This week….

- Grading almost caught up. What is left:
  - Quiz 4 (the atmel programming exercise)
  - Project 1 (need Catme surveys to complete this)
- Midterm on Thursday
- Project 2 due next Thursday

Midterm Preparation

- Exam discussion on D2L
  - Post sample questions (and answers)
- Look to homework assignments, and in-class exercises
- Exams from previous years
  - Warning: coverage can be quite different

Midterm Exam

- No books
- No electronic devices
- You may bring 1 page of **your own** notes
  - Double-sided
- Assigned seating

Number Representations

- Conversion between binary and:
  - Decimal
  - Hexadecimal
- Unsigned versus signed (2's complement) representations
- Bit-wise operations: &, |, ~, ^

Arithmetic

- Adding/subtracting binary numbers
- Taking the 2’s complement of a number (taking its negative)
- Shifting left/right (multiplication/division by 2)

Microprocessor Components

- Memory
- Registers:
  - General purpose
  - Special purpose, e.g.:
    - Program counter
    - PORTx, PINx, DDRx
- Arithmetic logical unit
- Data bus

Memory

- Addresses versus values
- Reading from versus writing to
- ROM versus RAM
- ROM versus EPROM (or Flash)

Atmel Digital Input/Output

How to use:

- DDRx
- PORTx
- PINx

You may be asked (in the context of a circuit):

- What a program does
- How to fix a program with bugs

Basic Circuits

- Resistors
- Diodes
- Analog comparators

Moving Between Analog and Digital

Digital to Analog:

- Resistive network

Analog to Digital:

- Flash ADC
- Successive approximation