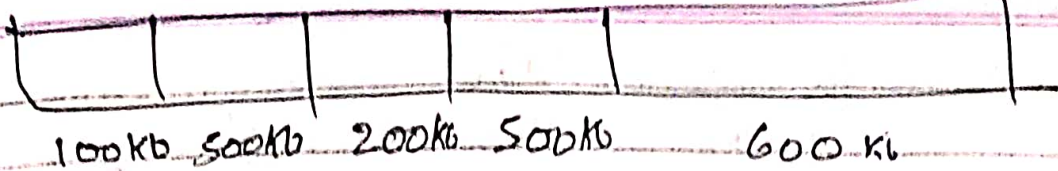


9

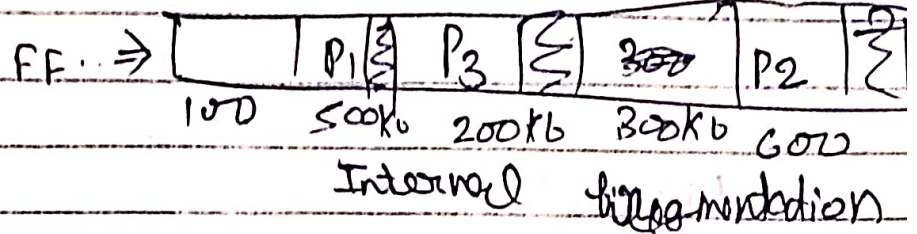


$$P_1 = 212 \text{ Kb} = 500 - 212 = 7$$

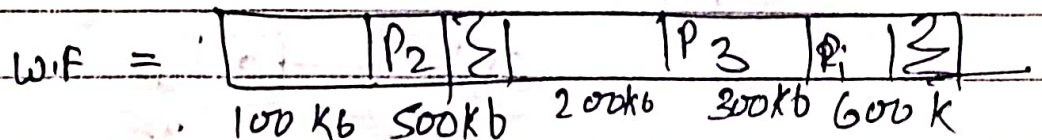
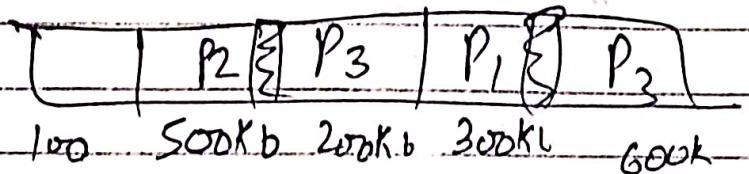
$$P_2 = 417 \text{ Kb}$$

