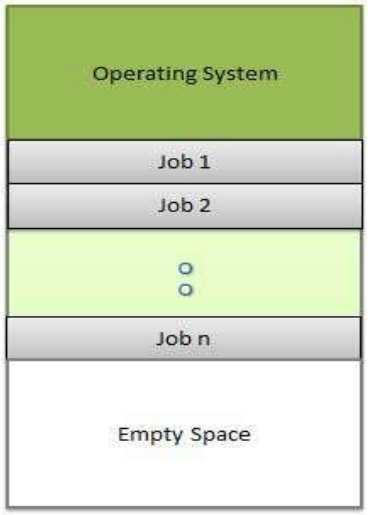
Computer System Architecture
Clustered Systems

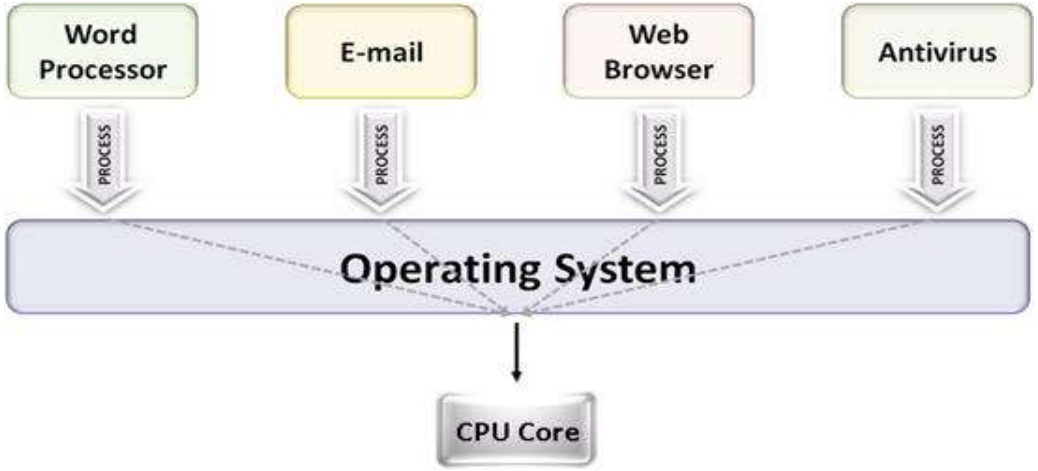


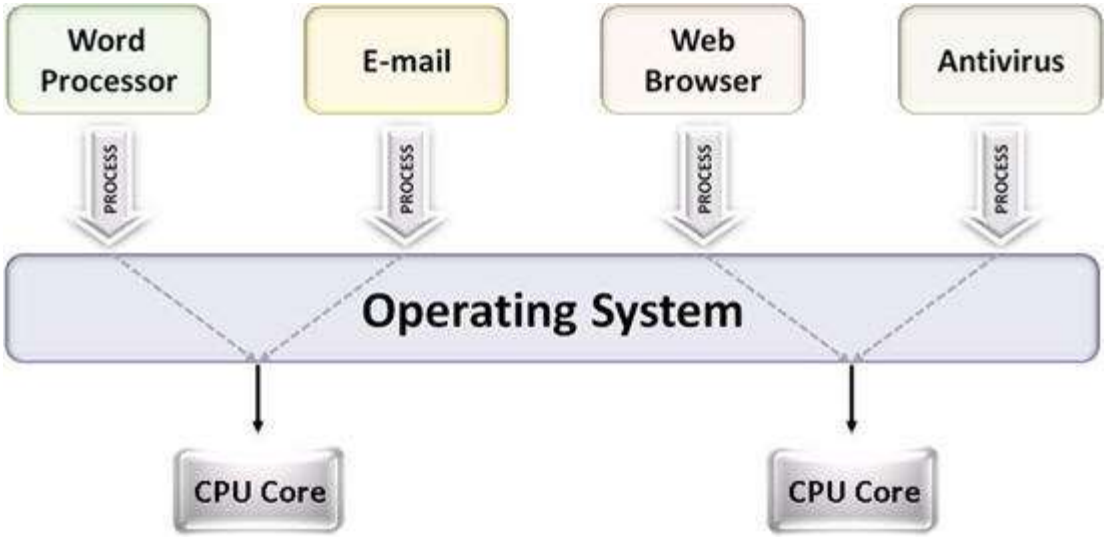
Operating System Structure

- **Multiprogramming** needed for efficiency
  - Single user cannot keep CPU and I/O devices busy at all times
  - Multiprogramming organizes jobs (code and data) so CPU always has one to execute
  - A subset of total jobs in system is kept in memory
  - One job selected and run via **job scheduling**
  - When it has to wait (for I/O for example), OS switches to another job
