Sunbeam Institute of Information Technology
Pune and Karad

Module - Embedded Operating System

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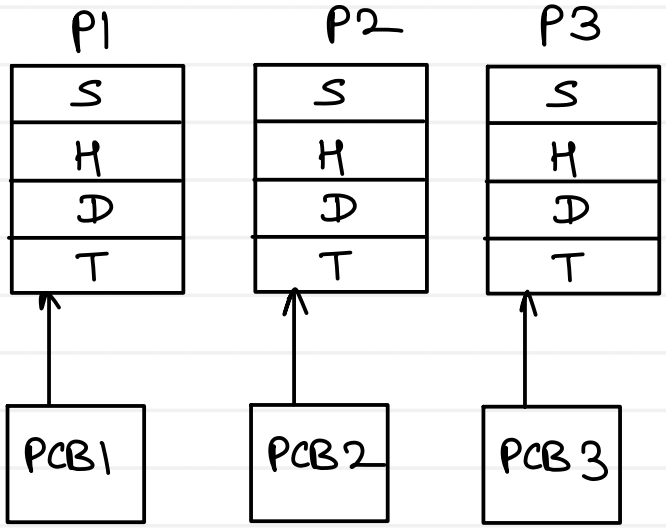
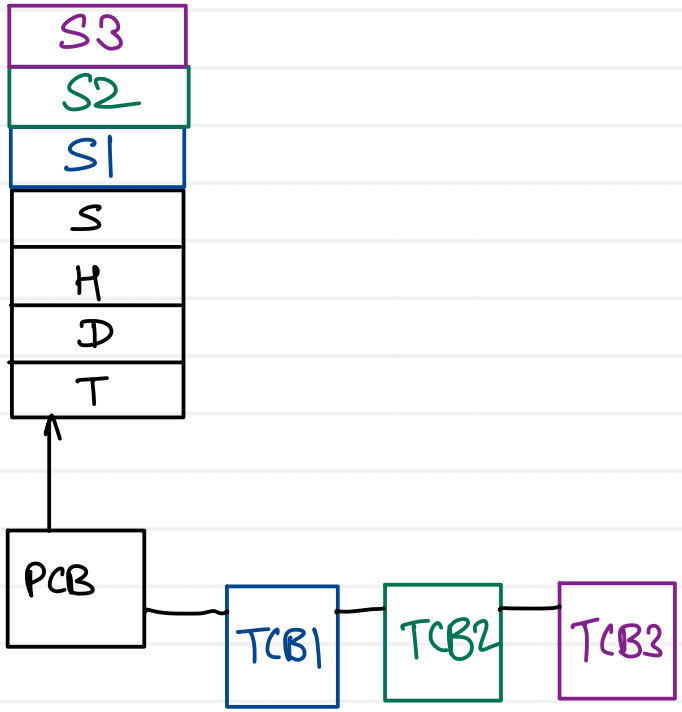
Process vs Thread



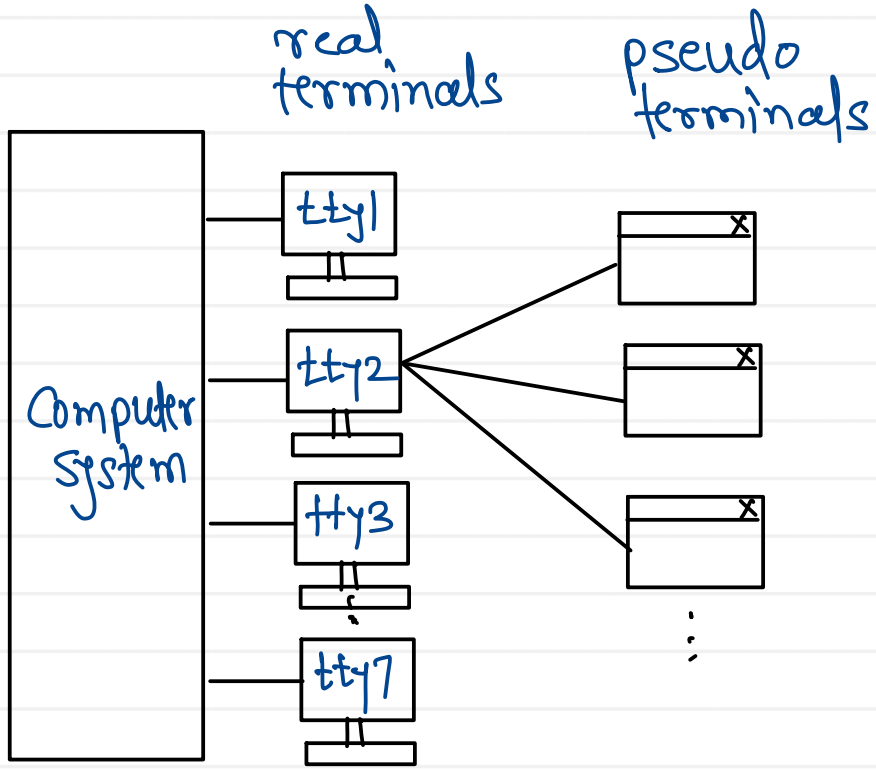
- by default every process has one main thread and it executes on CPU
- process is container of resources thread is a live entity which is running inside container

