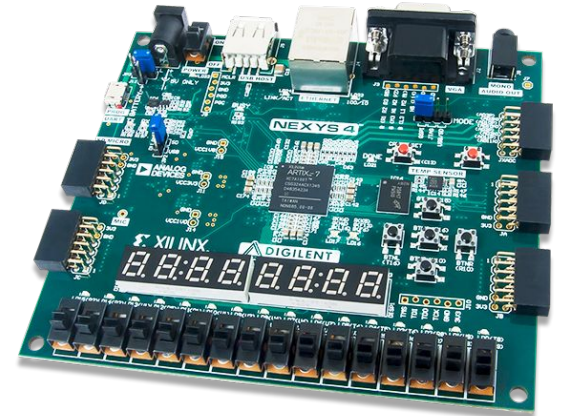
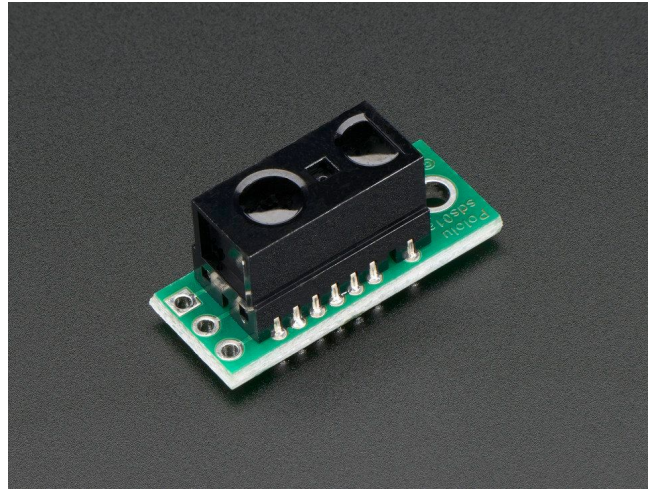
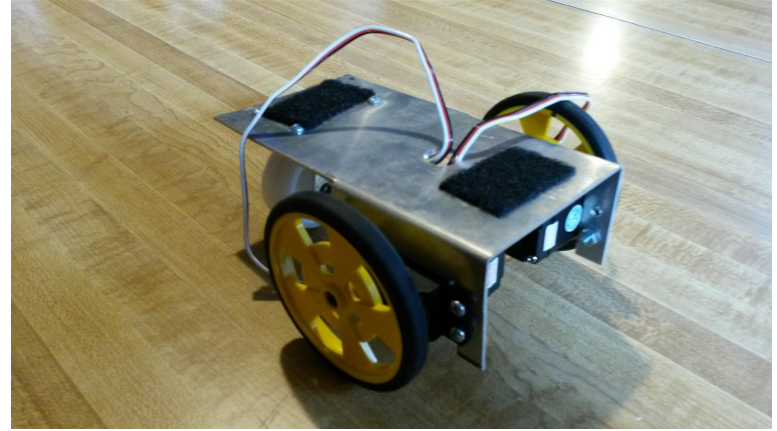


