# Project 1: Addressing Multiple Digital Lines

# Questions?

# Project 1

- Hardware:
  - Wire in a set of LEDs
  - (leave room for future components)
- Software:
  - Provide interface functions for the LEDs
  - Write a test main() function

# Project 1: Orientation Display

4 LEDs in a circle:

- Represent orientation with 8 different illumination patterns
- Interface function:

```
void display_orientation(int16_t theta)
```

  - theta = 10ths of a degree.  Value between -1799 and 1800
  - Left-handed coordinate system
  - (do not deviate from this specification)

# Project 1: Rotation Rate Display

10 LEDs in a line (use bar graph):

- Represent rotation rate
- Interface function:

```
void display_rotation_rate(int16_t rate)
```

  - Rate = 10ths of a degree/sec.  Value between -3000 and 3000
  - Illuminate the two center LEDs if rate is near zero

# Project 1: Test Function

- Add switch to circuit
- In `main()`: while(1) loop
  - One switch state:
    - Slowly increment a simulated orientation from -1799 to 1800
    - Display orientation
    - When orientation reaches 1800, reset to -1799
  - Other switch state:
    - Slowly increment rotation rate from -3000 to 3000
    - Display
    - When rate reaches 3000, reset to -3000

# Documentation

- Function-level documentation:
  - Summarize what the function does in a sentence or two
    - This is for future users of your function
  - Explicitly document the inputs and outputs of the function
    - Include variable names and meaning of the variables
- In-Line documentation:
  - Document the ***meaning*** of individual lines of code or small groups of lines
  - Document what you are doing and why
- See the project 1 specification for a link to an example

# Project Groups

- Use assigned groups starting today
- For each project, one person must take the lead on the software

# Hardware You Should Have

- Project box
- Wire kit with various LEDs (individuals & bar graphs)
- Arduino with USB cable
- AVR ISP with USB cable
- Breadboard
- 1K-ohm resistors (at least 14)
- 10K-ohm resistors (at least 2)
- 2 switches

# Hardware to Borrow

- Various tools
- Double-stick tape

# Next Time

Project 2: PWM control of motors