Bài 9.3:

Page	Page Frame
0	–
1	2
2	C
3	A
4	–
5	4
6	3
7	–
8	B
9	0

a) 9EF → 0EF
b) 111 → 211
c) 700 → 000
d) CFF → EFF

Bài 9.8:

Reference string: 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6

a) LRU replacement:

+, 3 frames

	1	2	3	4	2	1	5	6	2	1	2	3	7	6	3	2	1	2	3	6
F_1	1			4			5		1				7			2		–		
F_2		2			–			6			3			–			–			
F_3			3			1			2	–		6			1			6		

=> 15 page faults

+, 4 frames

	1	2	3	4	2	1	5	6	2	1	2	3	7	6	3	2	1	2	3	6
F_1	1				–		–		6				–							
F_2		2				–		–		–				–			–			
F_3			3				5			3		–								
F_4				4				6			7			1						

=> 10 page faults

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b) FIFO replacement

+ 5 frames:

1 2 3 4 2 1 5 6 2 1 2 3 7 6 3 2 1 2 3 6

F1 1 - 6 -

F2 2 - - 1 -

F3 3 2 - -

F4 4 3 - -

F5 5 7

=> 10 page faults

+ 6 frames:

1 2 3 4 2 1 5 6 2 1 2 3 7 6 3 2 1 2 3 6

F1 1 - - 7

F2 2 - - - - 1

F3 3 - - 2

F4 4 3

F5 5

F6 6 - -

=> 10 page faults

c) Optimal replacement

+ 3 frames

1 2 3 4 2 1 5 6 2 1 2 3 7 6 3 2 1 2 3 6

F1 1 - - 3 - -

F2 2 - - - 2 2 -

F3 3 4 5 6 - 1 6

=> 11 page faults

+ 4 frames

F1 1 - - 7 1

F2 2 - - - - -

F3 3 - - -

F4 4 5 6 - -

=> 8 page faults

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Bài 9.19:

Ta có:

$EAT = (1-p) \times 100 + p * [100 + (1-0,7) \cdot 8 \cdot 10^{+6} + 0,7 \cdot 2 \cdot 10^{+6}]$

$= 100 - 100p + 100p + 16,4 \cdot 10^{+6} p$

$\Rightarrow 200 = 100 + 16,4 \cdot 10^{+6} p$

$\Leftrightarrow p \simeq 6,1 \cdot 10^{-6} (s)$

Bài 9.21:

*, LRU

	7	2	3	1	2	5	3	4	6	7	7	1	0	5	4	6	2	3	0	1
F1	7	7	7	1		1	3	3	3	2		7	7	6	5	5	5	2	2	2	1
F2		2	2	2	-	2	2	4	4	4		1	1	1	4	4	4	3	3	3
F3			3	3		5	5	5	6	6		6	0	0	0	6	6	6	0	0

=> 18 page faults

*, FIFO:

	7	2	3	1	2	5	3	4	6	7	7	1	0	5	4	6	2	3	0	1
	7	7	7	1		1		1	6	6		6	0	0	0	6	6	6	0	0
		2	2	2		5		5	5	7		7	7	5	5	5	2	2	2	1
			3	3		3		4	4	4		1	1	1	4	4	4	3	1	3

=> 17 page faults

*, Optimal:

	7	2	3	1	2	5	3	4		6	7	7	1	0	5	4	6	2	3	0	1
	7	7	7	1		1		1		1			1								
		2	2	2		6		5		5			6		4		6	2	3		
			3	3		3		4		6	7		0		0		0	3	0		

=> 13 page faults

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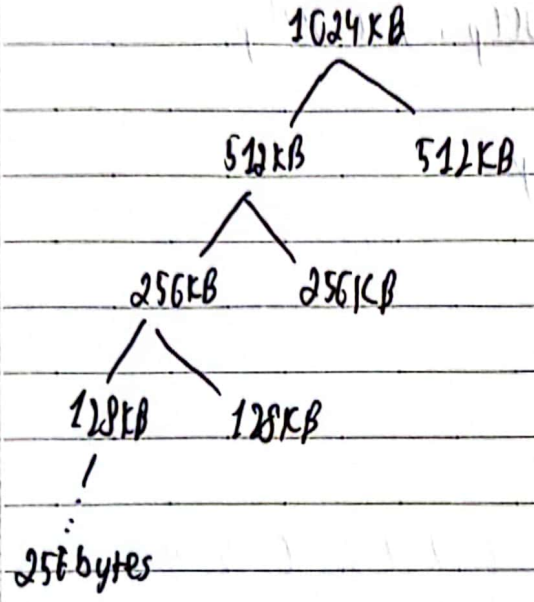
Bài 9.31:

EMAT = 0,18 · 1(µs) + 0,18 · 2(µs) + 0,02 (200 ns + 8 ms)

≈ 0,481 ms

Bài 9.35:



a) Requests 6KB → 8KB segment

b) Request 250 bytes → 256 bytes segment

c) Request 1500 bytes → 2KB segment

d) Request 7KB → 8KB segment

e) Request 900 bytes → 1024 bytes segment

Bài 9.22:

+, 0x E12C → 0x B12C

+, 0x 3A9D → 0x AA9D

+, 0x A9D9 → 0x 59D9

+, 0x 7001 → 0x F0C1

+, 0x ACA1 → 0x 5CA1

Explain:

→ Number of bits required to represent offset = $\log_2$ (page size)
= $\log_2$ 4096
= 12 bits

→ page number = 16 - 12 = 4 bits

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