Homework #3
CSCE 4114/5114 Embedded Systems
Due Sept 25th, 2024

Problem #1 True/False: (45 pts)   Blake Williams
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1.   T / **F** The Stop bit halts further transmissions

2.   T / **F** A Parity error occurs when a 1 is detected where the stop bit should appear.

3.   T / **F** The bitwidth of the UARTLite's Tx/Rx buffer depths can be configured during setup.

4.   **T** / F The baud rate of the UARTLite can be set in software

5.   T / **F** The send and receive data sizes can be set in software in the UARTLite.

6.   **T** / F The UARTLite uses the stop bit to detect a framing error.

7.   T / **F** A UART uses a synchronous clock between sender and receiver

8.   **T** / F The UARTLite's overrun error bit is cleared when the status register is read.

9.   **T** / F The Xilinx timer can be set to count up or down in the generate mode.

10.   **T** / F The Xilinx timer can use an external signal in the capture mode to transfer the value in the counter into the load register.

11.   T / **F** The (TINTx) bit in the timer command/status register will be automatically cleared when the timer is read.

12.   T / **F** Writing a "1" into the TINTx bit into the command/status register will initiate the timer to begin counting

13.   **T** / F The timer can be stopped in software.

14.   T / **F** The Xilinx timer allows one timer to be used in the PWM mode and the second in the generate mode.

15.   **T** / F The Xilinx timer allows one timer to be used in the capture mode and the second in the generate mode.

Problem #2 Short Answer: (55 pts)

1. You are setting up a serial communications channel for your embedded controller to match your PC. Your PC is set to communicate using 9600 Baud. How much time does it take to send out one transmission using 8-bit, even parity, one stop bit ?

Ans: _____11bits * 1/9600 = 0.001146 seconds_____

2. You have set up your UART to receive 7 bit data, even parity, and one stop bit. You receive the following: start_bit 0 0 1 0 1 0 1 0 1 0 0 What errors if any will be reported for this transmission ?

Ans: _____There will be a Parity Error and a Framing Error will occur_____

3. You want to make sure that you set the baud rate on your embedded system to be compatible with your desktop machine that is already set at 2500 baud. For 8 bits data, parity and one stop bit, what is slowest frequency you can safely set the receiver baud rate ?

Ans: _____50000hz_____

4. You want to send $(42)_{16}$ as an 8-bit transmission across the UARTLite using odd parity and 1 stop bit. Insert the transmission bits on the line showing all control and data bits. *Hint you must start the transmission with a start bit.

|_1_|_1_|_0_|_0_|_1_|_0_|_0_|_0_|_0_|_0_|_1_|_0_|_1_|_1_|_1_|_1_|

5. You and your lab mate are interested in using the Arty Board to clock how fast cars are traveling across the Fayetteville bike crossing on Razorback Road. You have decided to use the timer in the capture mode and string a pressure sensor across the road. The senor will send a logic 1 each time the tire of a car passes over.

What is the code word to configure (without running) timer0 to count up in the capture mode with auto overwrite using an external trigger. _____*Data_Reg = 0b00000111001_____

6. What is the code word to start timer0 _____*Data_Reg ^= 0b00010100000_____

7. Assume that *tcsr0 is a pointer to TCSR0.   Fill in code below to check if the capture event has occurred.

While(1) {
/** check to see if the capture event has occurred **/
    → your code

```
        if((*TCSR0 & 0b00100000000) == 0b00100000000){
                /** clear the last capture event in TCSR0*/
                    *TCSR0 |= 0b00100000000;
        }
```

}