Computer Architecture Course: IT089IU

International University – VNU HCM Date: March 2021

Dr. Le Hai Duong Time: 3 hours

**Laboratory Session4**

**Bitwise Logic**

In these exercises, you can only use the following instructions:

and andi nor or ori sll srl xor xori

**Exercise 1: Write a program that**

* 1. Put the number 0xDEADBEEF into register $t1 **without** using pseudoinstruction **li**. (**lab4\_1\_1.s**)
  2. Redo 1.1 as follows: use **ori** to load **each letter** into register. (**lab4\_1\_2.s**)
  3. Suppose that $t1 = 0xDEADBEEF. Using only register-to-register logic and shift instructions, Reverse the order of the bytes in $t1 so that register $t2 get the bit pattern 0xFEEBDAED (**lab4\_1\_3.s**)
  4. Redo 1.3 using only **and**, **or**, and rotate instructions. (**lab4\_1\_4.s**)

**Exercise 2: Write a program that**

* 1. Set the corresponding bit in register $t1 through $t8. That is, in register $t1 set bit 1, register $t2 set bit 2, and so on. (**lab4\_2\_1.s**)
  2. By using **ONLY** shift instructions and register to register logic instructions (no **li** pseudoinstruction or **addi**), put the pattern 0xFFFFFFFF into register $t1. (**lab4\_2\_2.s**)

**Reference:**

1. <https://en.wikibooks.org/wiki/MIPS_Assembly/Pseudoinstructions>
2. <https://courses.missouristate.edu/KenVollmar/MARS/Help/SyscallHelp.html>
3. <https://www.assemblylanguagetuts.com/mips-assembly-programming-tutorials/#MIPS_Data_Types>
4. <https://en.wikibooks.org/wiki/MIPS_Assembly/Arithmetic_Instructions>
5. <https://gab.wallawalla.edu/~curt.nelson/cptr280/lecture/mips%20arithmetic%20instructions.pdf>