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\* Engr220L - Lab 9

\* Date: Oct 26, 2022

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\* The Lab 09 program with timer delay.

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/\*\*\*\*\*\*\*\*\*\*\*\*/

/\* INCLUDES \*/

/\*\*\*\*\*\*\*\*\*\*\*\*/

.include "nios\_macros.s"

.include "nios\_defs.s" /\* .equ statements specific to this system \*/

/\*\*\*\*\*\*\*\*\*\*\*\*\*/

/\* CONSTANTS \*/

/\*\*\*\*\*\*\*\*\*\*\*\*\*/

.equ MS100, 5000000 /\* number of clock cycles in 100 msec provided as example \*/

.equ MS100LOW, 0x4b40 /\* 16 least signif bits \*/

.equ MS100HIGH, 0x4c /\* 16 most signif bits \*/

/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*/

/\* TEXT SECTION \*/

/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*/

.text

/\* Place the main routine at the reset address \*/

.org RESET\_VECTOR

/\* Program start location must be identified \*/

.global \_start

\_start:

/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*/

/\* MAIN PROGRAM CODE \*/

/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*/

MAIN\_PROG\_INIT:

/\* Initialize the value of i. \*/

movia r6, LEDR\_BASE

movi r7, 0

movi r8, 0x40000

stwio r7, 0(r6)

/\* Initialize the timer. \*/

movia r9, TIMER\_BASE

movia r10, 0x7840 # Store the value in the PeriodL register.

stwio r10, PERIODL\_OFFSET(r9)

movia r11, 0x17D # Store the value in the PeriodH register.

stwio r11, PERIODH\_OFFSET(r9)

movia r12, 0b10 # Store the value in the Status register.

stwio r12, STATUS\_OFFSET(r9)

movia r13, 0b0110 # Store the value in the Control register.

stwio r13, CONTROL\_OFFSET(r9)

movia r14, 0b01 # Store the AND-MASK and the ideal Status value.

movia r15, 0b00

MAIN\_PROG:

/\* Set up the while loop and increment the value of i each time the loop runs. \*/

LOOP\_START:

bge r7, r8, MAIN\_PROG\_END

addi r7, r7, 1

stwio r7, 0(r6)

/\* Set up the while loop and check if the timer has reached the TO. \*/

TIMER\_LOOP\_START:

ldwio r16, STATUS\_OFFSET(r9) # Load the current status value.

and r17, r16, r14 # Use bit masking to mask the run bit.

beq r14, r17, TIMER\_LOOP\_END # Check if the TO bit is 1.

br TIMER\_LOOP\_START

TIMER\_LOOP\_END:

stwio r15, STATUS\_OFFSET(r9) # Clear the TO bit.

br LOOP\_START

MAIN\_PROG\_END:

/\* infinite loop to keep out of global memory, useful for final breakpoint \*/

br MAIN\_PROG\_END

/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*/

/\* DATA SECTION \*/

/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*/

.data

/\* if any global variables are needed, place them here \*/

.end