- **Timesharing (multitasking)** is logical extension in which CPU switches jobs so frequently that users can interact with each job while it is running, creating **interactive** computing
  - **Response time** should be < 1 second
  - Each user has at least one program executing in memory ⇨**process**
  - If several jobs ready to run at the same time ⇨ **CPU scheduling**
  - If processes don't fit in memory, **swapping** moves them in and out to run
  - **Virtual memory** allows execution of processes not completely in memory

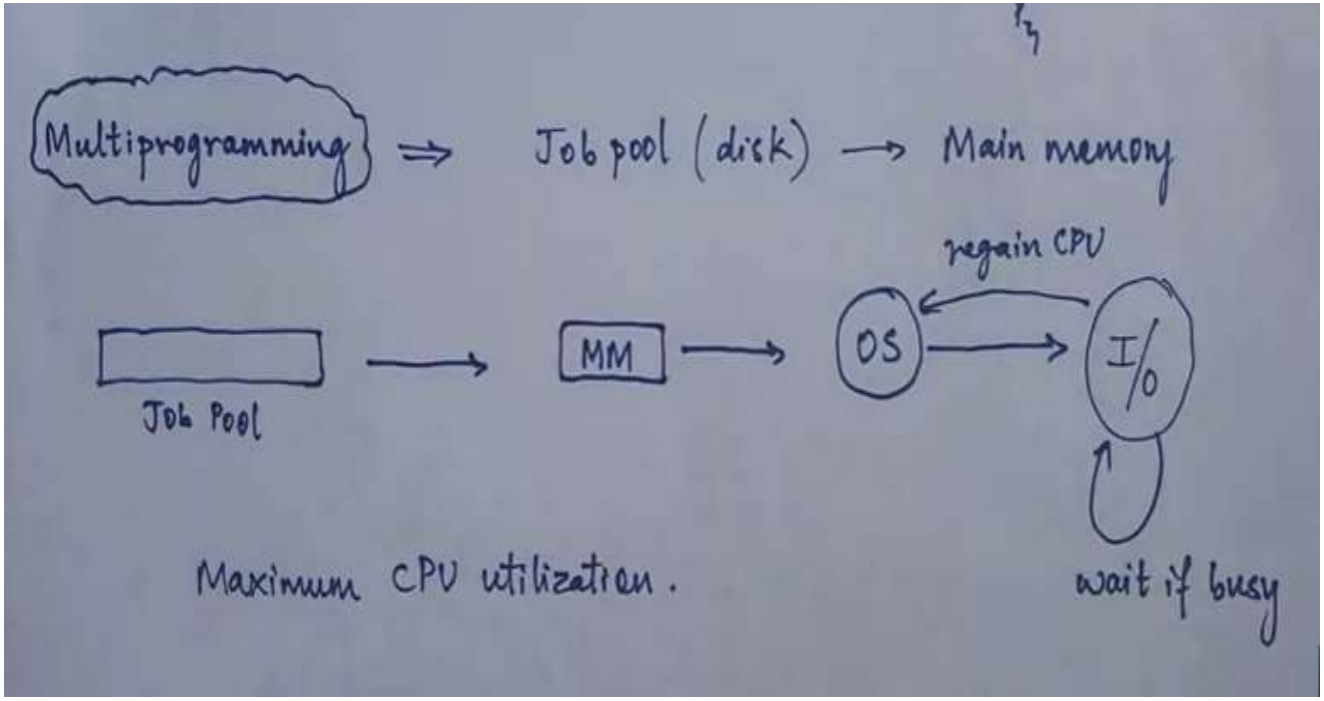
Operating System Architecture
Multiprogramming

