

Exercise 5 – Due Thursday 10/17 before noon

After using the premade sensor drivers in TinyOS it is time for you to make your own ADC drivers and sample some of the sensors yourselves. Of the external sensors on the Telosb only the two light sensors are sampled through the ADC module on the MSP430 while the thermistor and humidity sensor are sampled on a separate chip connected through I²C. For this exercise use the **cSkeleton** application in the cs450 directory as your starting point.

- A) In the **MSP430F1611 User Guide**, read the following pages well enough to complete the rest of the exercise:

9-1 to 9-6

9-7 (cursorily)

17-1 to 17-16

17-18 to 17-19

17-20 to 17-27 (cursorily)

- B) Write an application that reads both the solar light sensor and the PAR light sensor when the user presses the 'r' button. The sensors are connected to port **P6.4** and **P6.5** and the ADC input channel **A4** and **A5**. Setup the ADC to use:

1. **ACLK** as the clock source, undivided.
2. 4 cycle sample-and-hold time.
3. Sample-and-hold in pulse-mode.
4. 1.5V reference voltage using the internal reference generator.
5. **V_{REF+}** and **AV_{SS}** as references.

Note: Depending on your solution more values need to be set.

- C) **Constraints:**

1. You have to use the ADC ISR (**ADC12_VECTOR**) to read both channels.
2. You are **not** allowed to use the **ADC12IFG** flag for polling.
3. Printf (and any other printing) has to be done from the main function, **not** the ISR.
4. The output should be printed in **volts** with 2 decimals, **without** using floating points. **AV_{SS}** is connected to ground (0V).

- D) Upload your C file to Blackboard with all the above implemented.