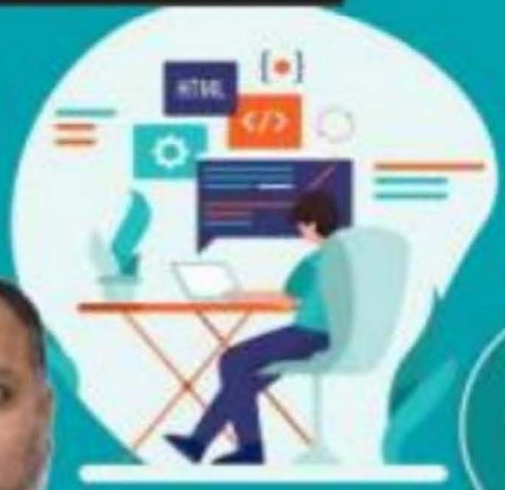
COMPUTER SCIENCE & IT

OPERATING SYSTEM

Functions & Goals

Lecture-01



Dr. KHALEEL KHAN

Today's Goal

Architectural requirements for multiprogrammed OS

Recap :

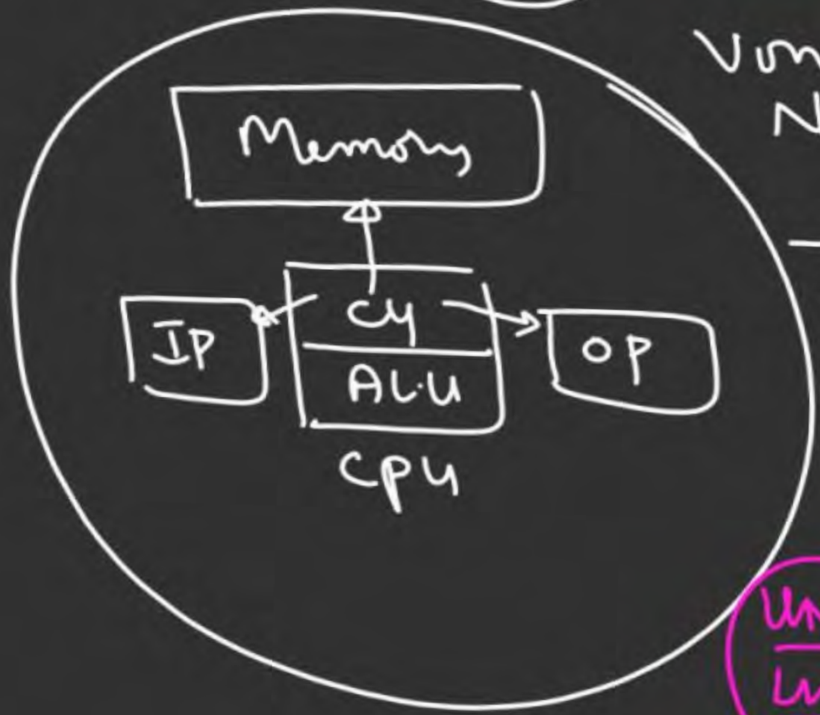
→ **What is OS**

→ Interface b/w user & H/W

IOS / Android / win

Harvard Arch / Mobile Phone

Architecture changes / OS changes



Von-Neumann Arch. / Stored Prog. Concept

UNIX / LINUX / WIN

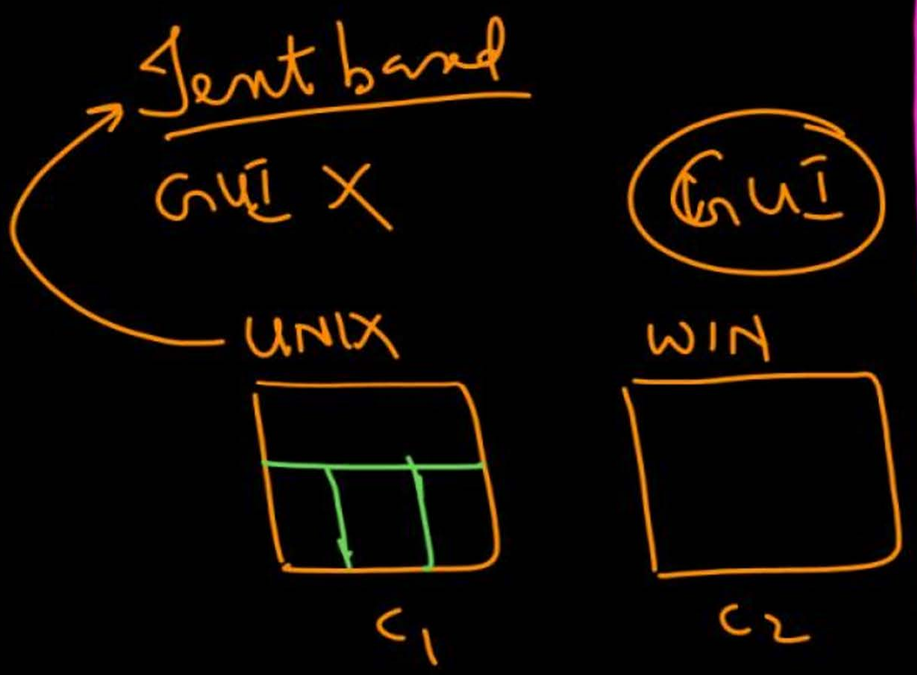
→ Control Program

→ Resource Manager

→ Set of utilities to simplify appl. develop.

→ Acts like a Govt

Functions & Goals of OS



A → Convenience
B → efficiency
Primary Goal of OS

C → Robustness
