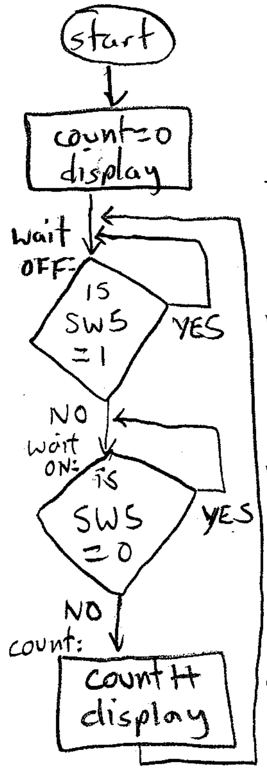
NAME: ________________________________ STUDENT #: ____________________

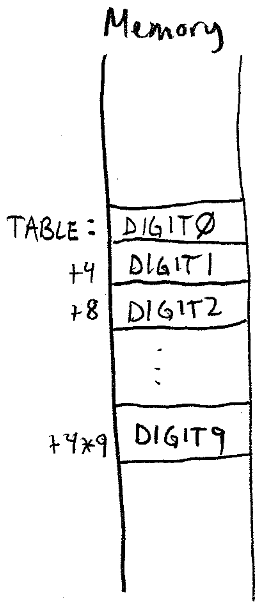
EECE 259: Introduction to Microcomputers **Lecture Quiz** **Feb 7, 2011**

1. Count the number of times switch #5 goes from "0" to "1" in r2 and display this on the red LEDs.

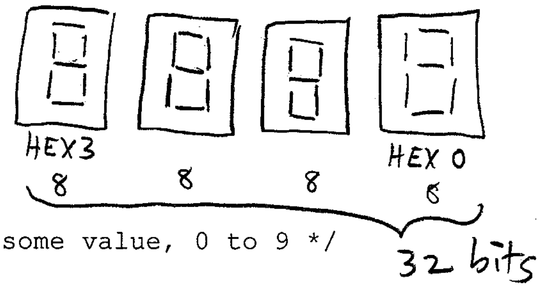


```
/* demonstrates use of polling to wait for a device */
.include "ubc-de1media-macros.s"
.equ    SW5, 0x20
.global _start
.text
_start:         movia   r23, IOBASE
                movi    r2, 0                /* count */
                stwio   r2, LEDR(r23)        /* blank display */

/* Wait until SW5 is off. This is called polling. */
waitOFF:        ldwio   r3, SWITCH(r23)
                andi    r3, r3, SW5          /* isolate SW5 */
                bne     r3, zero, waitOFF    /* zero is an alias for r0 */

/* Poll until SW5 is on. */
waitON:         ldwio   r3, SWITCH(r23)
                andi    r3, r3, SW5
                beq     r3, zero, waitON

/* Count the 0->1 transition. Before counting again,
 * be sure to wait for the switch to be turned off.
 */
count:          addi    r2, r2, 1
                stwio   r2, LEDR(r23)
                br      waitOFF
.end
```

2. a) Given a value in *r6* between 0 and 9, compute the associated 8-bit pattern for the 7-segment display in *r2*.
b) Write subroutine **digit2seg7(Xin,Yin)** to return **Xout**, **Yout**. The **X** values are numbers, and the **Y** values are 32-bit patterns intended the 7-segment display. Compute **Xout = Xin ÷ 10** with remainder **R**. For **Yout**, shift the current display (**Yin**) right by 1 "display position" and put the pattern for **R** in the HEX3 position.



```
/* part (a): demonstrates use of a lookup table */
.include "ubc-de1media-macros.s"
        /* this include file defines DIGIT0, DIGIT1, as follows:
         * .equ DIGIT0, 0x3F
         * .equ DIGIT1, 0x06
         * etc.
         */
.global _start
.text
_start: movia   r23, IOBASE

        movi    r6, ___2___    /* choose some value, 0 to 9 */
        movia   r7, TABLE
        muli    r6, r6, 4
        add     r7, r7, r6     /* address = TABLE + 4*r6 */

        ldw     r2, 0(r7)           /* look up correct DIGIT */
        stwio   r2, HEX7SEG(r23)    /* display digit value */

STOP    br      STOP

.data
TABLE:  /* the lookup table contents are located here */
.word DIGIT0, DIGIT1, DIGIT2, DIGIT3, DIGIT4
.word DIGIT5, DIGIT6, DIGIT7, DIGIT8, DIGIT9
.end

/* part (b) solution is not provided */
```



L15-1

NAME: ____STUDENT #: ______________________

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                stwio   r2, LEDR(r23)
                br      waitOFF
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2. a) Given a value in *r6* between 0 and 9, compute the associated 8-bit pattern for the 7-segment display in *r2*.
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.end

/* part (b) solution is not provided */
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