Lecture 25 - Microcontrollers

Microcontroller = small computer on a chip
Typically with ADC, DAC, & various I/O formats
Program via connection to standard computer
Fairly low cost ($5-100, depending)

When you have a complicated electronics task,
you can often use microcontroller in place of a circuit
Programming is much easier than electronics

Advantages:
- Save time
- Easy to change later

Disadvantages
- More expensive
- Slower than dedicated circuits
- Analog errors due to conversions
- Learning curve to get started

Many varieties of chips:
- PIC, ARM, Freestyle...
Can also get chips set up on mini-boards, easier to use:
- Arduino, PICAXE, mbed...

We'll use mbed boards - easiest to use
Program in C++ (similar to Java)
(Won't do anything too fancy)
mbeds fairly high end
Cost $60
vs. ~$30 for Arduino board

Note:
In section 13.5-7, add 1k resistor in series with pin 19:
End of semester:
  - Final exam: Monday 12/17, 2-5 pm
  - Early time: Saturday 12/15, 2-5 pm

Last year's final posted on website (average was 50%)

Use same format this year:
  - Closed book
  - Two sections: Part I = short questions on content of course
  - Part II = longer problems to solve

Part I covers everything.

Part II: focus on important topics:
  - Impedance
  - Op amp rules
  - Servos & feedback
  - Sequential logic

Course ends:
Count for 19% of grade.
Due Sunday Dec 9, 11:59 PM

Project:
Work day: Sunday Dec 9, 2-5 pm
Project due: Thursday Dec 13, midnight [vouchers included]

Turn in on my eport
Be sure to label with your name!

Testings: can test use same circuit from breadboard test

Check all three gains

Also power cable to test external power connection