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 \textit{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