M6 Assignment M6-Timer Count Modes

Connect LaunchPad, download and run - sketch_Time0_A3CapturePrintRC.ino

```
//                MSP430FR2433
//             -----------------
//         /|\|                 |
//          | |             P1.2|<-- TA0.CCI2A
//          --|RST              |  |
//            |             P2.2|--> ACLK
//            |                 |
//            |             P1.0|-->LED
//
```

Be sure to connect a jumper wire from P2.2 (ACLK) to P1.2 (TA0.CCI2A)

DOCUMENT:

Include a screen shot of the 'Successful' download of the code

Include a screen shot of the Serial Terminal showing the numbers

Include a listing of the sketch code as you run it

Refer to the following code from the 'ino' and answer the questions

```
72
73    // Timer0_A3 Setup: Capture each ACLK rising edge
74    TA0CCTL2 |= CM_1 | CCIS_0 | CCIE | CAP | SCS;
75                                              // Capture rising edge,
76                                              // Use CCI2A=ACLK,
77                                              // Synchronous capture,
78                                              // Enable capture mode,
79                                              // Enable capture interrupt
80
81    TA0CTL |= TASSEL_2 | MC_2 | TACLR;        // Use SMCLK as TA0 clock source, clear TA0R
82                                              // Start timer in continuous mode
83
84    __bis_SR_register(LPM0_bits | GIE);
85
86 }
```

Questions:

1. Line 74, TA0CCTL2 sets which CCR?
2. Line 74, does the CCIE enable the interrupt for the CPU or just the CCR?
3. Line 74 sets the Capture or Compare mode?
4. Line 74 will create an interrupt when?
5. Line 81 sets the CCR or the whole timer?
6. Line 81 sets which Operating mode for the timer?
7. Line 81 selects which clock input for the timer?

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```
88 // Timer0_A3 CC1-2, TA Interrupt Handler
89 #pragma vector = TIMER0_A1_VECTOR
90 __interrupt void TIMER0_A1_ISR(void)
91 {
92   static int LastCapture;
93
94     switch(TA0IV)
95     {
96         case TA0IV_NONE:
97             break;                               // No interrupt
98         case TA0IV_TACCR1:
99             break;                               // CCR1 not used
100        case TA0IV_TACCR2:
101
102                    P1OUT ^= 0x01;                // Toggle P1.0 (LED)
103                    printf("TA0CCR2 %d\n", TA0CCR2);
104                     TA0CTL |= TACLR;
105                    __delay_cycles(1000000);        //slow blink 16960 remainder
106            break;                               // CCR2 not used
107        case TA0IV_TAIFG:
108            break;                               // overflow
109        default:
110            break;
111    }
112 }
```

Questions:

8. TA0IV is used for which CCRs?
9. TA0IV is also used for which condition for TA0?
10. TA0IV uses which vector location?
11. What is the vector location for CCR0 interrupt?
12. Which Interrupt are we printing the CCR value?

VIDEO – next page

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VIDEO:

Show ‘Successful’ of download screen from your computer

Press the reset button and record the start of the printout from the Serial monitor as it scrolls up the screen (see below

Show a shot of the LEDS and jumper on the Launchpad board

Be sure to say your name, date, and time in the audio explanation