07 July 2023   08:10

① CPU   scheduling   algo
 - FCFS
 - SJF
    ├ SNTF
    └ SRTF
 - Round Robin
 - Priority Queue

- Multilevel Queue
- IPC
    ├ Indepent process
    └ Co-operative Process
 - Share Memory
 - Pipe
 - msg Queue
 - Signal
 - socket

 - Syn tool
    1- Semaphore
        ├ classic/counting
        └ Binary
    2 - mutex

→ Deadlock Char²
    1- Mutual exclusion
    2- No Premption
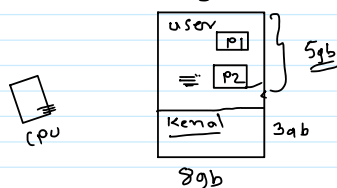   3- Hold wait
    4- Circular wait

✷ Deadlock prevention
✶ Deadlock Detect & Avoid
 - Deadlock Recover
    - Resource Pemption
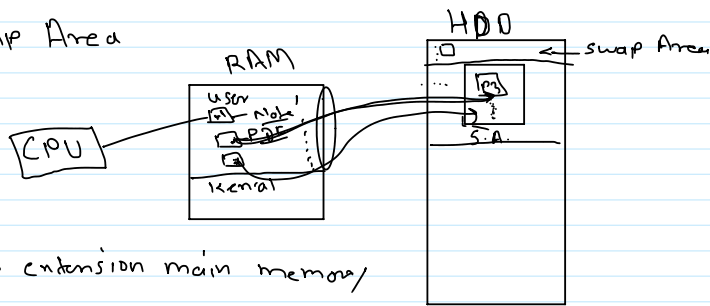   - Prorcesess Kill

- Memory types (CF)
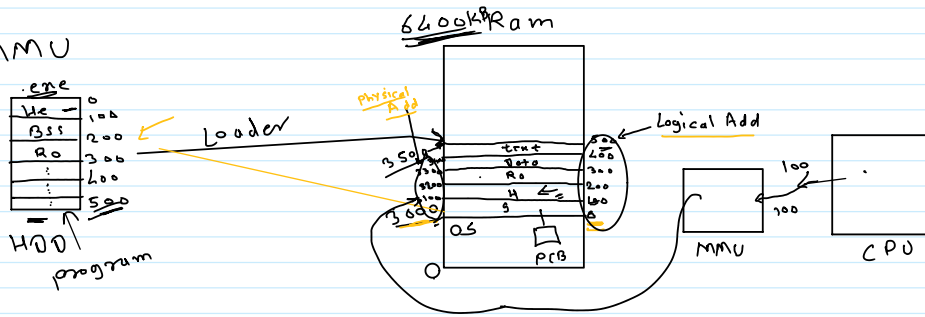
* Memory Management
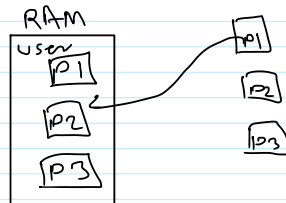

* Swap Area   HDD

89b

✳ Swap Area

RAM   HDO

user ... swap Area

CPU   Kernel   S.A.

—To extension main memory

✳ MMU

6400kB Ram

He   0
BSS   100   Loader   Physical Add
Ro   200
      300   Logical Add
      400   txt
      500   Data   MMU   CPU
            Ro   100
HDO   OS   100
program   PCB

✳ memory Allocation

RAM
① Contigeouse M.A   user
                      P1   P1
② Non-Contegous M.A   P2   P2
                      P3   P3

① Contigeous M.A.