Thread - light weight process



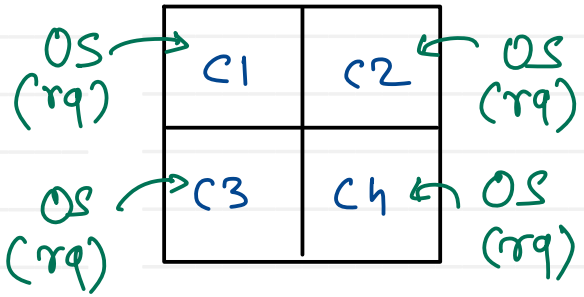
Types of Operating system

5> Multiuser system :
- multiple terminals are connected to system
(keyboard + Monitor)

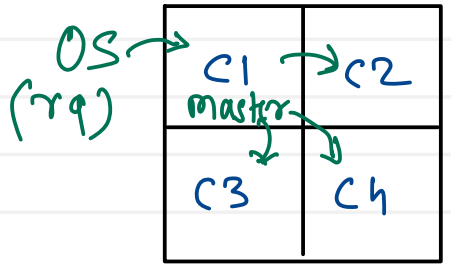


6> Multiprocessing system
- multiple CPUs are putted together in single chip. such chips are called as multiprocessor / multicore
- OS can schedule multiple processes for multiple cores, means multiple instructions will be processed paralle

