Test #3 Review – Summer '04

Topics:

- PIC Reset Actions
- CMOS Power consumption
- Watchdog Timer
- Sleep Mode
- Parallel Port Usage
- LED/Switch IO
- Asynchronous Serial IO Communication
- Interrupt structure on the PIC18

1. Write C code that detects if a power-up or MCLR reset occurs.
2. What location is executed on reset?
3. Name 4 sources of reset on the PIC18.
4. Draw a schematic that connects a reset switch to the PIC18.
5. Configure PORTB so that the upper four bits are inputs, the lower 4 bits are outputs.
6. What is the watchdog timer? Why is it useful?
7. How do you prevent the watchdog timer from going off?
8. How does the PIC enter sleep mode?
9. What can wake the PIC from sleep mode?
10. Assume a PIC18 is connected with a low-true pushbutton switch on RB1, and an LED output on RB0. Write C code that toggles between flashing the LED rapidly versus flashing the LED slowly for each press and release of the pushbutton.
11. What is an open drain output? Draw a diagram.
12. What is the function of the RBPU configuration bit for PORTB and why is it useful?
13. What is the equation for dynamic power consumption in a CMOS circuit?
14. What is the most efficient way to save power in a CMOS circuit? What is the performance tradeoff when you do this?
15. Write a C subroutine to configure a PIC for a baud rate of 19200 assuming an FOSC of 29.4912 MHz.
16. Write a C subroutine that will wait for a character to be available from the serial port and return it.
17. Write a C subroutine that will output a character to a serial port.
18. Explain parity. Assume a 7-bit data, even parity bit format. What is the parity bit for the 7-bit value 0x4A?
19. What is a framing error?
20. Draw the waveform for sending a 0x3B serially using asynchronous transmission. Give the view from the TX pin of the PIC.
21. What is the functional difference between RETURN and RETFIE?
22. Write C code that enables an interrupt to be generated when a character is received on the serial port.

23. When a high priority interrupt is generated, give the sequence of actions that occurs.
24. What is the problem of relying on the shadow registers for saving the W, BSR and STATUS in the low-priority interrupt service routine?
25. Write C code that will check for data availability within a circular buffer, and return the character in the buffer if data is available.
26. Write C code that will place a character in a circular buffer.
27. What does the term “polled IO” mean?
28. Why is the purpose of using a circular buffer for interrupt IO?
29. In serial asynchronous IO, the number of bits sent in any transmission is usually limited to about 10 bits. Why is this?