DPM Design Group 11:

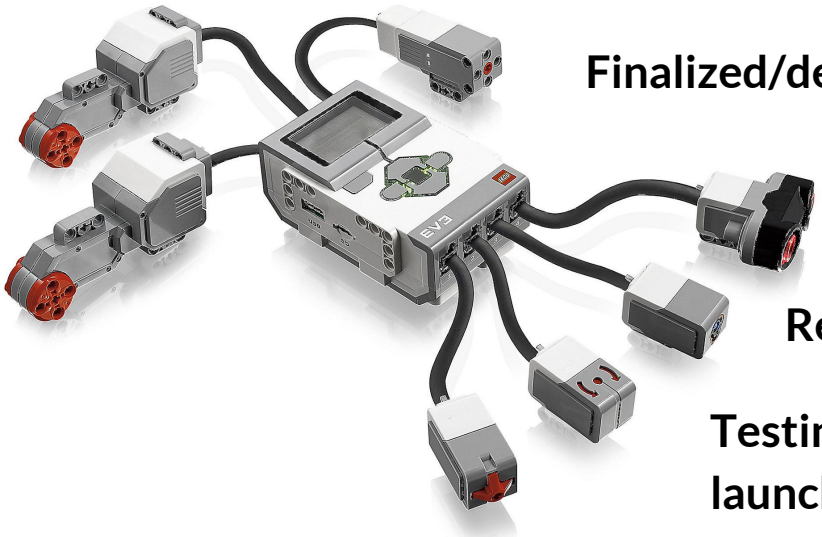
Alex Durham
Ethan Ian John

ECSE-211: Design Principles & Methods

Design Project

Tasks Completed:

March 17 - March 24



Finalized/debugged odometry correction & navigation

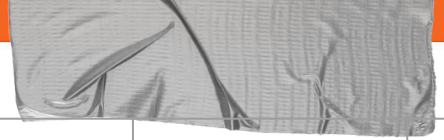
Added offensive capability (move with/shoot ball)

