This week:

- Project 1 (need Catme surveys to complete this grading)
- Pencasts: new d2a and a2d material

Following weeks:

- Midterm on Tuesday
- Groups send envoy by Thursday for serial port and oscilloscope training
- Project 2 due Tuesday after break
Midterm Preparation

• Exam discussion on D2L
  – Post sample questions (and answers)
• Look to in-class exercises
• Exams and homework 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 won’t be covered