2014 - 컴퓨터구조 기말고사 답안지 - 답 (80점 만점)

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2, 5, 8, 9, 10 번은 답을 뒷면에 쓸 것.

1. (1) **[1점]** (3800   ) ~ (3FFF   )

1-(2) **[6점]** [표 2]

Virtual Address	Virtual page number	Page fault (Y/N)	Physical page number	Physical Address
4A38	9	Y	0	0238
3870	7		1	0870
20B0	4	Y	2	10B0
67A4	12		3	1FA4
2220	4		2	1220
01E0	0	Y	0	01E0

1-(3) **[4점]** [표 3]

	Valid	PPN
0	1	0
1		
2		
3		
4	1	2
5		
6		
7	1	1
8		
9		
10		
11		
12	1	3
13		
14		
15		

3-(1) **[3점]** [표 5] Initial state of the data cache

	V	Tag	Data	V	Tag	Data
0	1	0000	M[000]~M[007]	1	1001	M[120]~M[127]
1	1	0000	M[008]~M[00F]	0	1100	
2	1	0100	M[090]~M[097]	1	1000	M[110]~M[117]
3	1	1111	M[1F8]~M[1FF]	0	0010	

3-(2) **[6점]** [표 6] Program

Instructions	Tag (이진수)	Index (십진수)	H/M
lw $1, 0x068($0)	0011	1	
lw $2, 0x114($0)	1000	2	H
lw $3, 0x030($0)	0001	2	
lw $4, 0x120($0)	1001	0	H
lw $5, 0x00C($0)	0000	1	H
lw $6, 0x024($0)	0001	0	

3-(3) **[2점]** [표 7] Final state of the data cache

	V	Tag	Data	V	Tag	Data
0		0001	M[020]~M[027]			
1				1	0011	M[068]~M[06F]
2		0001	M[030]~M[037]			
3						

4. [각 0.5점]	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	324	324	9	8	6	320	7	308	11	3

[각 2점]	IF	ID	EX	MEM	WB
6-(1)	sub	lw	slt	(bubble)	(or)
또는	and	sub	lw	slt	(or)
6-(2)	and	sub	(bubble)	(bubble)	(lw)
6-(3)	sub	lw	slt	or	(add)
6-(4)	and	sub	(bubble)	lw	(slt)

7-(1) **[1점]**	ForwardA = 1	ForwardB = 0
7-(2) **[1점]**	ForwardA = 0	ForwardB = 1

2.

(1) **[4점]**

Valid	Tag	PPN
1	5	0
1	12	3

(2) **[2점]** 0, 5, 7, 12

(3) **[2점]** 338, 0C4, CA0, 5F0

(4) **[2점]** 338, 5F0

5. **[각 2점]**

(1) 2a: add-slt   1b: lw-sub

(2) or-slt (1개) 또는 add-or (1개) 또는 add-slt (1개)

    lw-sub (2개)

(3) lw-sub (1개)

8. **[각 4점]**

(1)

	IF	ID	EX	MEM	WB
CC2	add	beq	lw		
CC3	sub	add	beq	lw	
CC4	slt	(bubble)	(bubble)	beq	lw
CC5	bne	slt	(bubble)	(bubble)	beq
CC6	and	bne	slt	(bubble)	(bubble)
CC7	or	and	bne	slt	(bubble)
CC8	lw	(bubble)	(bubble)	bne	slt
CC9	beq	lw	(bubble)	(bubble)	bne
CC10	add	beq	lw	(bubble)	(bubble)
CC11	sub	add	beq	lw	(bubble)
CC12	slt	sub	add	beq	lw

(2)

	IF	ID	EX	MEM	WB
CC2	add	beq	lw		
CC3	slt	add	beq	lw	
CC4	bne	slt	add	beq	lw
CC5	and	bne	slt	add	beq
CC6	lw	and	bne	slt	add
CC7	beq	lw	and	bne	slt
CC8	add	beq	lw	and	bne
CC9	sub	add	beq	lw	and
CC10	slt	sub	add	beq	lw
CC11	bne	slt	sub	add	beq
CC12	and	bne	slt	sub	add

(3)

	IF	ID	EX	MEM	WB
CC2	add	beq	lw		
CC3	slt	(bubble)	beq	lw	
CC4	bne	slt	(bubble)	beq	lw
CC5	and	bne	slt	(bubble)	beq
CC6	lw	(bubble)	bne	slt	(bubble)
CC7	beq	lw	(bubble)	bne	slt
CC8	slt	beq	lw	(bubble)	bne
CC9	add	(bubble)	beq	lw	(bubble)
CC10	sub	add	(bubble)	beq	lw
CC11	slt	sub	add	(bubble)	beq
CC12	bne	slt	sub	add	(bubble)

9. (1) **[2점]** Programmed I/O는 device가 ready될 때까지 CPU가 device 상태를 check하고,
         Interrupt-driven I/O는 device가 ready되면 CPU에 interrupt를 걸어서 알려준다.

(2) **[2점]** RAID-3는 byte level striping과 parity 전용 disk
        RAID-5는 block level striping과 distributed parity

(3) **[1점]** interrupt mask

10. (1) **[1점]** 23
    (2) **[1점]** 18
    (3) **[2점]** $2^{23} \times (1+18) = 152M$ bits
    (4) **[2점]** 12
    (5) **[2점]** $2^{10} = 1024$
    (6) **[2점]** $2^{13} \times (1+25+32 \times 8) = 2^{13} \times 282 = 2256K$ bits