# Vehicular Obstacle Avoidance with Rewind

Jonathan Garcia-Mallen

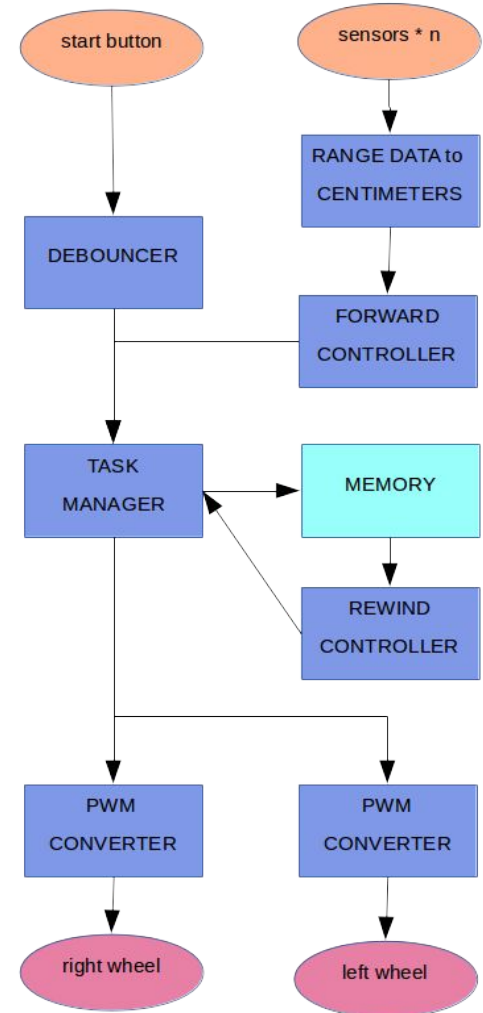
# Overview

- Robot moves forward
- Detects obstacles
- Hits nothing
- Then goes back



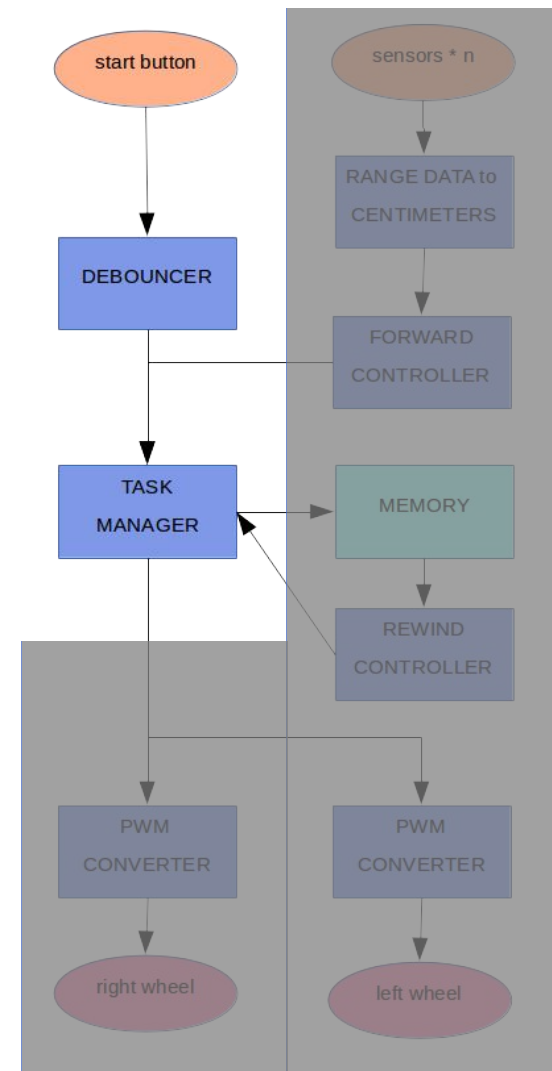
# System Architecture

- Task Manager
- Forward Controller
- Forward Controller
- Rewind Controller
- PWM Converter



# Task Manager

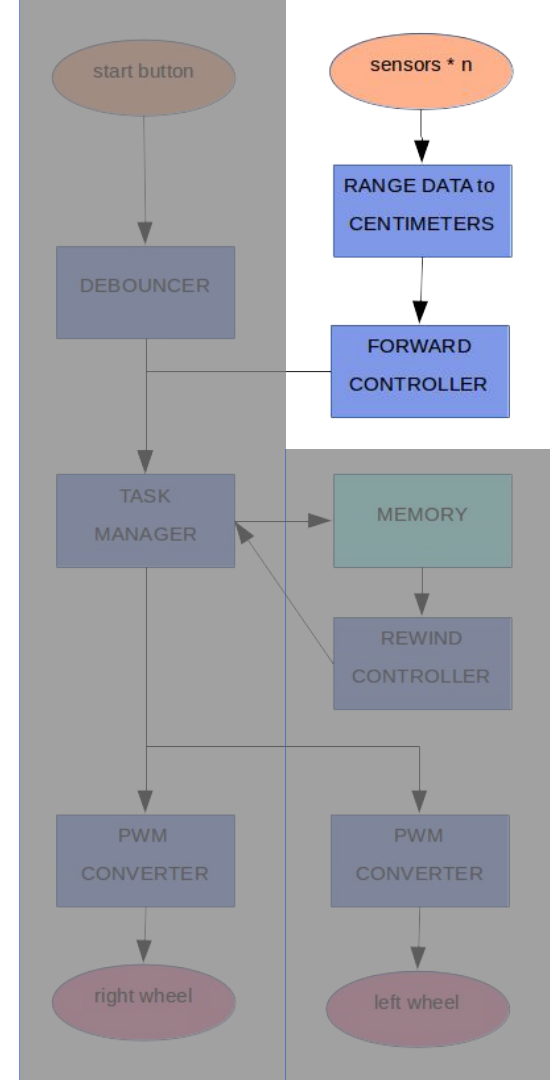
- Takes wheel commands from user and controllers
- Switches from forward state to reverse state
- Pass wheel commands to PWM converter