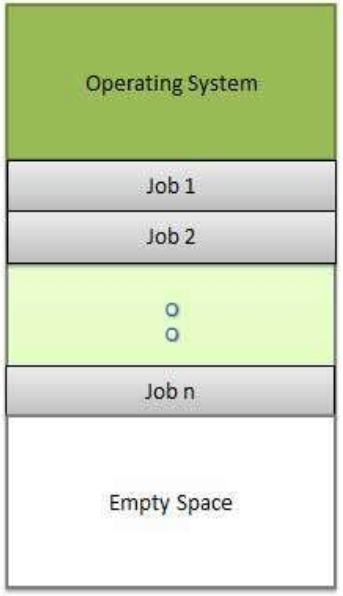




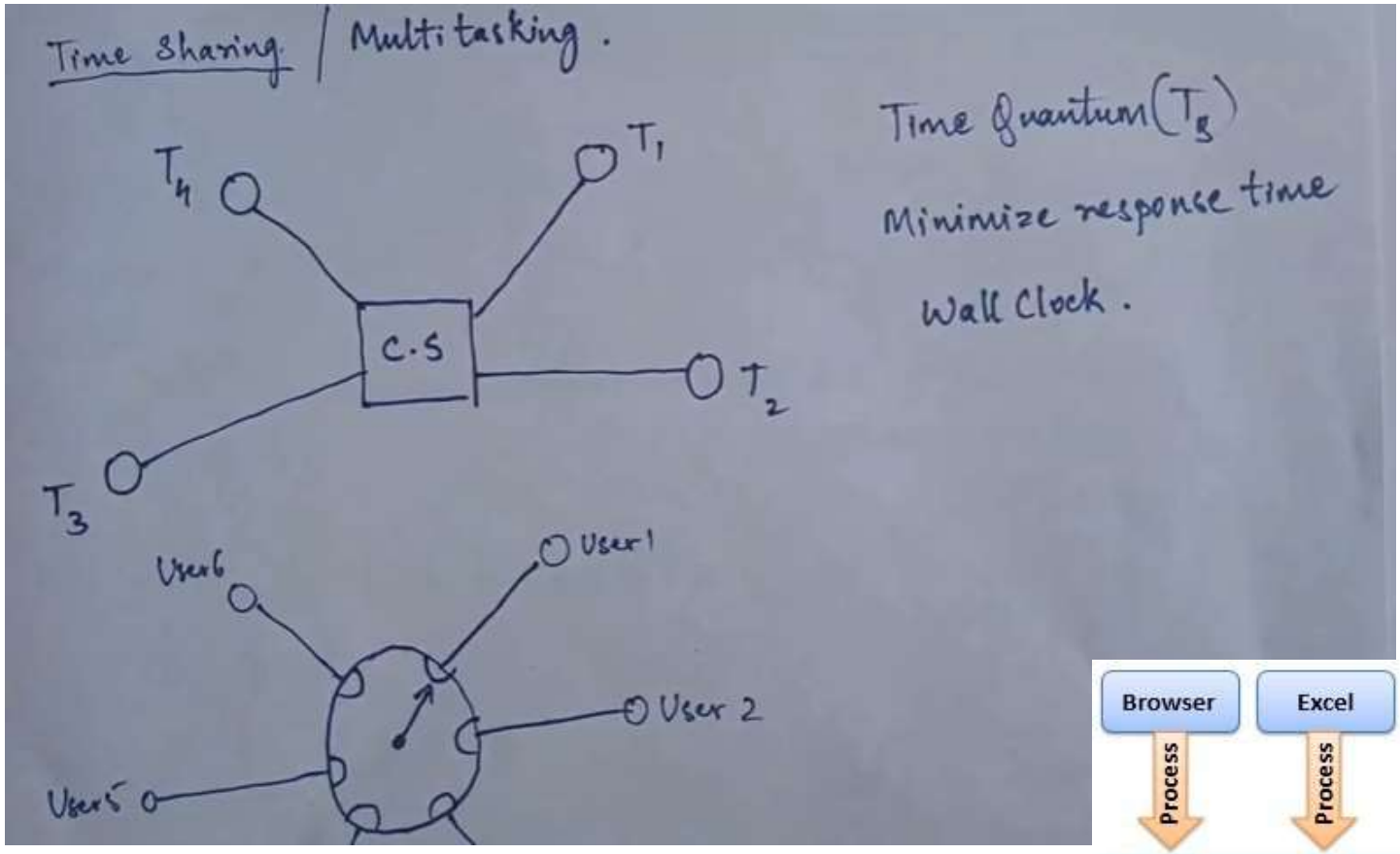


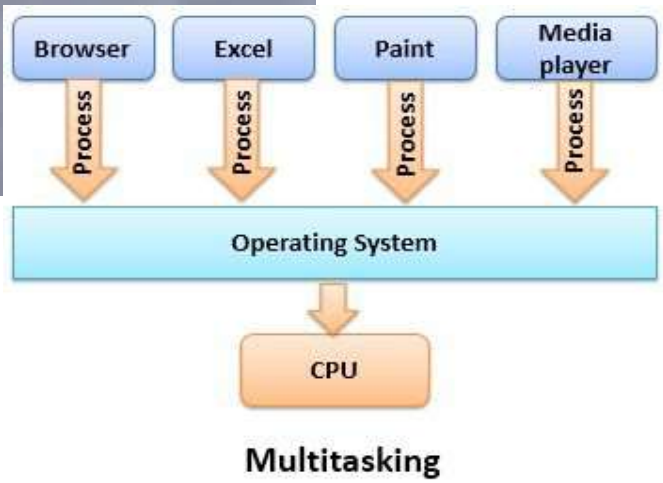
Operating System Architecture
Multiprogramming





