ELE406 FALL2022 LAB2

Arithmetic, Logic and Decisions

Refer to Lecture notes Ch1.4 for HW and SW debugging tools on Rhody

Assignment #1: Unsigned Numbers

1. Write a program called “gpio1.asm” to read the GPIO and write to GPIO.
    a. When read from GPIO, SW(7..0) are in bits 7 down to 0. Assuming that NumA = SW(7..4) and NumB = SW(3..0), are both unsigned numbers, i.e. range from 0 to 15. HINT: use “AND” and “ROR”.
    b. When write to GPIO, the 32-bit number is displayed as 8 hexadecimal digits. However, only 4 digits at a time are displayed: the lower four digits by default and when key(3) is pressed the higher four digits.
    c. Program output:
        i. If NumA < NumB then write 0x12345678 to 7-seg displays.
        ii. If NumA = NumB then write 0x01010101 to 7-seg displays
        iii. If NumA > NumB then write 0x87654321 to 7-seg displays
2. Refer to Lecture notes Ch2.4 for arithmetic and Logic operators. HINT: use “LDH” and “LDL” to load a 32-bit unsigned number to a register in two instructions. Note that “LDI” loads a 16-bit signed number to a register.
3. Upload “gpio1.asm” to the ELE406 Brightspace site under “Assignments\Lab #2”.

Assignment #2: Signed Numbers

1. Write a program called “gpio2.asm” to read the GPIO and write to GPIO. This program is identical to “gpio1” above except that NumA and NumB, are now both signed numbers, i.e. range from -8 to +7. HINT: use “OR” to perform sign-extension.
2. Program output:
    a. If NumA < NumB then write 0xABCDEF01 to 7-seg displays.
    b. If NumA = NumB then write 0x12121212 to 7-seg displays
    c. If NumA > NumB then write 0x10FEDCBA to 7-seg displays
4. Upload “gpio2.asm” to the ELE406 Brightspace site under “Assignments\Lab #2”.

Lab 2 Report:

From Assignment #1: (Unsigned numbers)

1. Upload "gpio1.asm" to the ELE406 Brightspace site under "Assignments\Lab #2".
2. Verifications:
    a. Set up SW(7..0) on DE1: 1 = ON, and 0 = OFF
    b. Write NumA and NumB in DECIMAL.
    c. Relation (NumA vs. NumB): "<", "=", or ">".
    d. Verified: check mark.

SW(7..0)	NumA	NumB	Relation	Verified
10100101				
10101010				
01011010				

From Assignment #2: (Signed numbers)

1. Upload "gpio2.asm" to the ELE406 Brightspace site under "Assignments\Lab #2".
2. Verifications:

SW(7..0)	NumA	NumB	Relation	Verified
10100101				
10101010				
01011010				

Grade: _____

Assignment Verified by: _____