Refined mechanical design

Testing of navigation, odometry correction, ball launching

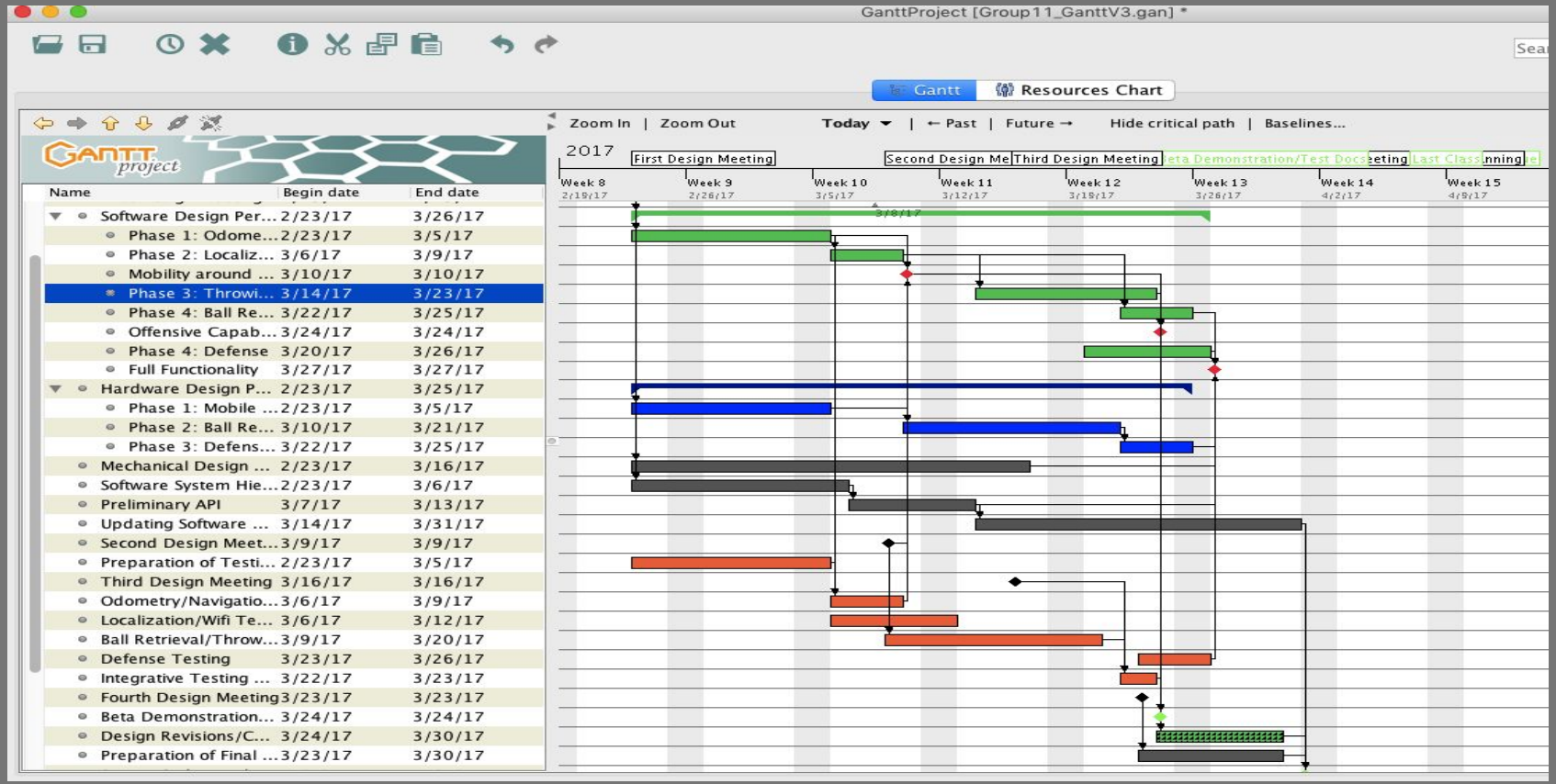
Calibration of sensors (light/ultrasonic)

Recent Tasks:

