

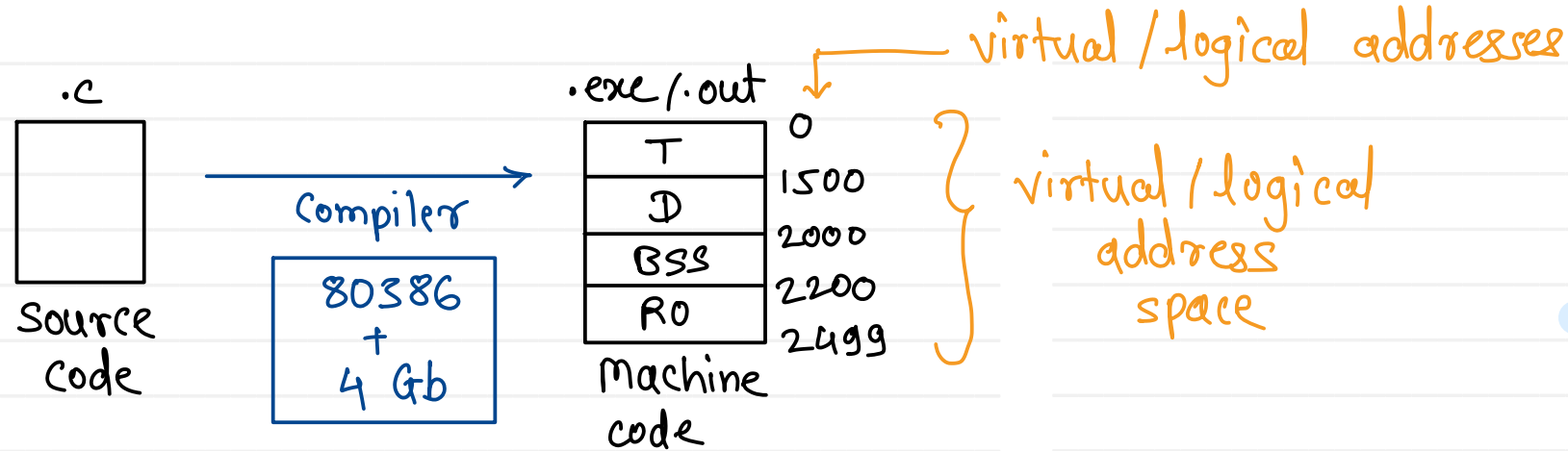


Sunbeam Institute of Information Technology
Pune and Karad

Module - Embedded Operating System

Trainer - Devendra Dhande

Email – devendra.dhande@sunbeaminfo.com

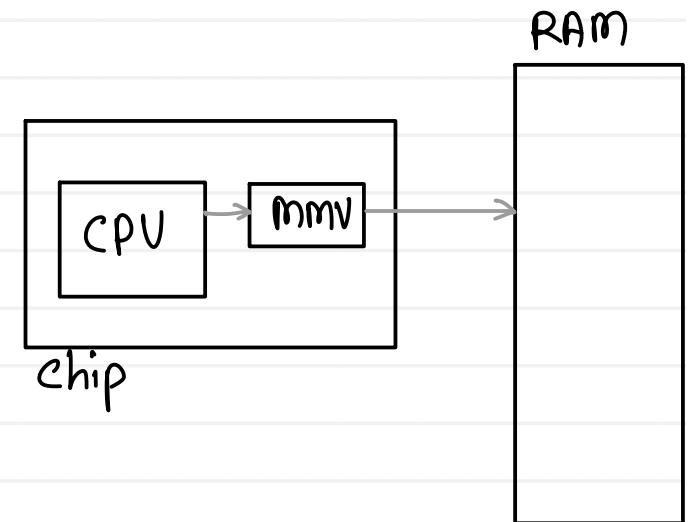


CPU always executes process in virtual address space

- MMU (Memory Management Unit) is used to convert logical addresses into physical addresses.
- MMU Hardware is present inside CPU chip itself

Types of MMU :

- 1) Simple MMU : Contiguous memory allocation
- 2) Segmentation MMU : Segment wise allocation
- 3) Paging MMU : Page wise allocation



