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: Heading Display

4 LEDs in a circle:

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

  ```
  void display_heading(int16_t heading)
  ```

  - Heading = 10ths of a degree. Value between -1799 and 1800
  - Left-handed coordinate system

  - Do not deviate from this specification!

Project 1: Heading Velocity Display

10 LEDs in a line (use bar graph):

- Represent heading velocity
- Interface function:

```
void display_heading_velocity(int16_t velocity)
```

  - Velocity = 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 heading from -1799 to 1800
        - Display heading
        - When heading reaches 1800, reset to -1799
    - Other switch state:
        - Slowly increment heading velocity from -3000 to 3000
        - Display
        - When velocity reaches 3000, reset to -3000

Code Specifications as Contracts

- You are implementing code that will be used for future projects and by your other group members

- Implement exactly the functions that we ask for
  - Name of function must be as specified
  - Parameter types and names must be as specified
  - Return values must be as specified

Documentation

- Project-level documentation
  - Top of each C (and H) file
  - Project #
  - Date
  - Group number
  - Group members
  - Group member responsible for the software

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
        - Discuss any other effects that the function has (e.g., changing pin state)
- 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
- For each project, one person must take the lead on the software

Due by the Project Deadline

- Documented code (C, and eventually H, files) checked-in to the subversion tree
  - Useful for sharing with us and with your group members

- Demonstration/code review with me or the TA

Due Shortly after the Project Deadline…

Personal Report: Catme will ask you to fill out a survey

- This will be used to provide feedback to you and your group members
- I will also use this to detect asymmetries in group member participation

Grading

Personal programming component:

- Each group member must collect 3 personal programming components over the semester
- One is available for each of the 10 projects
- Grading is generally “done” / “not done”

Grading II

Group grade

- Assess circuit, program, functionality and documentation
- See the rubric for details

- In most cases, the group grade will be given to each group member
  - In cases of significant, repeated asymmetries, grades will be balanced to reflect contribution

Hardware to Borrow

- Double-stick tape

Next Time

Timers and counters