Ram – user
P1 ──→ P1
20kB   20kB

–1 –Fixed Size Partion

4000kB RAM
        4000   —No of process limited/Degree of multiprograming limited
        3000
P1   P3   —Internal Fragmentation
1500   2000
P2   P2   — Size of process limited
600   1000
P3   P1
1000   1000 KB
P4   0
P5
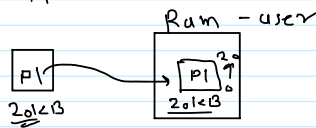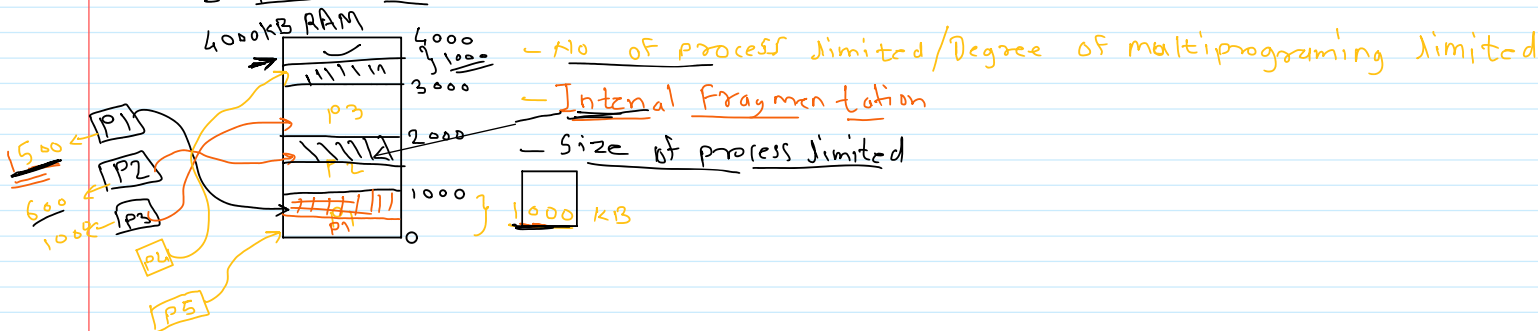
② Variable Size Partition
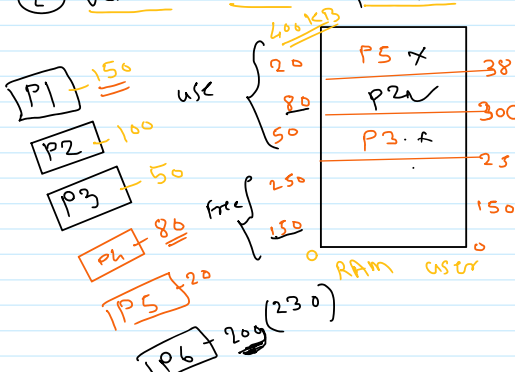
400KB   Advant.
        20 P5 ✗ 380   ①NO I.F.
P1 150 use 80 P2✓ 300
P2 100   50 P3.✗ 250   ② process size Not limited
P3 50   250
                        ③ Degree of M.P Not Fixed
P4 80 free 150
P5 20   RAM user   Disadvantage
P6 200(230)   —External Fragmentation

IP5
IP6 → 20g (230)

— External Fragmentation

② Non-Contiguous M.A

① Segmentation
② Paging

RAM

200
S ← Seg
H ← 0
P1

↗ 5 P1 100
↗ H P1 100kB

② Paging

Process 8kB → 320kB
Pages → P1 4km   4
P2 8kB   4
P3 12kB   4
P4 16kB
P5 2kB
18

(1 2 3)