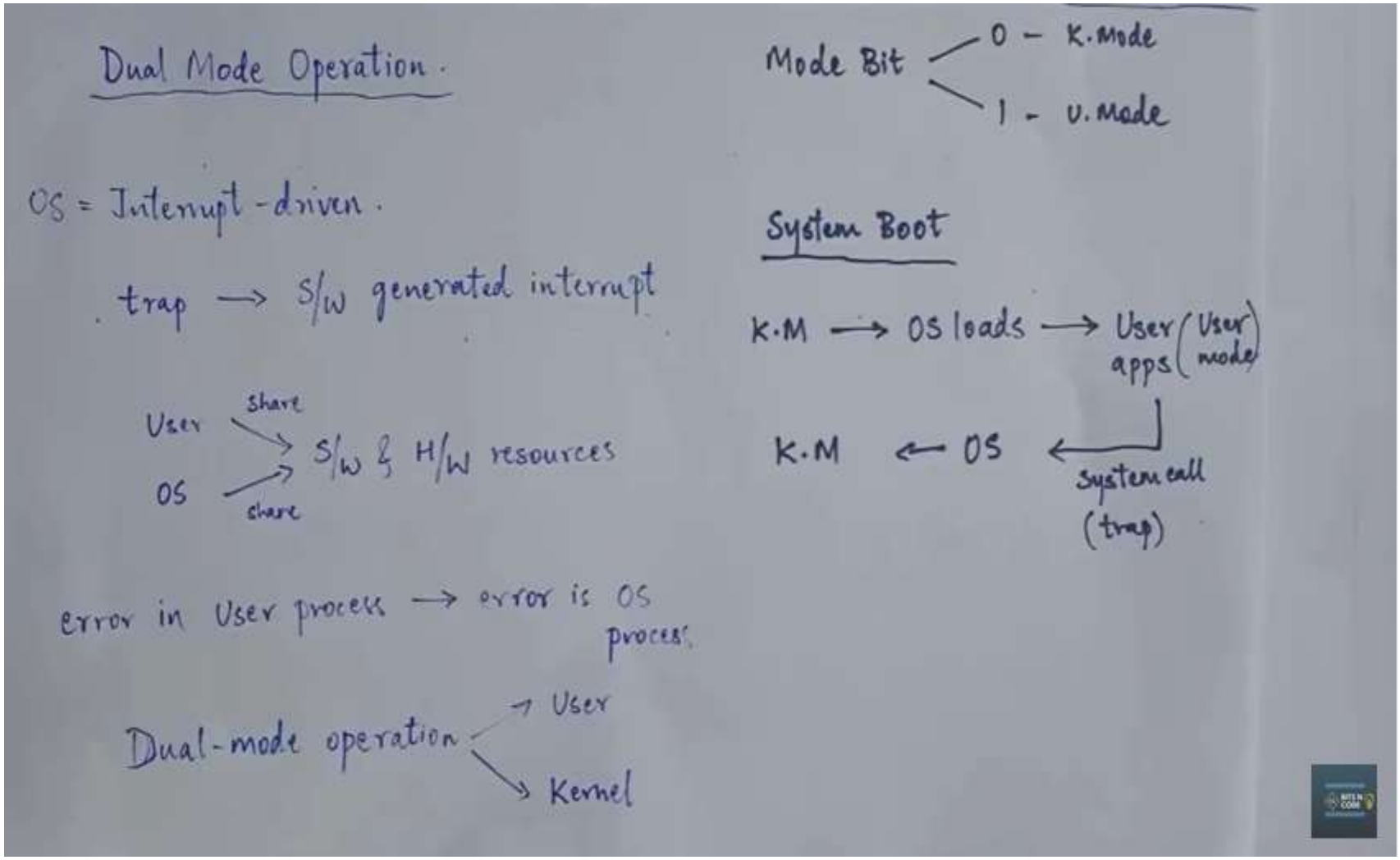
Operating System Architecture
Time Sharing Systems