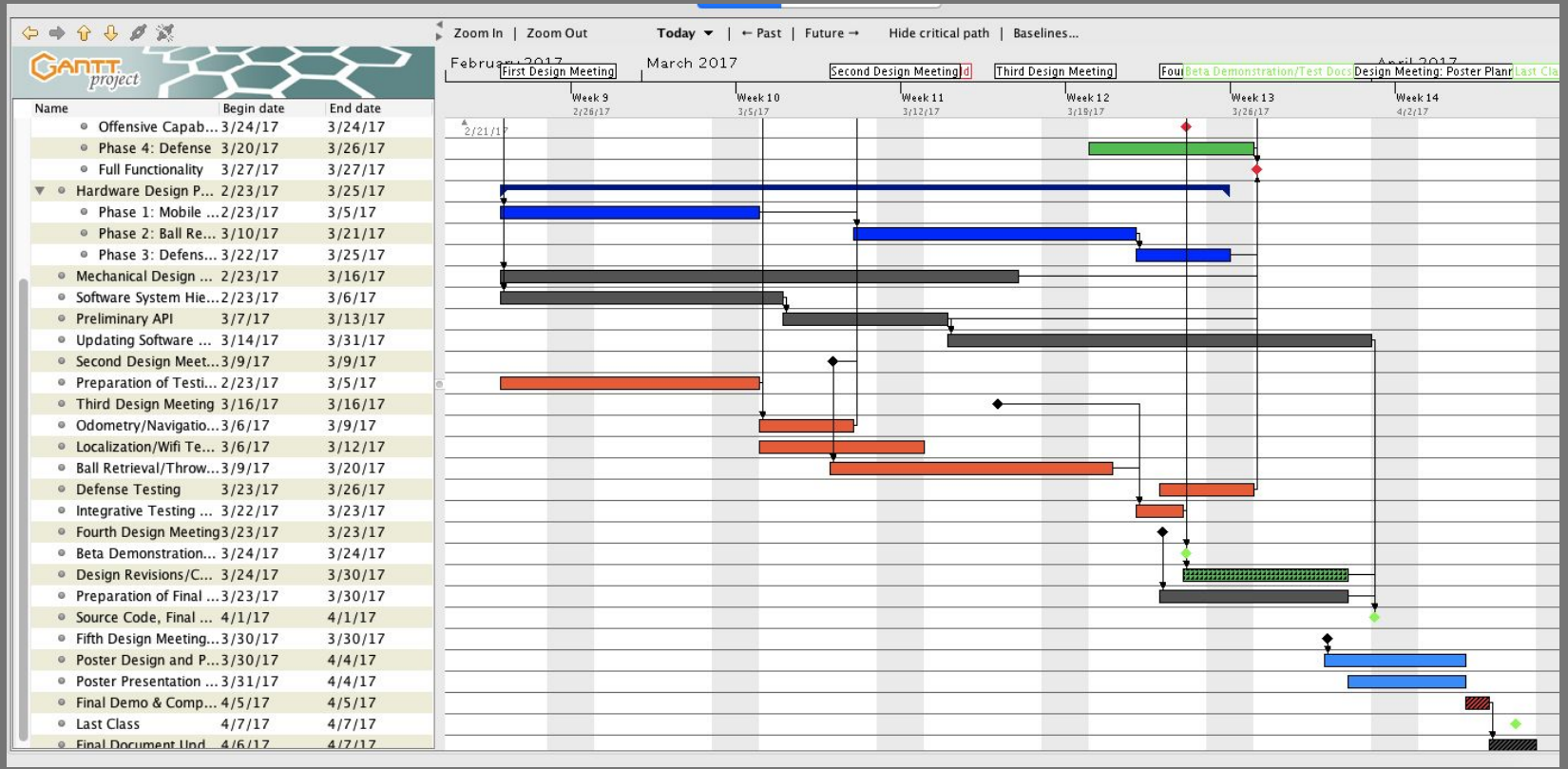


Task:	Gantt Due Date:	Completed?	Incomplete?	On Schedule?
Final Mechanical Design (LDD)	3/24/17	X		Yes
Offense Integrated Software	3/6/17		X	Yes
Defense Integrated Software	3/13/17		X	Yes
Ball launching software design	3/20/17	X		Yes
Testing ball launching integrated mechanism	3/23/17	X		Yes
Integrative Testing	3/24/17		X	Yes
Obstacle Avoidance Software	3/23/17		X	Yes
Design of Obstacle Avoidance	3/16/17	X		Yes
Ball Retrieval	3/19/17		X	No

Gantt Chart V4.0 (up to beta demo)



Gantt Chart V4.0 (future)



Budget Update:

Team Member:	Week 1	Reading Week (Overtime)	Week 2	Week 3	Week 4	Week 5	Total: (excluding reading week)
Alex	7	5	3	6	13		29
Durham	8	2	4	8	15		35
Ethan	2	4	7	8	13		30
Ian	5	4	3	6	15		27
John	8	6	2	6	18		34
						Team Total:	155

- **Currently under budget: 57% of budget consumed approx. 75% through the project**
  - Saves budget for integrative testing
  - Saves budget for final documentation
  - Saves budget for poster design and presentation practice
  - Saved budget for potential setbacks

