

0907432 Computer Design (Spring 2010)

Quiz 2A

رقم الشعبة:

رقم التسجيل:

الاسم:

Instructions: Time 15 minutes. Closed books and notes. No calculators. Please answer all problems in the space provided. **No questions are allowed.**

<Good Luck>

Q1. The following table shows the values of the data and parity blocks in a five-disk RAID system:

New D0	D0	D1	D2	D3	P
AB9C	F457	0098	00FF	2FFF	A387

Calculate the new parity P' for RAID 3 and for RAID 4.

RAID 3

```
D0'  F457  1010101110011100
D1   0098  0000000010011000
D1   00FF  0000000011111111
D3   2FFF  0010111111111111   XOR
=====
P'   1000010000000100 = 8404
```

RAID 4

```
D0'  AB9C  1010101110011100
D0   F457  1111010001010111   XOR
=====
      010111111001011
P    A387  1010001110000111   XOR
=====
      111110001001100= FC4C
```

Q2. Assume 4 KB pages, a four-entry fully associative TLB, and true LRU replacement. If pages must be brought in from disk, increment the next largest page number. The initial state of the TLB and page table is as follows:

TLB:

Valid	Tag	Physical Page Number	Final Valid	Final Tag	Final Ph. Page No.
1	11	12	<u>1</u>	<u>1</u>	<u>13</u>
1	7	4	1	7	4
1	3	6	1	3	6
0	4	9	<u>1</u>	<u>0 -> 2</u>	<u>5 -> 14</u>

Page Table:

Valid	Physical page or in disk	Final Valid	Final Physical page or in disk
1	5	1	5
0	Disk	<u>1</u>	<u>13</u>
0	Disk	<u>1</u>	<u>14</u>
1	6	1	6
1	9	1	9
1	11	1	11
0	Disk	0	Disk
1	4	1	4
0	Disk	0	Disk
0	Disk	0	Disk
1	3	1	3
1	12	1	12

For the following stream of virtual addresses, show the final state of the system. Also list, for each reference, if it is a hit in the TLB, a hit in the page table, or a page fault.

Hexadecimal Address	TLB Hit/Page Table hit/page fault
0FFF	VPN = 0, TLB MISS PAGE TABLE HIT
7A28	VPN = 7, TLB HIT
3DAD	VPN = 3, TLB HIT
3A98	VPN = 3, TLB HIT
1C19	VPN = 1, PAGE FAULT
1000	VPN = 1, TLB HIT
22D0	VPN = 2, PAGE FAULT