.exe / .out

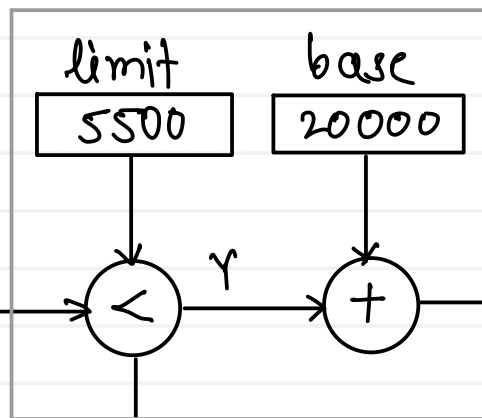
T	0
D	1500
BSS	2000
RO	2200
	2499

Machine code

Loader

CPU

2000



mmu

22000

5500		
3500	S	25500
2500	H	23500
2200	RO	22500
2000	BSS	22200
1500	D	22000
0	T	21500
		20000

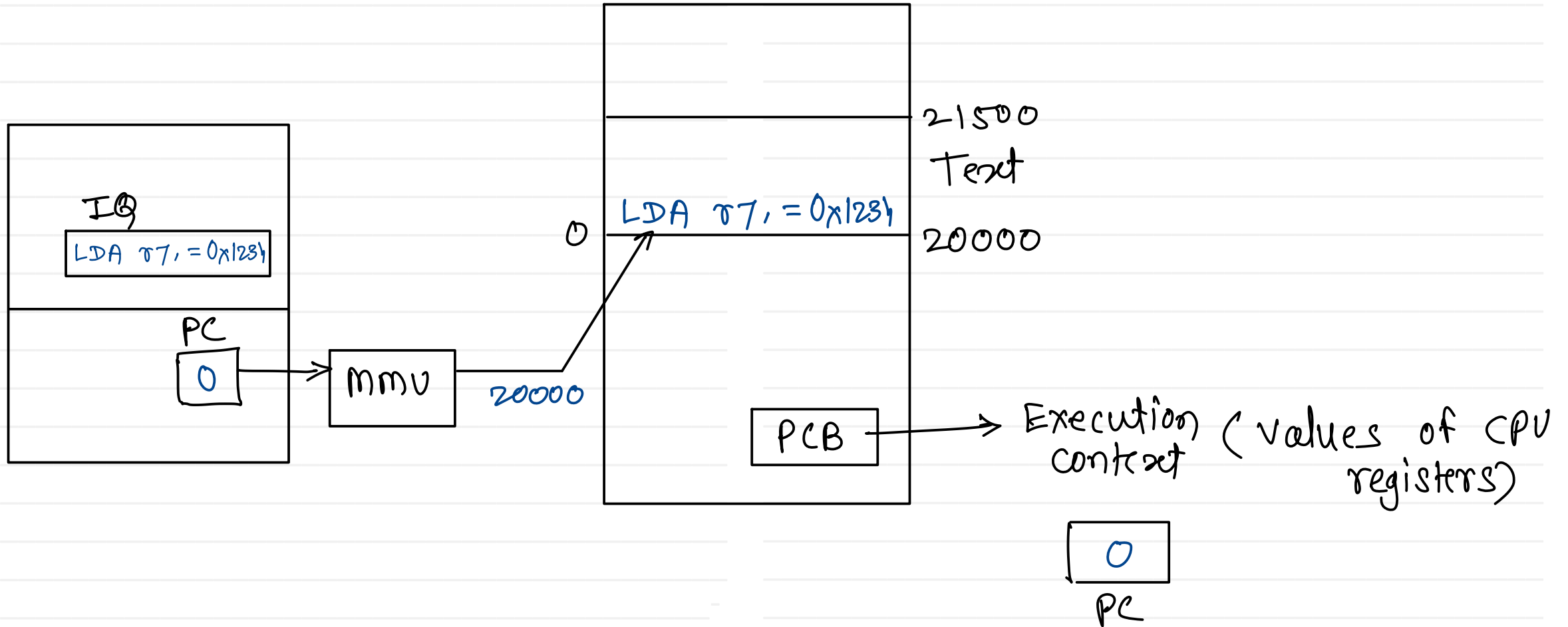
Actual / physical addresses

Physical address space

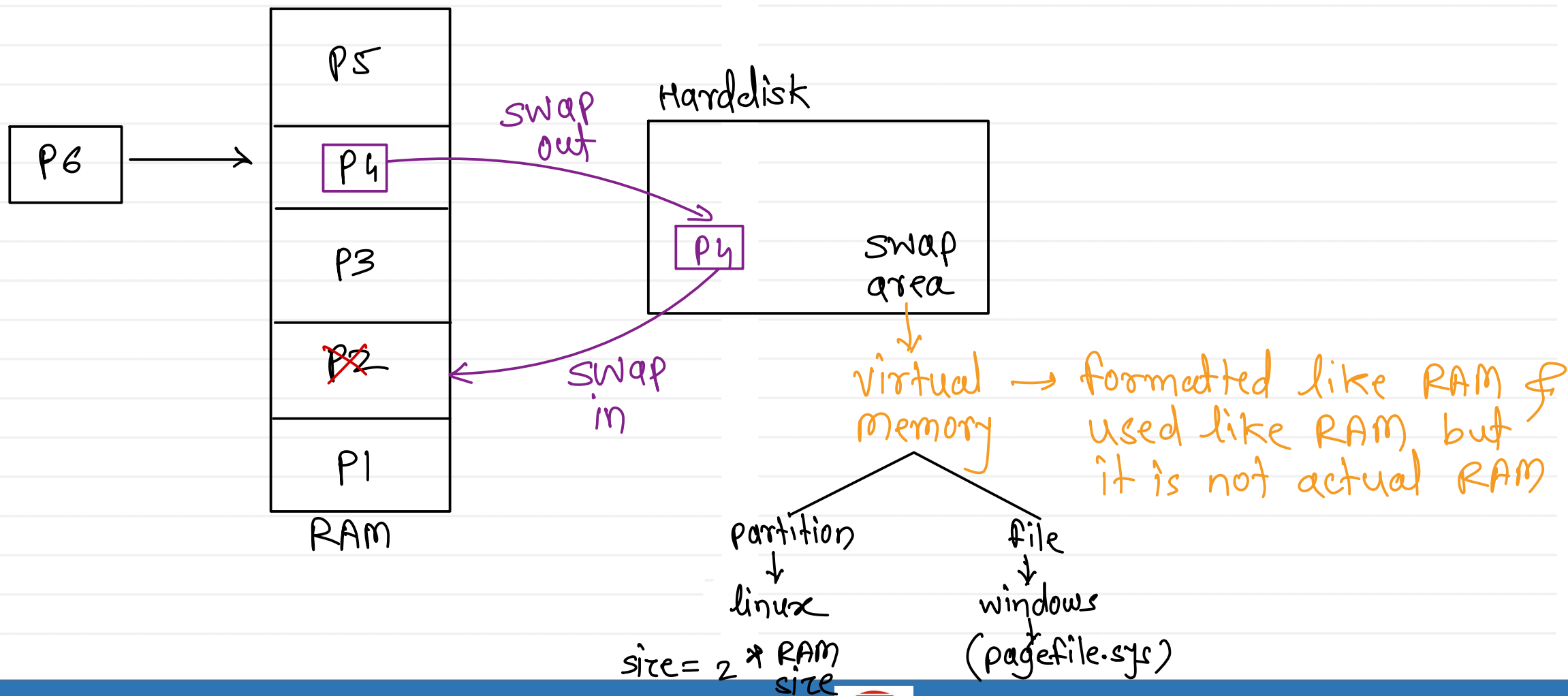
OS

PCB

limit	base
5500	20000



virtual memory - extension to main memory (RAM)



File = collection of data

File = data + meta data

(Actual Content
of file)

(data block)

(information about
file)

- name, location/path
- size
