Introduction:

This homework assignment is designed to be complementary to Lab 1 and future labs. One of the best ways to begin to learn about a new device is to start with the data sheet. The data sheet for our processor (for the Make Controller board) and the AR Drone is on the class web page under

Class Materials→ AT91SAM7X Data Sheet
Class Materials→ AR Drone SDK Manual

Using your tools, you should be able to scan/search through the document and answer each of the following questions. They have been taken directly from those documents. These are addressing many of the high points of the device and do involve many of the pieces of the processor that we will be working with this quarter. Learning to read datasheets is an incredibly useful and required skill set.

Keep your answers short, but descriptive and complete.

Questions on the AT91SAM7X and Make Controller

1. What kinds of memory does the ARM 7 contain?
2. What is the SAM-BA Boot Program and what is it for?
3. What is the purpose of the System Controller? What major blocks of the system does it control?
4. Identify each of the user peripherals and give a one sentence description of what each does.
5. How many instruction types does the ARM 7 support? Why? What are they?
6. How many data types does the ARM 7 support? What are they?
7. How many registers does the ARM 7 support? What are they for? Three of the registers each serve special purpose, what are those purposes?
8. What are the major categories into which the ARM 7 ARM instructions are organized?
9. What are the major categories into which the ARM 7 Thumb instructions are organized?
10. What is the major mechanism by which one talks to / configures the various peripheral subsystems on the ARM7 chip?
11. What is the Periodic Interval Timer and what is its purpose?
12. What is the Watch Dog Timer and what is its purpose?
13. What is the purpose of the Advanced Interrupt Controller? Where do the inputs come from?
14. What is the purpose of the Power Management Controller and what does it do to optimize power consumption of the chip?
15. What is the Debug Unit and how does one gain access to it from outside of the chip?
16. What is the SPI interface on the ARM7? What is it used for?
17. What are the major modes of the SPI interface?
18. What is the TWI interface on the ARM7 and what is its purpose?
19. What is the USART interface on the ARM7 and what is it intended to be used for?
20. What is the Baud Rate Generator and what is its purpose in the USART subsystem?
21. What is the PIO, what is its purpose, and how many are there?
22. What is the SSC and what is it used for?
23. How many timer counters does the ARM7 have? How long (number of bits) are they?
24. What is the PWM and what might it be used for?
25. The ARM7 has a 10 bit A/D. What does this mean? What is the smallest voltage that the A/D can resolve?
26. How many different analog signals or inputs can the A/D measure?

Questions on the AR Drone

27. What are the three UDP port numbers that are used to communicate with the AR Drone and what does each port let you do?
28. What kinds of sensors does the AR Drone have?
29. How often does the AR Drone send back the Navdata (like status, position, speed, etc)?
30. What does the ARDRONE_COM_LOST_MASK bit do?
31. What is the AT command for telling the drone to land?

Deliverables
Typed answers to these questions (HW1 is individual).

Submit HW1 using the turn in link provided on the webpage.