RAM
P1
P2
P3   5gb
P4
P5 ▨
4kb   ← Frames
9gb

Virtual mem

RAM   page in
P1   page   Pn
D1   out   Pm   — Swap Area
P2
P3
Mew
89b

12gb

27 30

4.0kB   S A
P1 +   VM
P2 a
P m
P2   P f
HDD

CPU

Process   50kB
RAM
Page

11.30
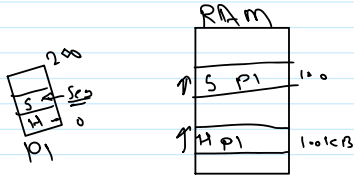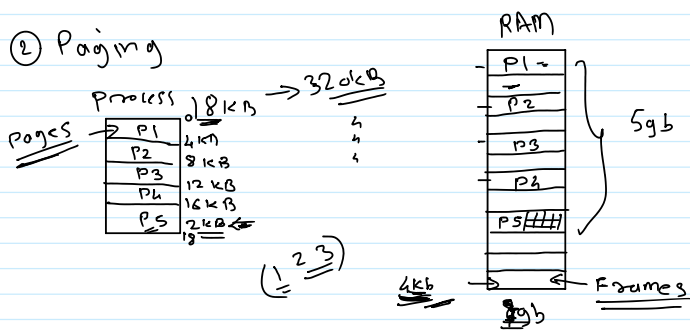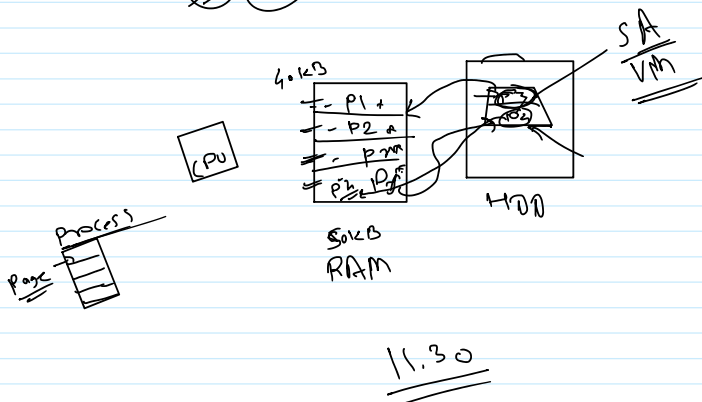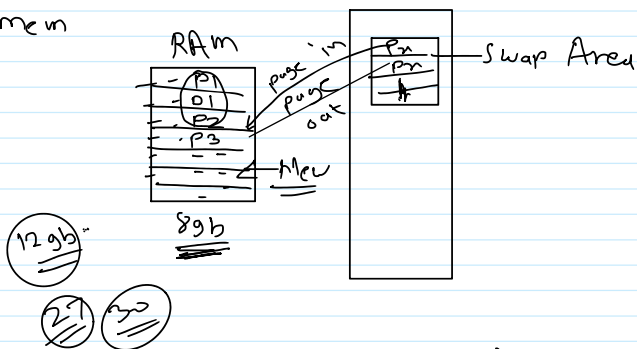
Frame Count 3

FIFO Page Replacement

Pages →

①	②	③	④	1	2	5	1	2	③	4	5	╳ — 12
F1												

1	1	1	4	4	4	5	5	5	5	5	5
	2	2	2	1	1	1	1	1	3	3	3
		3	3	3	2	2	2	2	2	4	4

F1 F2 F3

F. F. F F F9 F F Hit Hit F↑ F Hit

Number of Page Fault = 9

(Belady's Anomaly)

Hit = 3   Avg Hit Ratio = $\frac{3}{12}$

Fault = 9   Avg F.R = $\frac{9}{12}$

Screen clipping taken: 07-07-2023 11:32

ORR = Replace Not use near future

Frames = 3   Algo

Optimal Page Replacement

Pages →

1	2	3	④	1	2	5 →	1	2	3	4	5 → ╳

1	1	1	1	1	1	1	1	1	3	3	3
	2	2	2	2	2	2	2	2	2	4	4
		3	4	4	4	5	5	5	5	5	5

F1 F2 F3

F F F F H H F H H F F Hit

Number of Page Fault = 7

Hit = 5

Screen clipping taken: 07-07-2023 11:40

LRU $\frac{F = -}{H = -}$

Algo = LRU
Frame Cont = 3

LRU Page Replacement

Pages →

1	2	3	4	1	2	5	①	2	3	4	5

1	1	1	4	4	4	5	5	5	3	3	3
	2	2	2	1	1	1	1	1	1	4	4
		3	3	3	2	2	2	2	2	2	5

F1 F2 F3

F F F F F F F H H F F F

Number of Page Fault = 10

Implementation: Stack based approach -- O(n)

Second chance LRU -- Approximate LRU (similar) -- O(1)

$\frac{F = }{H = }$

O(n)

Screen clipping taken: 07-07-2023 11:49

✗ File management

32gb   28gb   2kb

		Master File Table	☐ ☐ ☐ ☐

boot block   Super block   inodes   Data block

Master file Table

hide.
hgb

NTFS
FAT
ext

process - life Cycle

R.Q   J.Q

CPU

W.Q

Computer hard drive

spindle
disk
saved file
actuator
power port
data cable port
drive configuration port

read/write head

arm
circuit board

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motor

Track

Sector
(512 A)

Plater

0 1 — make aluminium | alloy
— magnetic Coating

S   S
1   0

Emf