- type
- no. of links
- permissions
 - r-read, w-write, x-execute
 - u-user, g-group, o-others
- timestamps
 - create, access, modify
- user/owner, group
- info about data blocks

File
Control
Block
(FCB)

type → -rw-rw-r-- no. of links → 1 sunbeam sunbeam size (bytes) → 24 Oct 4 10:07 sample.txt
 permissions/Access/mode user/owner group timestamp name

Types of files:

- 1) Regular file (-)
- 2) Directory file (d)
- 3) Link file (l)
- 4) Pipe file (p)
- 5) Socket file (s)
- 6) Char special file (c)
- 7) Block special file (b)

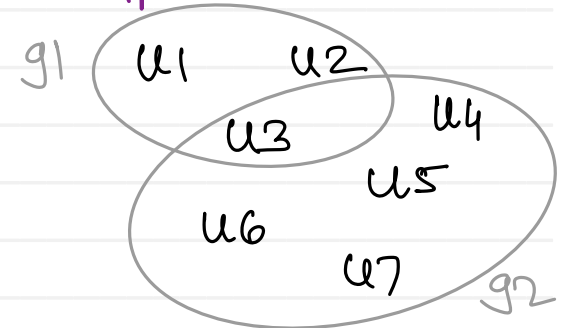
Permissions : levels:

