ECE3221 Lab 1

Name: Stephen Cole

SID: 3553803

Part One:

set pc to 0x100

movia r11,0x10000000

* pc incremented to 0x104
* r11 set to 0x10000000
* pc incremented to 0x108

The new value in r11 represents the address of the red leds.

set pc to 0x108

movia r10,0x10000040

* pc 0x10c
* r10 set to 0x10000000
* pc 0x110
* r10 incremented to 0x10000040

The new value in r10 represents the address of the switches.

set pc to 0x110

ldwio r3, 0(r10)

* 0x0000000f loaded into r3 from switches
* LED remain the empty
* the value in r3 represents the value formed by the switched 0xf
* pc to 0x114

stwio r3, 0(r11)

* r3 sent to LEDs
* pc to 0x118

The value r3 is loaded into the LEDs. LEDs matching the selected switches were illuminated.

br top

* pc to 0x110

The program counter is set to the top of the loop.

br command

* Operation PC ← PC + 4 + σ (IMM16) (I Type)
* Hex 0x003ffd06
* Bin 0000 0000 00 11 1111 1111 1101 00 00 0110

Table 1.A

|  |  |  |  |
| --- | --- | --- | --- |
| rA | rB | IMM16 | OP |
| 00000 | 00000 | 0011 1111 1111 1101 00 | 000110 |
| 0x00 | 0x00 | 0x3ffd | 0x06 |

* Directs branch to location of top address

Running the program

* While looping from 0x110 to 0x118 the LEDs are set to whatever the switches are set to.

Part Two

Assembly Instructions

.global \_start

\_start:

br Start

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ECE3221 LAB#1 - MY FIRST NIOS-II PROGRAM

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DATE:22/05/2020 NAME: Stephen Cole

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.org 0x100

Start:

movia r11,0x10000000 \

# r11 = address of red leds

movia r10,0x10000040

# r10 = address of switches

movia r12,0x10000010

# r12 = address of green leds

movia r3,0x1

top:

#ldwio r3,(r10) # load r3 from the switches

andi r6,r3,0x8 # force all but Bit3 to low

srli r6,r6,0x3 # move bit to LSB

andi r7,r3,0x1 # force all but Bit1 to low

xor r6,r6,r7 # xor both lsb's

stwio r6,(r12) # send r3 to green leds

slli r3,r3,0x1 # create new Bit0

or r3,r3,r6

stwio r3,(r11) # send r3 to the red leds

br top # repeat forever

#----------------------------------------------

What is the period?

The period of the content visible on the red LEDs is 15 cycles.