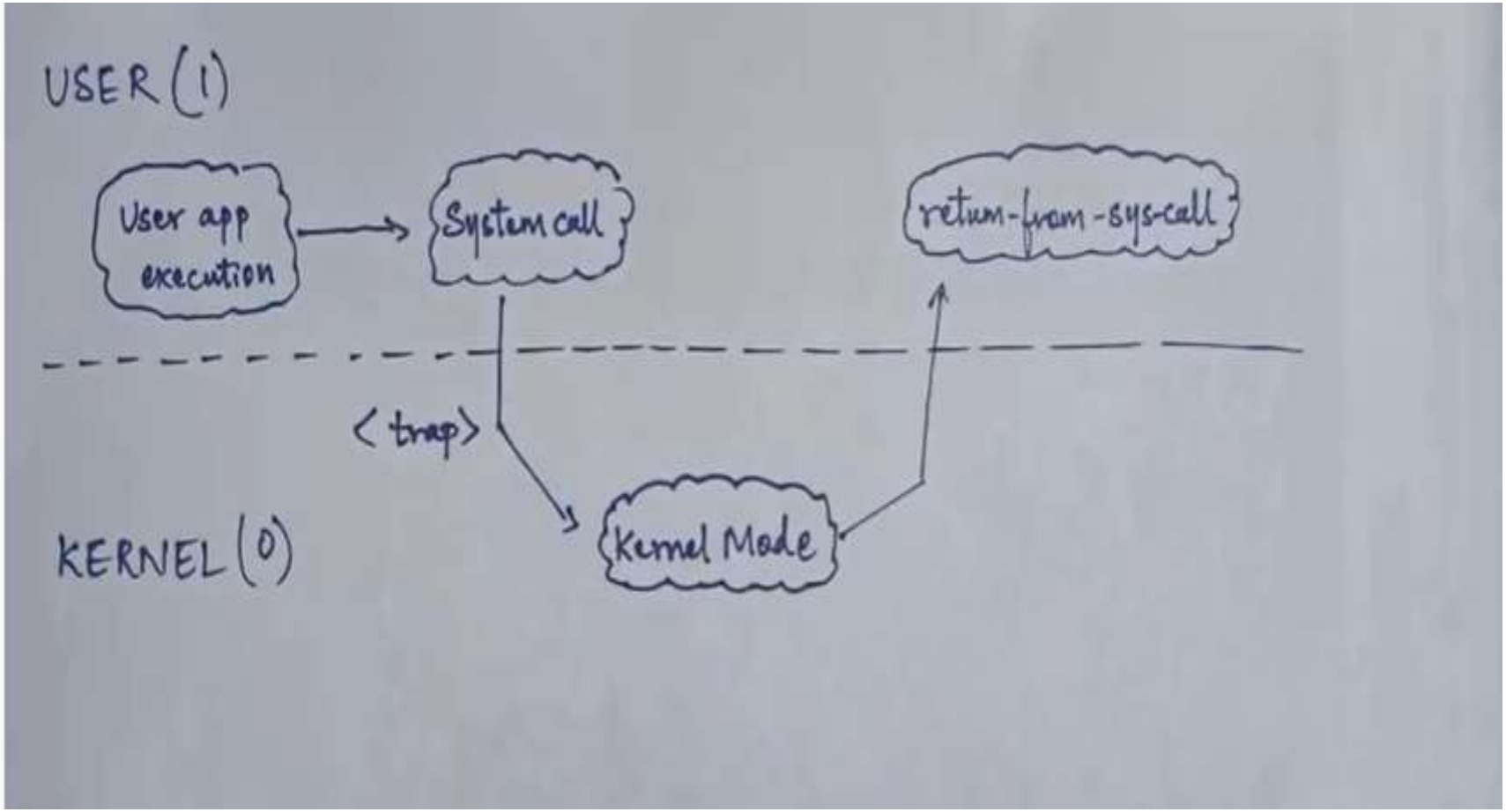


Multitasking

Operating System Operation
Dual Mode Operation



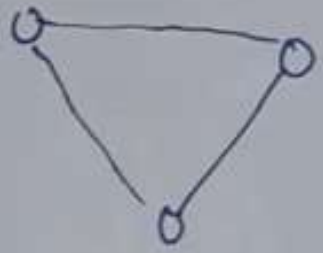
Operating System Operation
Dual Mode Operation