r - read
 w - write
 x - execute

u - user/owner
 g - group
 o - others

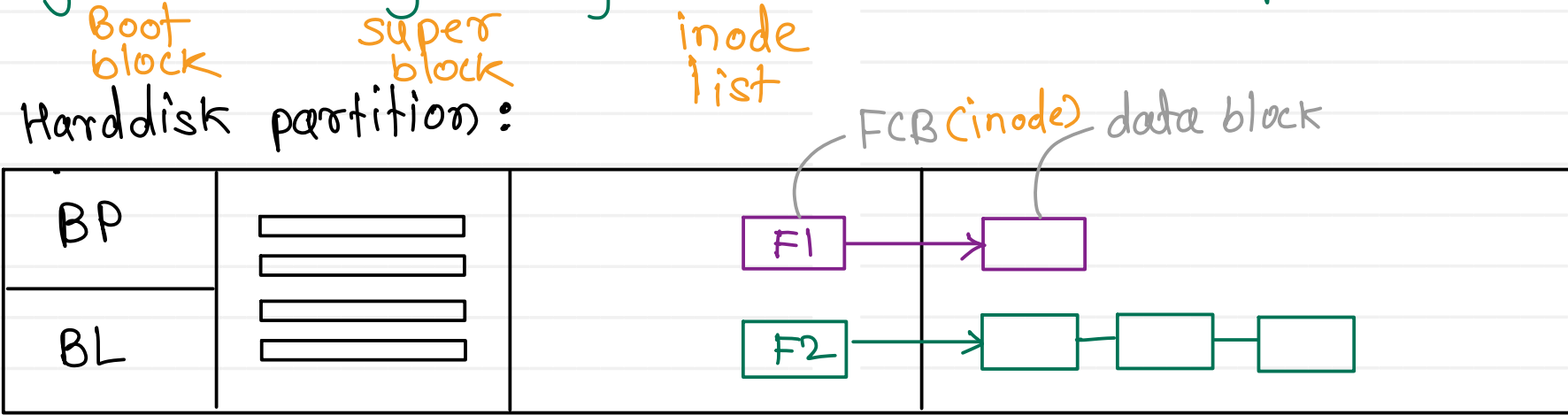
rw-rw-r--
 ↑ ↑ ↑
 u g o

Groups:



file name : sample.txt
 user/owner : u1 (rw-)
 file group : g1 (rw-)
 others : g2 (r--)

File system : Organizing files on harddisk partition



Boot sector



contains two programs which are needed for booting

- 1) Bootstrap program
- 2) Boot loader

volume control Block



info about volume/partition

- label
- size
- filled, empty
- info about free data blocks

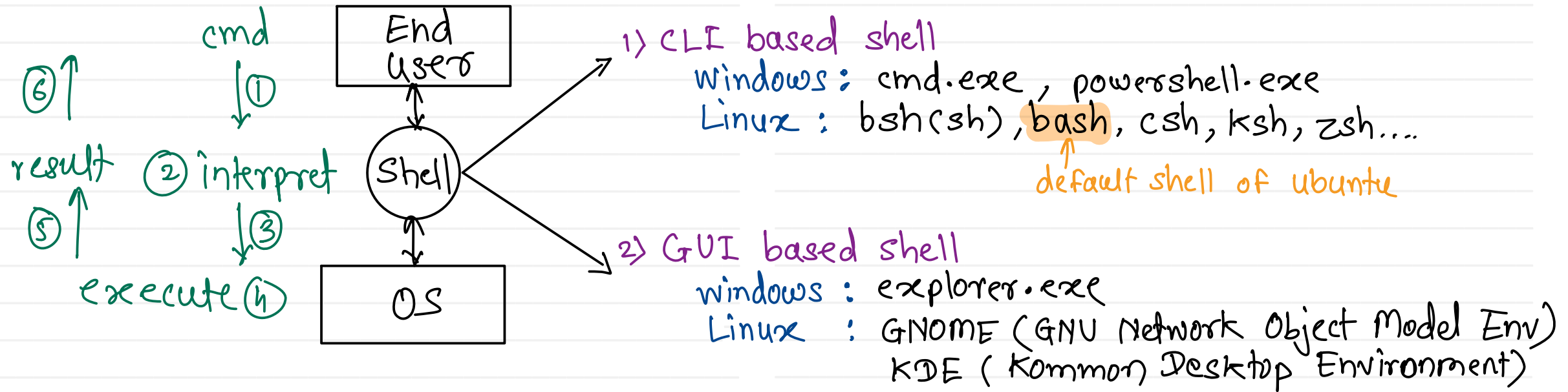
Master file table

Data Blocks

- size of data block is fixed but it is configurable at the time of formatting

size = 4096 bytes

- user interface is provided by one program and it is called as shell.
- shell is called as command interpreter
- shell is an intermediate betⁿ OS & user





Thank you!!!

Devendra Dhande

devendra.dhande@sunbeaminfo.com