1> Symmetric multiprocessing

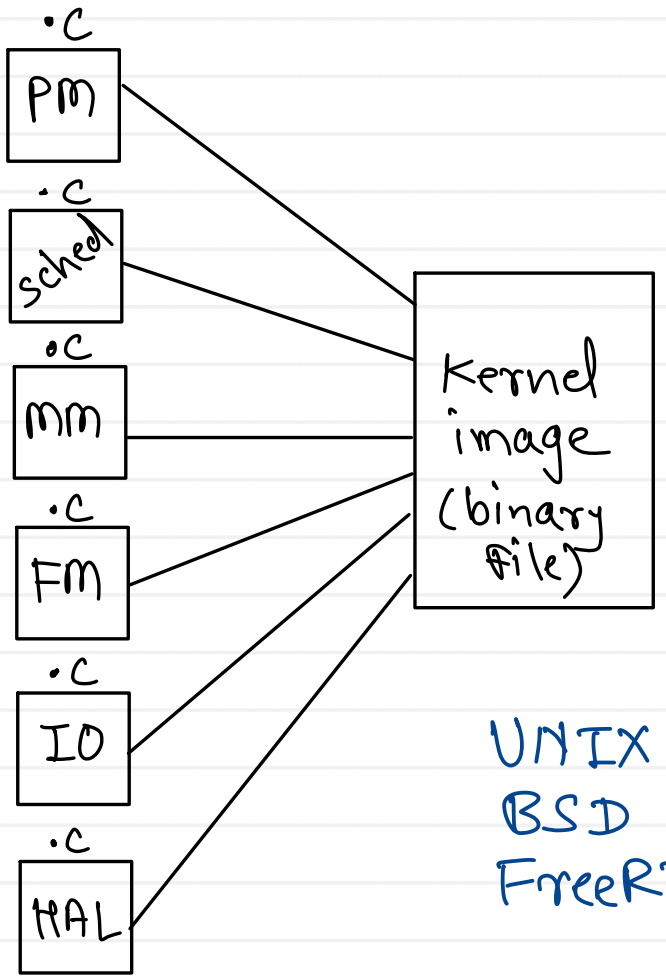


2> Asymmetric multiprocessing



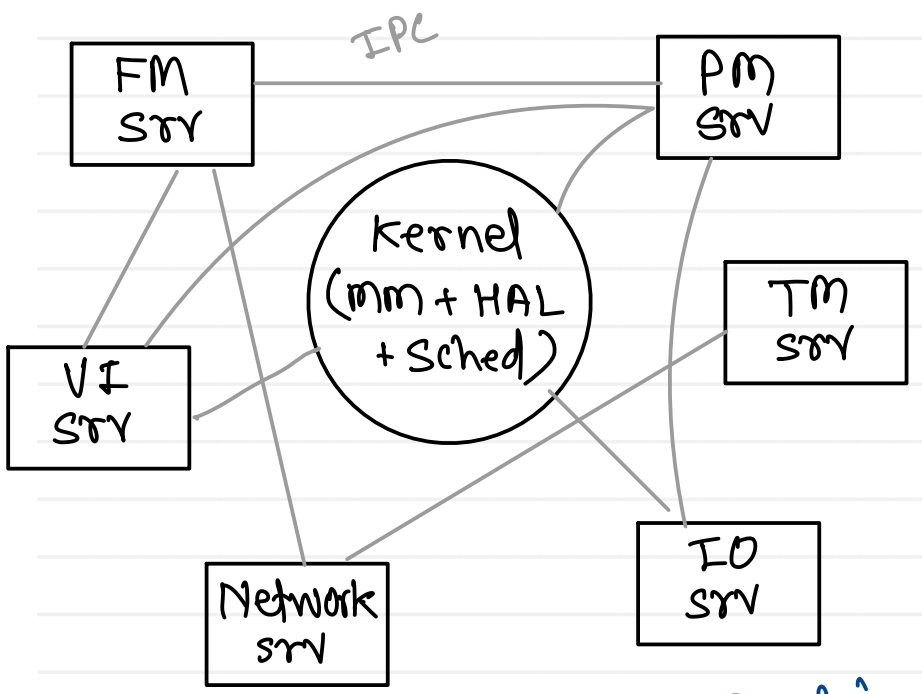
Types of kernel

Monolithic Kernel



UNIX
BSD
FreeRTOS

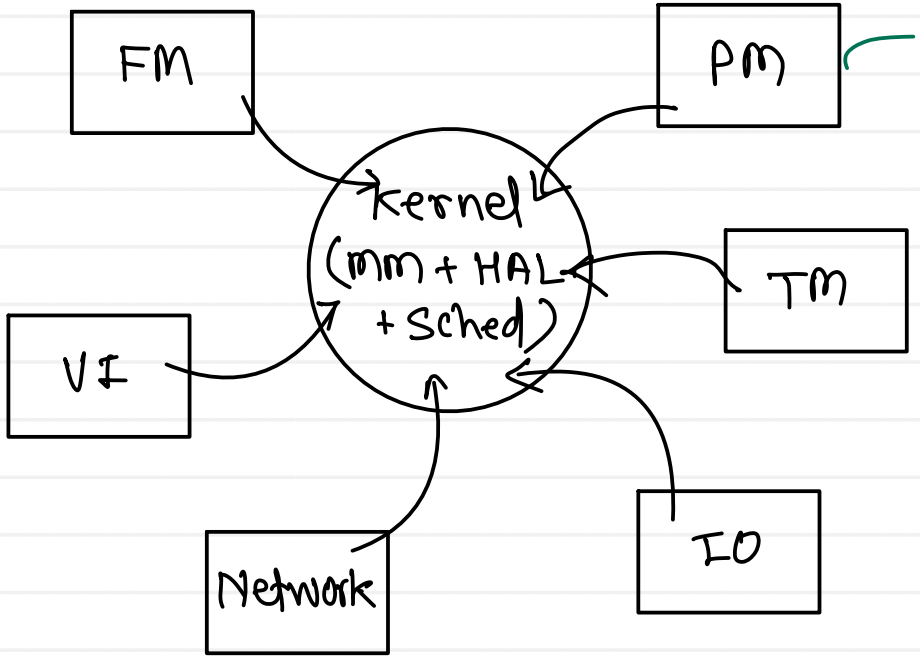
Micro Kernel



Symbian
QNX
MACH

Types of kernel

Modular Kernel



- dynamically loadable module
  (.dll / .ko)
  ↑
  Kernel Object

Windows

Hybrid kernel

∑ multiple kernels

e.g. Darwin = BSD Unix + MACH

Linux kernel

Linux = (Monolithic) static component +

1) Process management
2) Memory management
3) CPU scheduling
4) IO subsystem
5) Hardware Abstraction
6) system calls
7) ....