Design Details

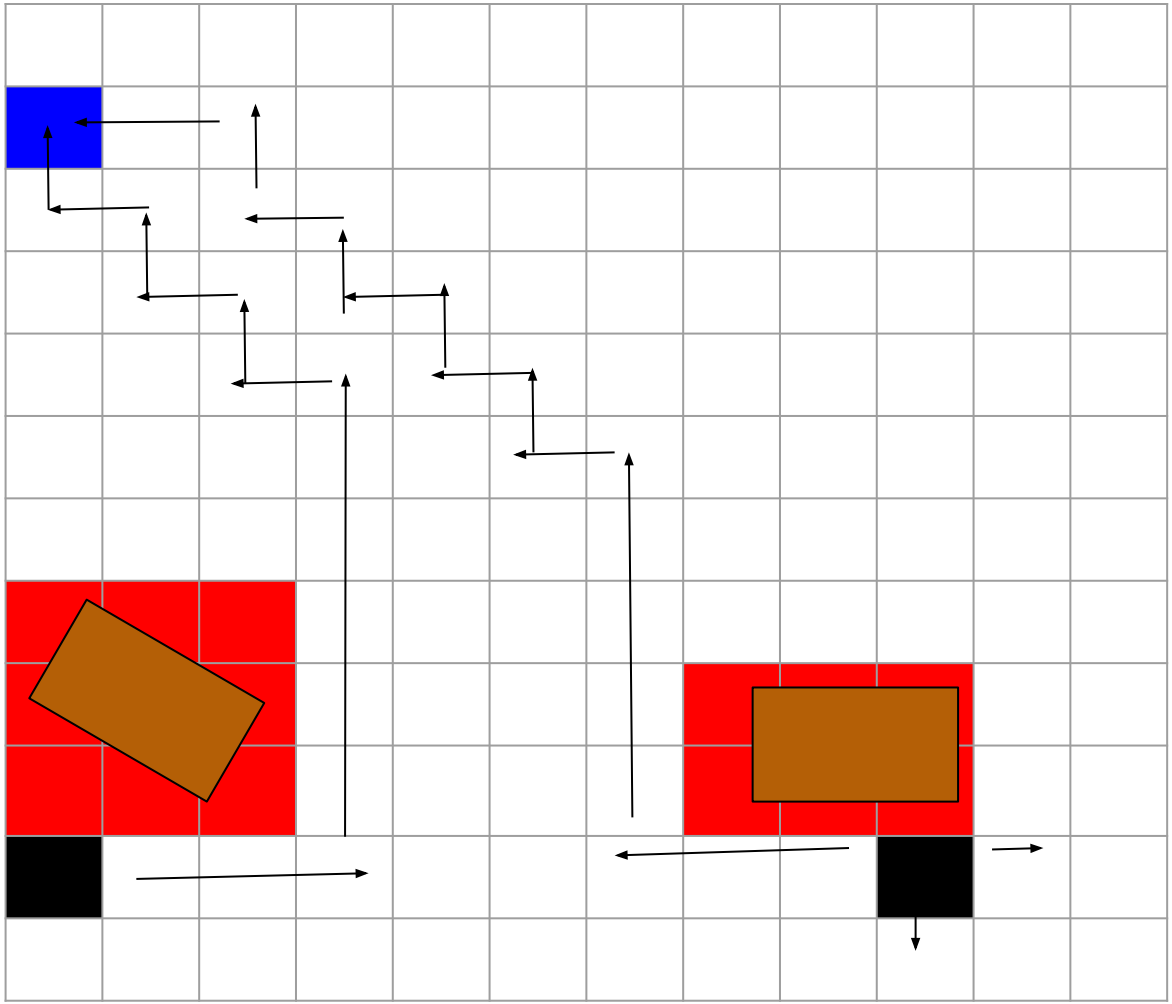
Updates from March 17- March 24:

-Obstacle Avoidance

-Final Hardware Design

Obstacle Avoidance

- Robot moves center of square -> center of square
- Maps obstacles using ultrasonic sensors
    - Stores known squares containing obstacles
    - Knows not to move to these squares
- Greedy algorithm makes “best” move at each location given
    - 1. Square towards destination (Y)
    - 2. Square towards destination (X)
    - 3. Not 1 or 2, not previous square
    - 4. Previous square