D → Reliability
E → Scalability (Ability to evolve)
F → Portability

Sat: 5-9
Sun: 9am-1pm

Personal Computing

1., 7 for (Von-Neumann) Arch. Primary Goals is Convenience

Computing Domain changes, Goals changes

1. Real time Computing:

(RTS) → Systems that operate in strict deadlines (Time Constraints)

(RTOS) → VxWorks

Ex: Missile Control, Satellite, ATC, Military operations, Nuclear Sys...

Real time Systems

Hard

→ Deadlines are very tight (strict)

→ heavy losses / Destruction

Soft

Enquiry System : Bank ATM

→ Deadlines Not strict

→ No loss / Destruction

Primary Goal of RTOS : efficiency

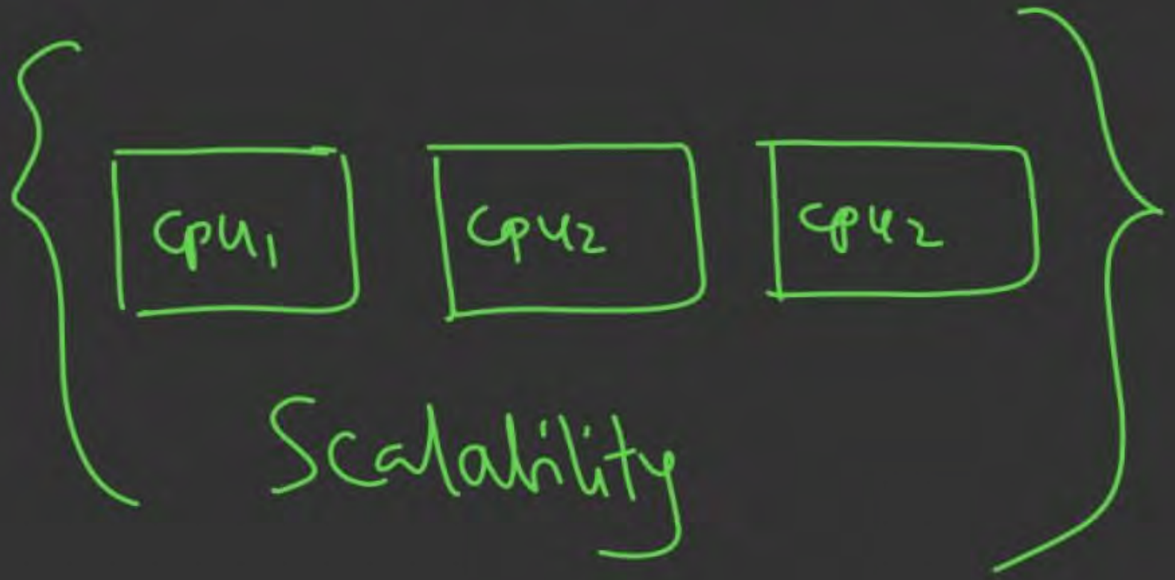
Mobile O.S (Mobile Computing)

→ Primary Goal ?

