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

1.1 Put the number 0xDEADBEEF into register $t1 **without** using pseudoinstruction **li**. (**lab4_1_1.s**)
1.2 Redo 1.1 as follows: use **ori** to load **each letter** into register. (**lab4_1_2.s**)
1.3 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**)

1.4 Redo 1.3 using only **and**, **or**, and rotate instructions. (**lab4_1_4.s**)

Exercise 2: Write a program that

2.1 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**)

2.2 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