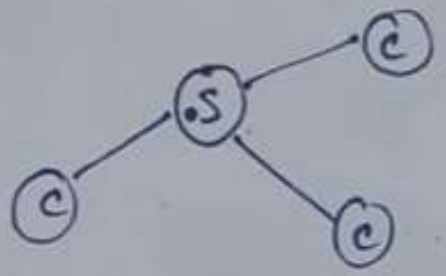


Computing Environment

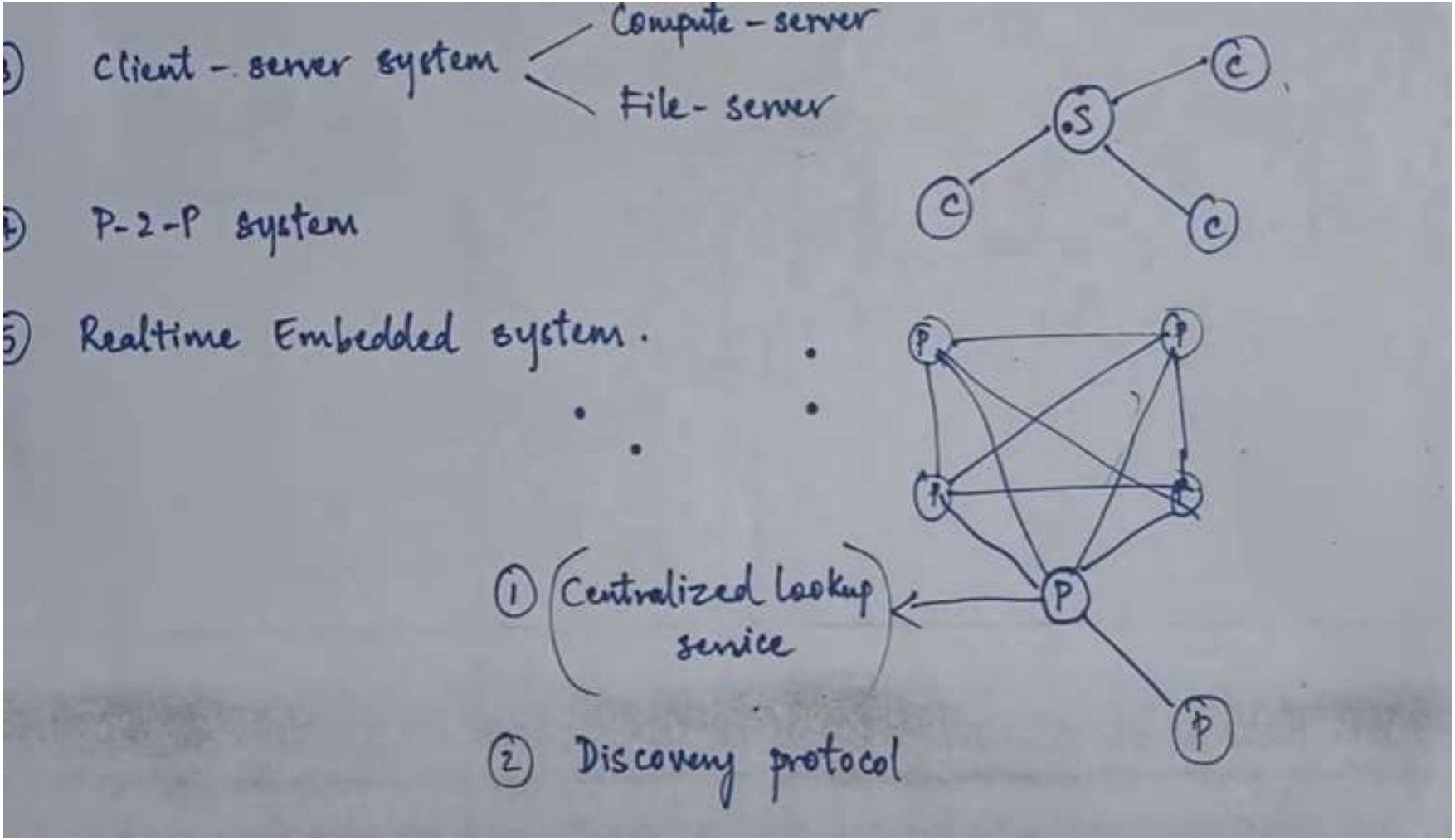
Different Computing envts —

1. Distributed systems
   - LAN
   - WAN
   - MAN
   - PAN
2. Network - operation system
3. Client - server system
   - Compute - server
   - File - server
4. P-2-P system
5. Realtime Embedded system.





Computing Environment



Summarization