kernel = vmlinuz

location = /boot

(Modular) Dynamic Component +

1) file system managers
2) Device driver
....

dynamically loadable modules

↓

.ko = kernel object

location = /lib/modules/6.8.0-57-generic

(Micro) + GUI shell

1) GNOME
2) KDE

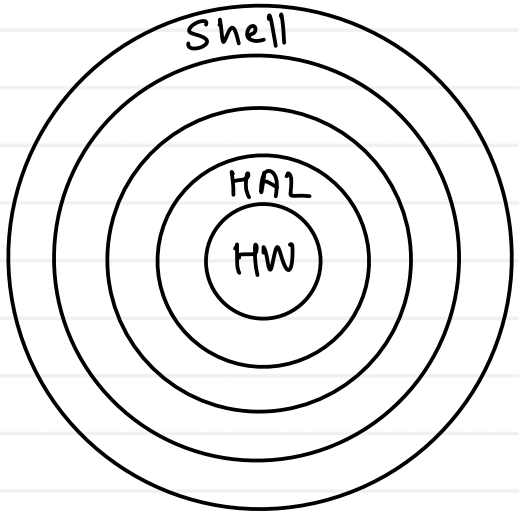
(xServer)

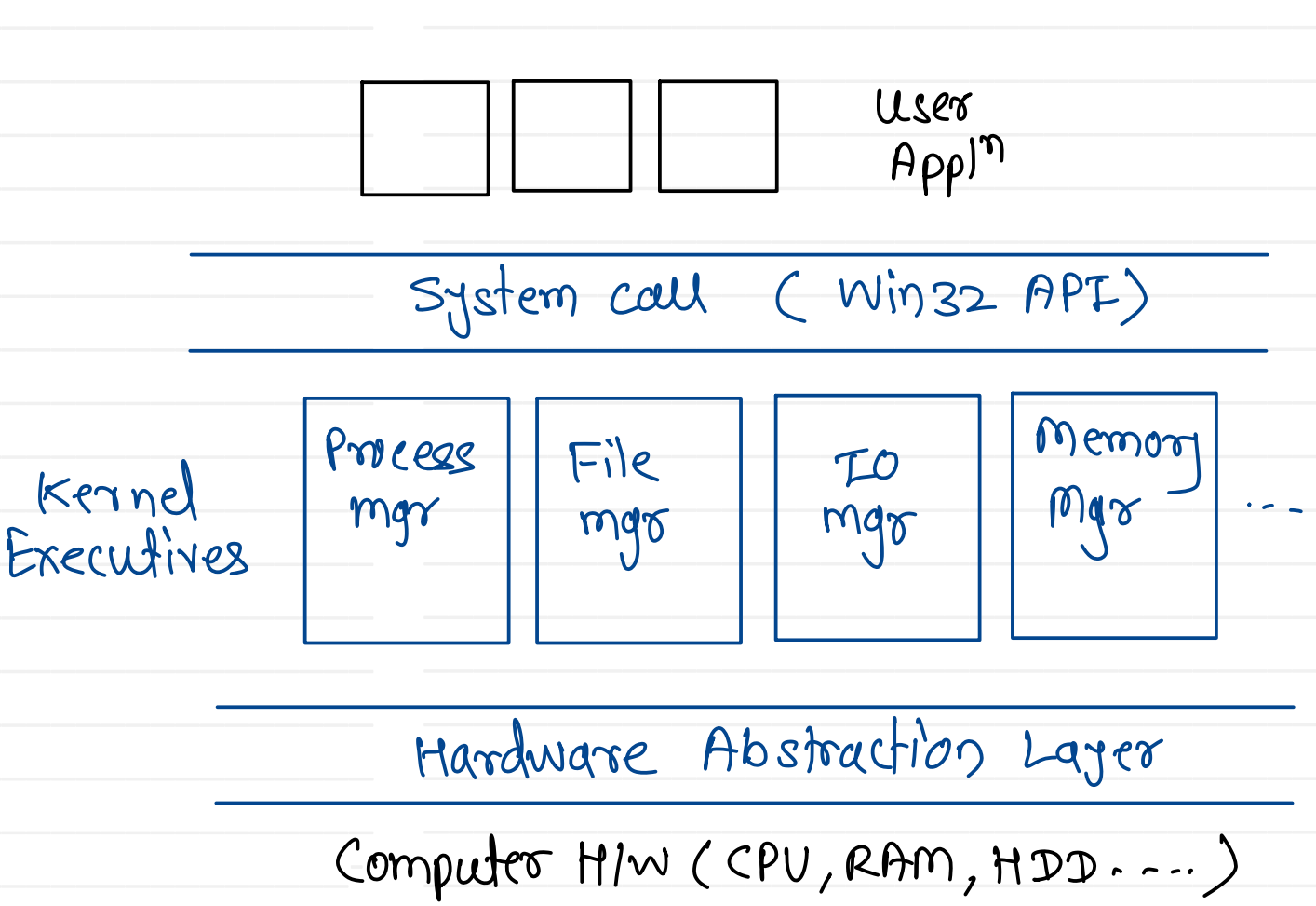
startx

used to start UI

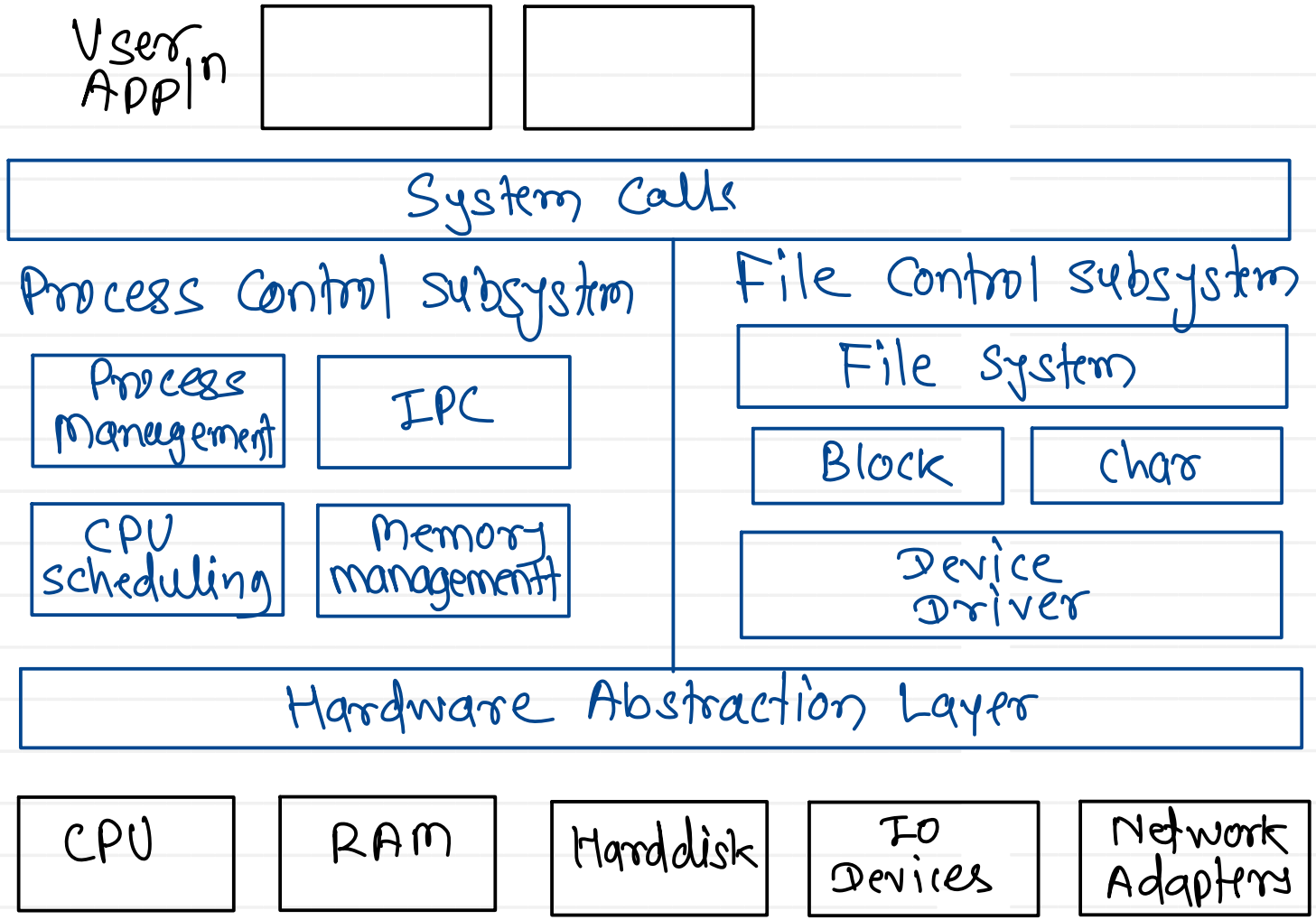
linux source code - www.kernel.org

Windows kernel

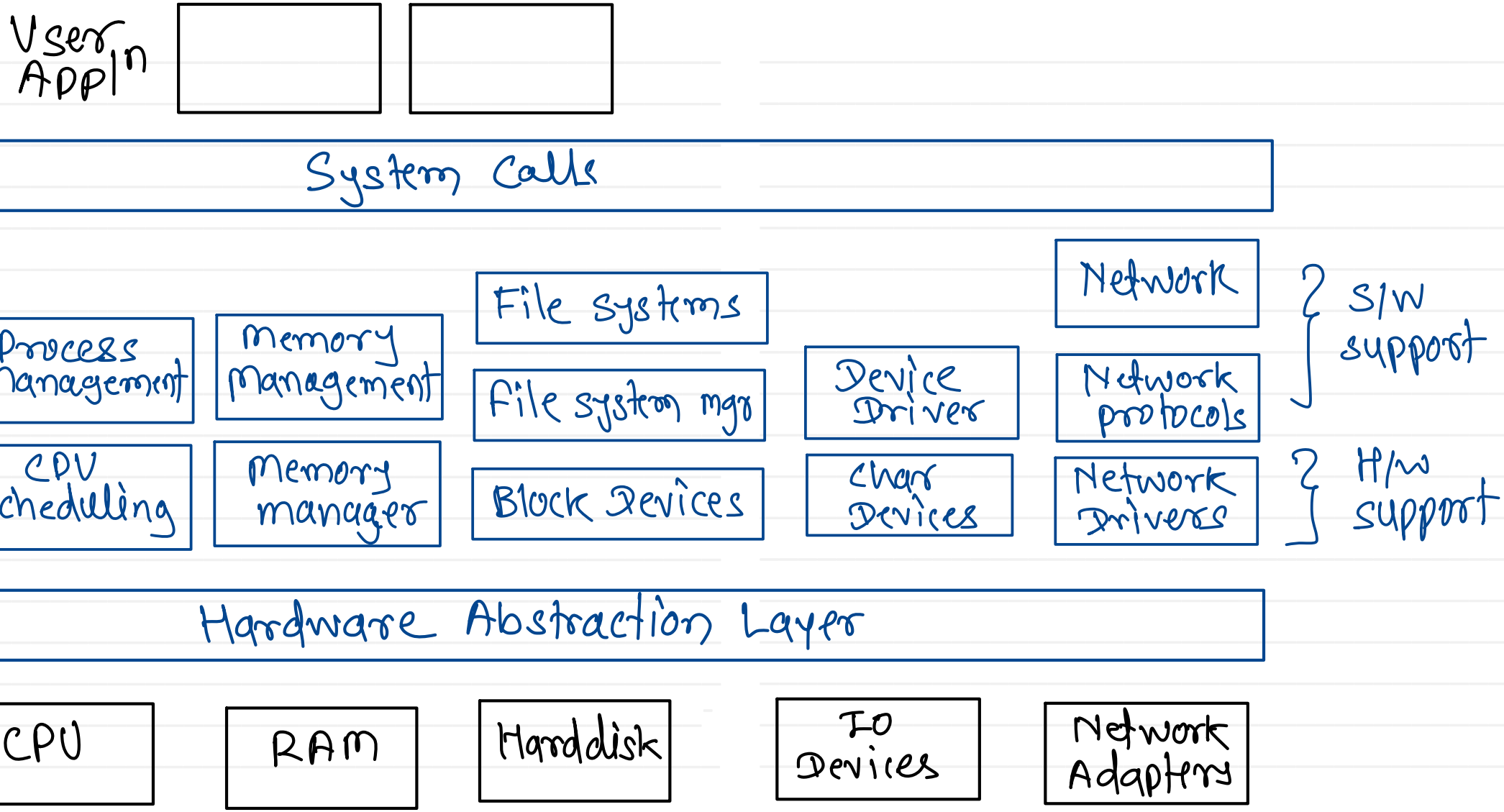




UNIX kernel


User Appln
System Calls
Process Control subsystem
Process Management
IPC
CPU scheduling
Memory management
File Control subsystem
File System
Block
Char
Device Driver
Hardware Abstraction Layer
CPU
RAM
Harddisk
IO Devices
Network Adapters

Linux kernel



Thank you!!!

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