Blayten Jones
010979697

Homework 2

1. Problem #1 True/False: (45 pts)
   - 1.1. T/F The Stop bit halts further transmissions
   - 1.2. T/F A Parity error occurs when a 1 is detected where the stop bit should appear.
   - 1.3. T/F The bitwidth of the UARTLite's Tx/Rx buffer depths can be configured during setup.
   - 1.4. T/F The baud rate of the UARTLite can be set in software
   - 1.5. T/F The send and receive data sizes can be set in software in the UARTLite.
   - 1.6. T/F The UARTLite uses the stop bit to detect a framing error.
   - 1.7. T/F A UART uses a synchronous clock between sender and receiver
   - 1.8. T/F The UARTLite's overrun error bit is cleared when the status register is read.
   - 1.9. T/F The Xilinx timer can be set to count up or down in the generate mode.
   - 1.10. 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.
   - 1.11. T/F The (TINTx) bit in the timer command/status register will be automatically cleared when the timer is read.
   - 1.12. T/F Writing a "1" into the TINTx bit into the command/status register will initiate the timer to begin counting
   - 1.13. T/F The timer can be stopped in software.
   - 1.14. T/F The Xilinx timer allows one timer to be used in the PWM mode and the second in the generate mode.
   - 1.15. T/F The Xilinx timer allows one timer to be used in the capture mode and the second in the generate mode.

2. Problem #2 Short Answer: (55 pts)
   - 2.1. 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?
     9600 baud = 9600 bits per second.
     11 bits total (8-bit, parity bit, top bit, start bit?)
     11/9600 = .00114 seconds

   - 2.2. 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?
     Taking into account both the parity and stop bit and even the start bit, the data is actually 8 bits at a minimum. This means that this should raise a data error.

2.3. 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 the slowest frequency you can safely set the receiver baud rate?

8 bits + parity + stop + start = 11 bits

Slowest is 2500 baud????

Baud = # bytes * # bits/frame * frequency

2500 = ??? * 11 bits * frequency

2.4. 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

In binary: 01000010

|_1_|_1_|__0__|_0__|_1__|_0__|__0_|_0__|__0_|__1_|__0_|_1__|_1__|_0__|_1_|_1_|

2.5. 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.

*TCSR0Data = 0b00000111001 //(set load, auto_reload, external capture, 0=up, capture mode)

Or 0x39

2.6. What is the code word to start timer0

*TCSR0Data ^= 0b00010100000 //(toggle the bits rather than setting each bit to its opposite individually…)

Or 0x50

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

```
While(1) {
        if((*tcsr0 & 0b00100000000) == 0b00100000000){
                //do code here
                *tcsr0 |= 0b00100000000; //autoreload
        }
}
```