$$P_3 = 112 \text{ Kb}$$

$$P_4 = 426 \text{ Kb}$$



B.F



P_4 have to wait

Q

$$\text{TLB hit} = 0.9$$

$$\text{RAM Access time } T = 100 \text{ ns}$$

$$\text{TLB " " " } = 20 \text{ ns}$$

Effective access time with TCB =

$$= H \times (T + t) + (1 - H) \times (2 \times T + t)$$

$$= 0.9 \times (100 + 20) + 0.1 \times (2 \times 100 + 20)$$

$$0.9 \times \frac{120}{10} = 10.8$$

$$0.1 \times \frac{220}{10} = 2.2$$

$$10.8 + 2.2 = 13$$

consider the symbol table

Symbol	Base	Limit
0	219	600
1	2300	14
2	90	100
3	1327	500
4	1952	96

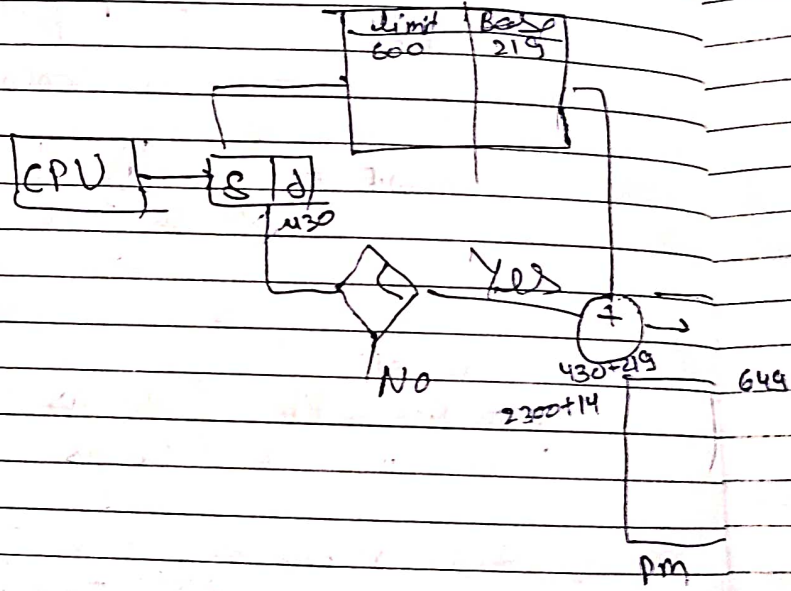
(i) 0, 430

(ii) 1, 10

2, 500

3, 400

4, 112



frame no 3

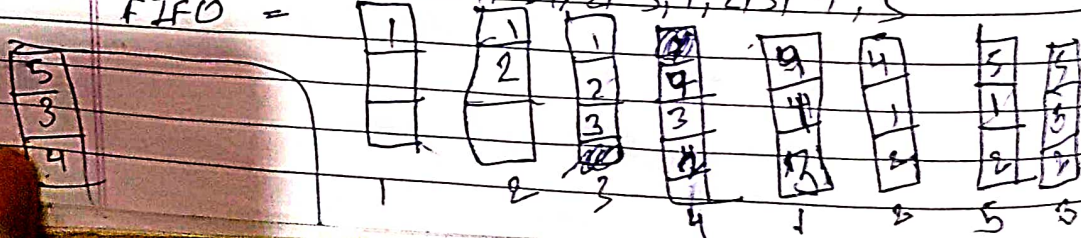
7	7
0	0

Page replace Algo 2

frame no = 3

Suppose

Page references = 1, 2, 3, 4, 5, 1, 2, 3, 4, 5
 FIFO =



$$\text{Page fault} = 9$$

$$\text{Page fault ratio} = \frac{9}{12} = \frac{3}{4}$$

$$\text{hit ratio} = \frac{3}{12} = \frac{1}{4}$$

Q. frame no. 3

7, 0, 1, 2, 0, 3, 0, 4 [2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 9]

AFO	7	7	
		0	

649

Q.

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

1-72

Belady's Anomaly

from some page reference sequence increase the num of frame also increase the num of page fault & this is known as valid Belady's Anomaly

4, 7, 6, 1, 7, 6, 1, 2, 7, 2

no of frame 3

no of page fault = 8

Adv → ① Simple easy to understand
 ② slow overhead

Disadv Poor Performance

suffer from Belady's Anomaly

LRU (Least Recently Used)

The page that has not been used very long time in the main memory will be selected for replacement

frame no = 3
 Page reference → 1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5

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

Adv:

- ① efficient in practical situation
- ② don't suffer from Belady's Anomaly

Dis:

- ① complex implementation
- ② expensive hardware support

① main all

11/

Optimal Page Replacement:-

This algo replace the pages that will not be use for longest time in future but practically it is not possible because we can't predict in advance those pages that will not use for longest period of time.

frame no = 3

1, 2, 3, 4, ~~1~~, ~~2~~, 5, ~~1~~, ~~2~~, 3, 4, ~~5~~

⇒

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

page fa = 7

$$R_a = \frac{7}{14}$$

No of frame 4

5 7 0 1, 7, 6, 7, 2, 1, 6, 7, 6, 1

Or main m hold three page frame initially all frame are empty

2, 3, 2, 4, 6, 2, 5, 6, 1, 4, 6
 w/ ratio will be

11/3 1/11 3/11 2/11