# Forward Controller

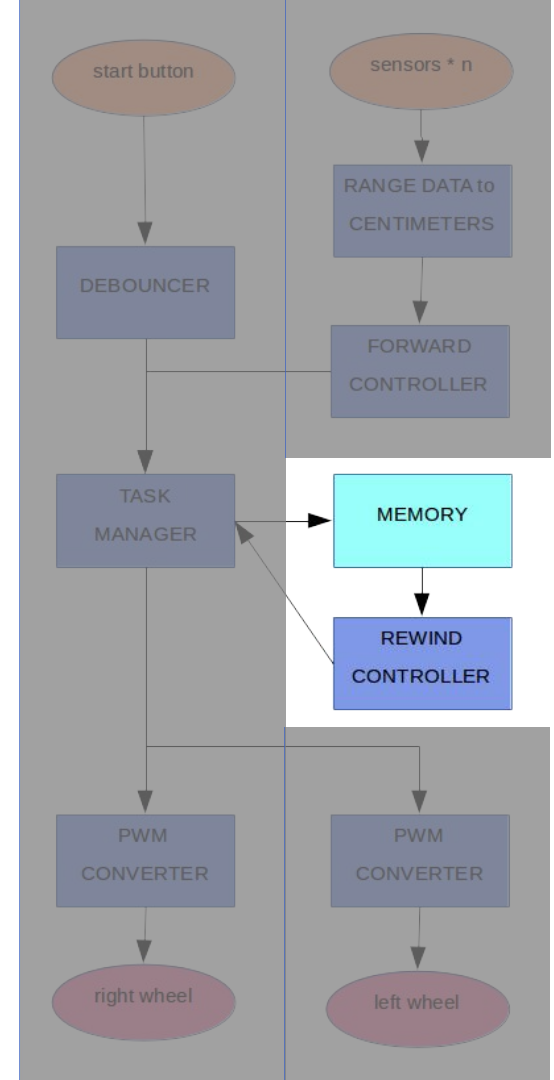
$$wheel\_l = speed * \left( \sum_{i=0}^{\lfloor n/2 \rfloor} p_i r_i \right)$$

