

CMPE 12 Homework 3 - Fall 2014

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Due: November 25, 2014 4pm

25 Points

Do the following problems and the problems from the 2nd Edition of the book (3 points each). **Show your work for full credit.** Submit in PDF format on eCommons.

1. 10.8 [1.5 pts]
2. 11.3 [1 pt]
3. 11.4 [1 pt]
4. 11.9 [3 pts]
5. 11.10 [3 pts]
6. 11.11 [2 pts]
7. 11.12 [1.5 pts]
8. a) The following code is intended to jump to $k0+4112$, but it doesn't. [1 pts]


```
addiu    k0,k0,4112
jr       k0
addiu    k0,k0,-4112
```

 - a) Why not?
 - b) How can we fix the problem and ensure that the jump is taken and the second addiu is not performed?
9. The unconditional jump instruction (J) performs $PC = PC[31:28] \text{ --- offset} \ll 2$. How can you jump if you want to modify $PC[31:28]$ as well? [1 pts]
10. How is the stack on the PIC32 organized (where is it and which way does it grow)? [1 pt]
11. How do you...[2 pts]
 - a) PUSH register 16 onto the stack?
 - a) POP register 16 from the stack?
12. What is the purpose of the \$fp register? [1 pts]

13. What is the difference between register \$v0 and \$r2? [1 pt]
14. How are branches in PIC32 different than branches in LC-3? [1 pt]
15. Describe the operation of each instruction: [2 pts]
 - a) `eret`
 - b) `bne at,r0,0x9d0000c0`
 - c) `lui t1,0x0`
 - d) `sw t1,0(t2)`
16. In PIC32, how do you: [2 pts]
 - a) Add an signed immediate value of -2 to value in register 1.
 - b) Enable interrupts.
 - c) Branch forward 5 instructions if register 1 is less than register 0.
 - d) Store the unsigned byte 7 to a memory location that is 5 instructions beyond register 7.