- Convenience
- efficiency
  - Battery Power

Parallel Computing domain

Distributed : Amoeba (Multi-processor Systems)



Types of O.S?

Disk Technology

- Uniprogrammed (U.Pr)
- Multiprogrammed (M.Pr)

1st Gen: 1930 - 40's
No OS
(Card-Reader)

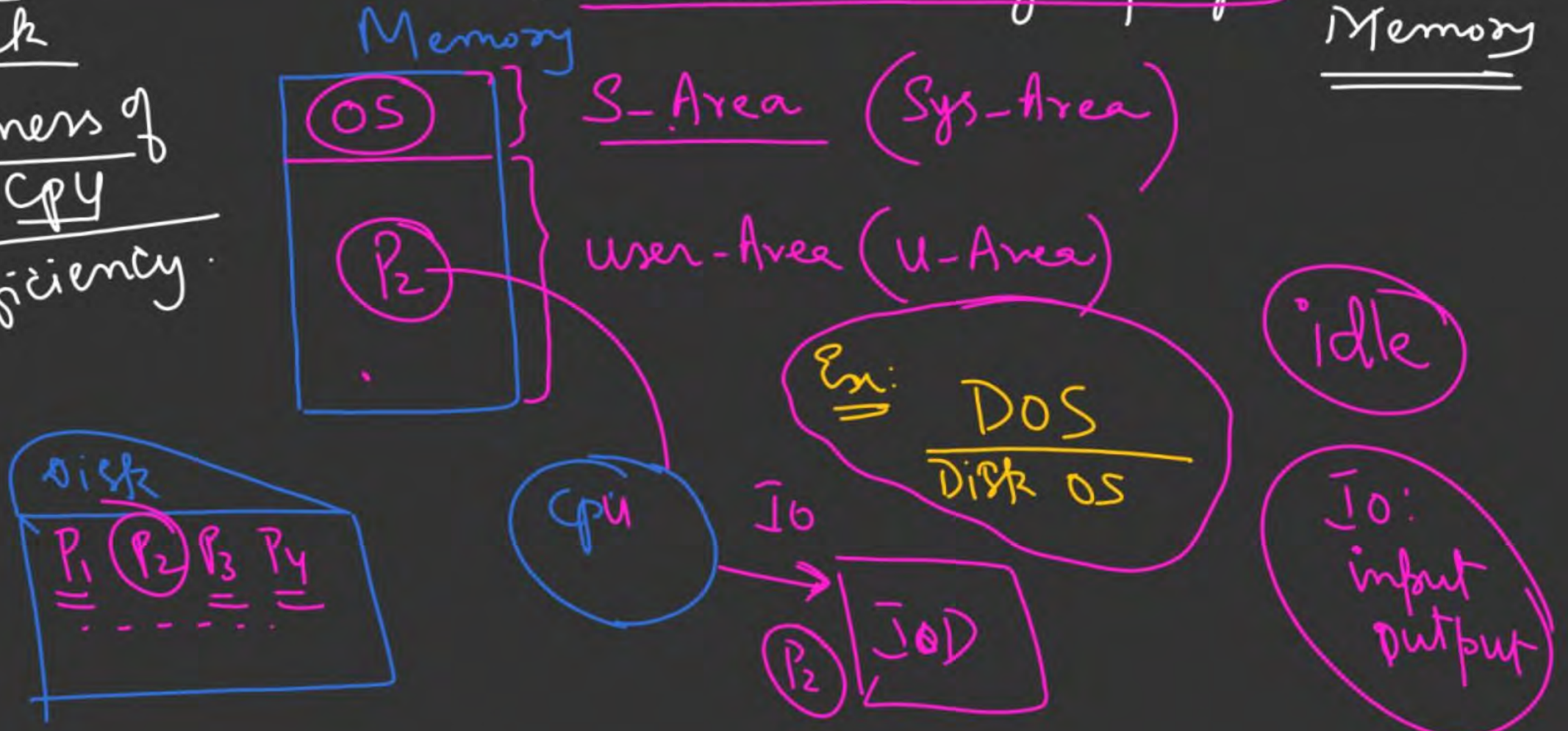
2nd Gen: (1940 - 50)
Mag. Tapes
No OS

3rd Gen.: 1950 - 60's
(Mag. Disk)

Uniprogramming: Ability of the O.S to Load and execute a Single program in Memory

