Project 2
Project 2 Objectives

At the end of this project, you should be able to:

• read analog information through the Atmel Analog-to-Digital converter,
• using a sensor model, interpret analog voltages in terms of sensed quantities, and
• convey information about sensors using a set of LEDs and using serial output.
Part 1: Circuit

- Add a second switch
- Connect the rate gyro
- Connect the distance sensors
Part 2: Rate Gyro

Must implement:

• int16_t get_rotation_rate(void)
  – Returns rate in 10ths of a degree per second (left-handed coordinate system)
  – Range: -300 to 300 deg/sec for (most groups)

• void display_rotation_rate(int16_t rate)
  – Display using the 10 LED bar
Part 2: Rate Gyro II

Must implement:

• Main function: grow your while(1) loop:
  – Get the heading, rotation rate and distances
  – Display one of: rotation rate, left distance, right distance (depending on switch configuration) using LEDs
  – Write sensor data to serial port
Part 3: Distance Sensors

Must implement:

• `uint16_t get_distance(DistanceSide side)`
  – `side == LEFT` or `side == RIGHT`
  – Return distance in mm
  – Must carefully convert analog signal into distance

• `void display_distance(uint16_t dist)`
  – Changes the 10 LEDs to indicate distance
Part 4: Hovercraft

Mount:
• Batteries
• Forward thrust fans
• Breadboard
• Distance sensors
Demonstration/Presentation

• Same model as project 1