$$wheel\_r = speed * \left( \sum_{i=\lceil n/2 \rceil}^n p_i r_i \right)$$



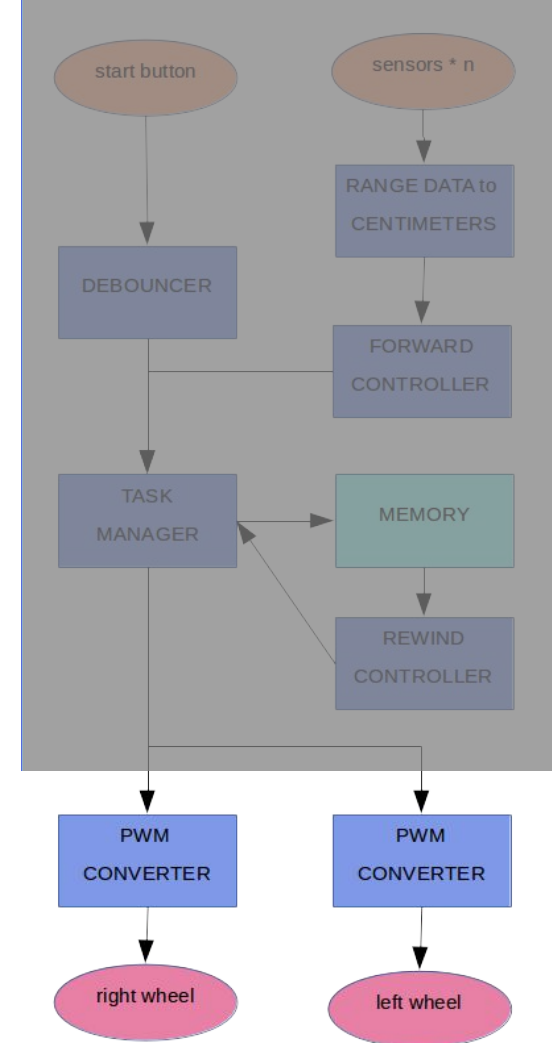
# Reverse Controller + Memory

- Task manager has stored wheel commands in memory
- Reverse controller pulls them out and reverses them
- Not sure how much to downsample
- Not sure whether to use DDR2 memory



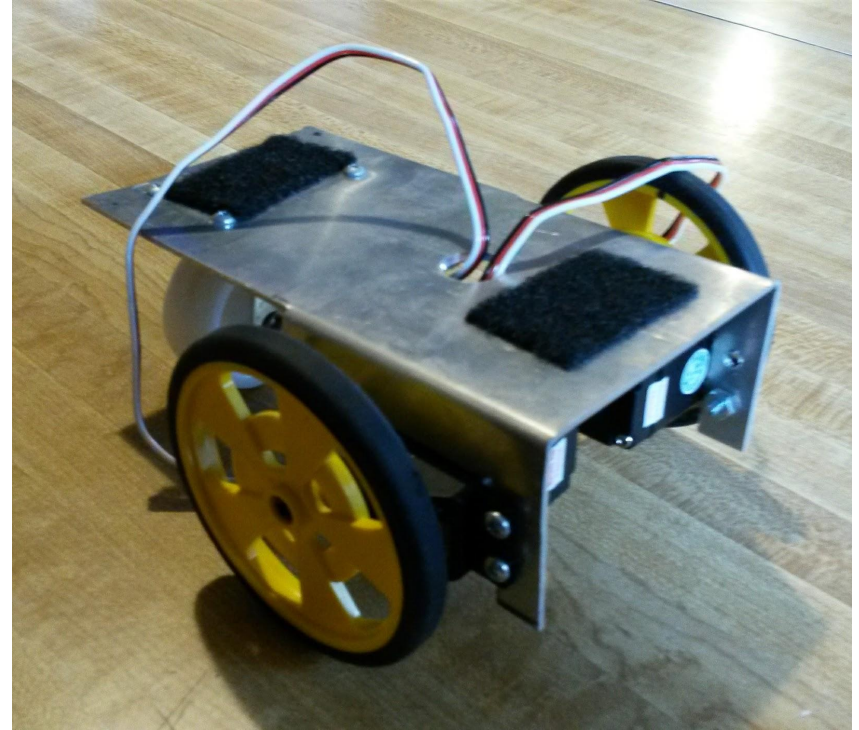
# PWM Servo Control

- Sparse specs
- Use wave generators and oscilloscopes in lab to determine motor innards / life
- Motors might be dead; if so, order new ones



# Stretch goals -- add features!

- Sound feedback
- Wall following
- PD or PID control
- Sound control
- Add camera and follow lines





# Timeline

- 13 Nov - Servos spinning (if dead, new servos ordered)
- 15 Nov - Display sensor output on Nexys
- 16 Nov - Task Manager tested and finished
- 26 Nov - Both controllers ready to be tested
- 27 Nov - Begin testing Forward Controller, Rewind Controller
- 30 Nov - Start working on stretch goals / resolve surprises

Questions?