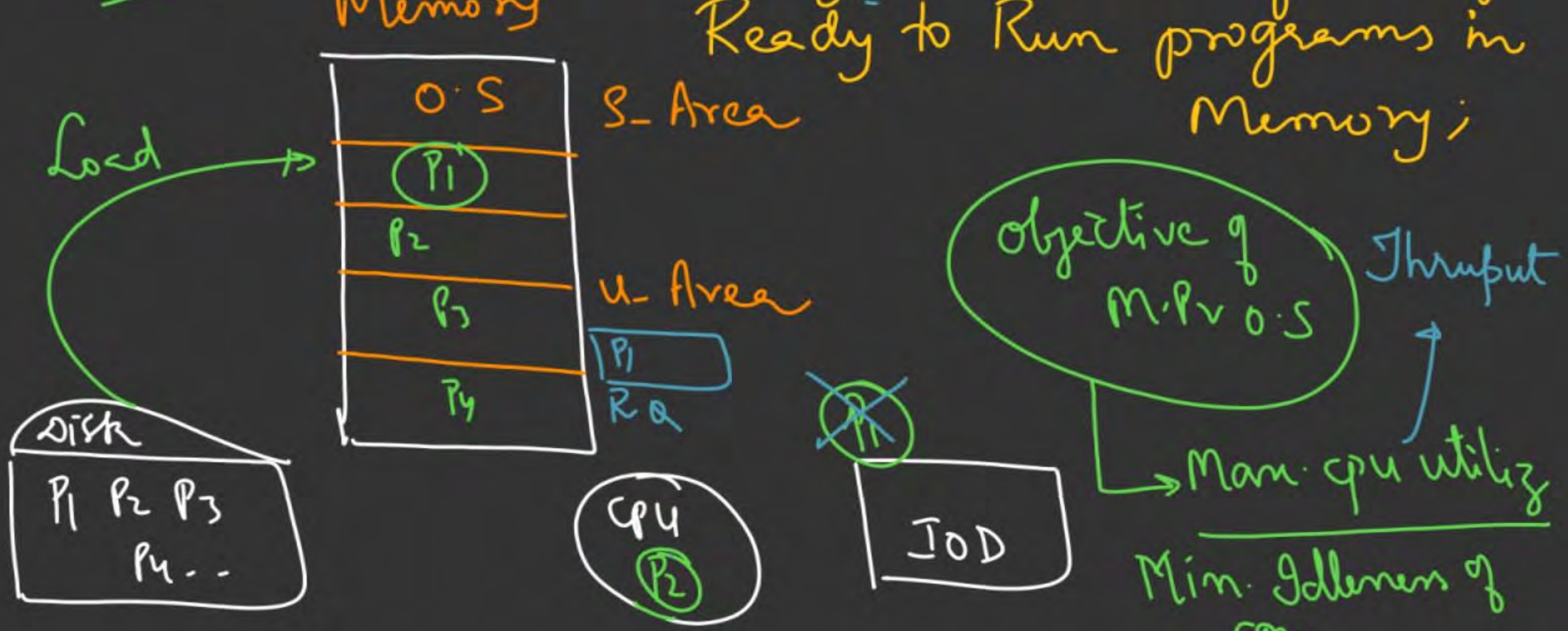
Drawback: Idleness of CPU

Inefficiency.



Multiprogramming: Ability of O.S to Load and manage execution of Multiple Ready to Run programs in Memory;

M.Pr



Objective of M.Pr O.S

- Throughput
- Max. CPU utiliz
- Min. Idleness of CPU

Thruput: No. of Programs/Tasks/appl. Completed per unit time;

10 programs — 60 m
? — 1 m

$\frac{10}{60} = \frac{1}{6}$

9-1

4 x 60
= 240 m

15 topics — 240 m
? — 1 m

$\frac{15}{240}$

Types of Multiprogramming :

Pr. M.Pr OS: UNIX; LINUX; WINDOWS; MACH

- No forceful dealloc
- Non Preemptive (N.Pr) — WIN 3.x
  - Program releases CPU voluntarily
  - Completion
  - IO
  - System Call
- Preemptive (Pr)
  - Forceful deallocation

IOS

CPU P1

Starvation (responsiveness)

Interactiveness

Function call to O.S for availing OS service

Enforce Preemption:
- Priority
- Time

Pr.M.Pr is Multitasking

THANK
YOU!