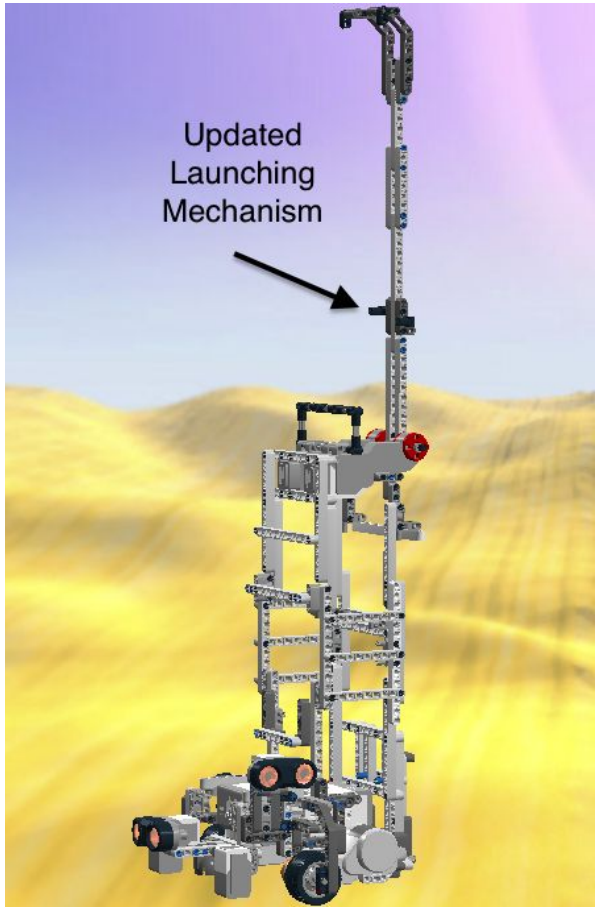


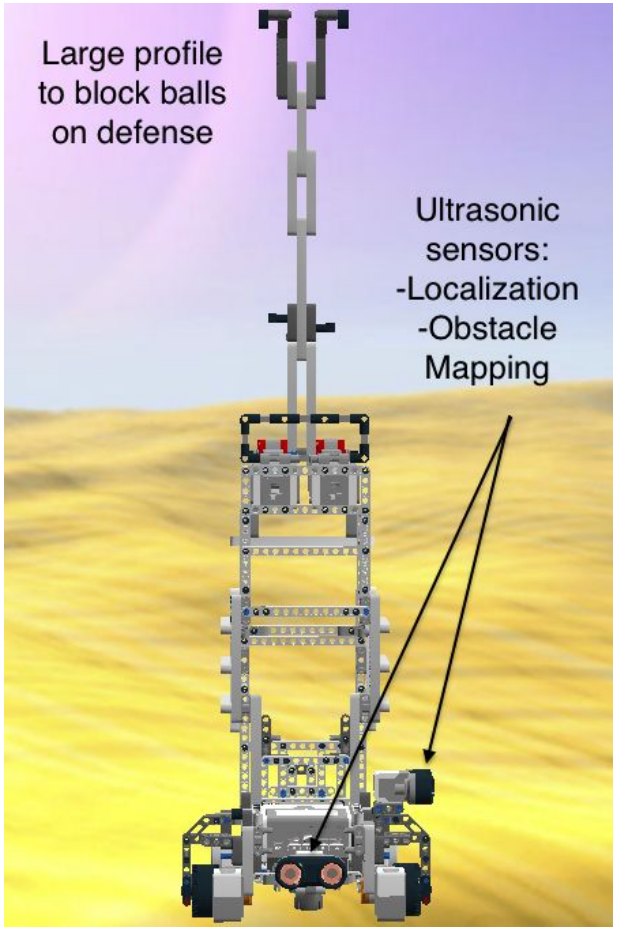
Updates to mechanical design

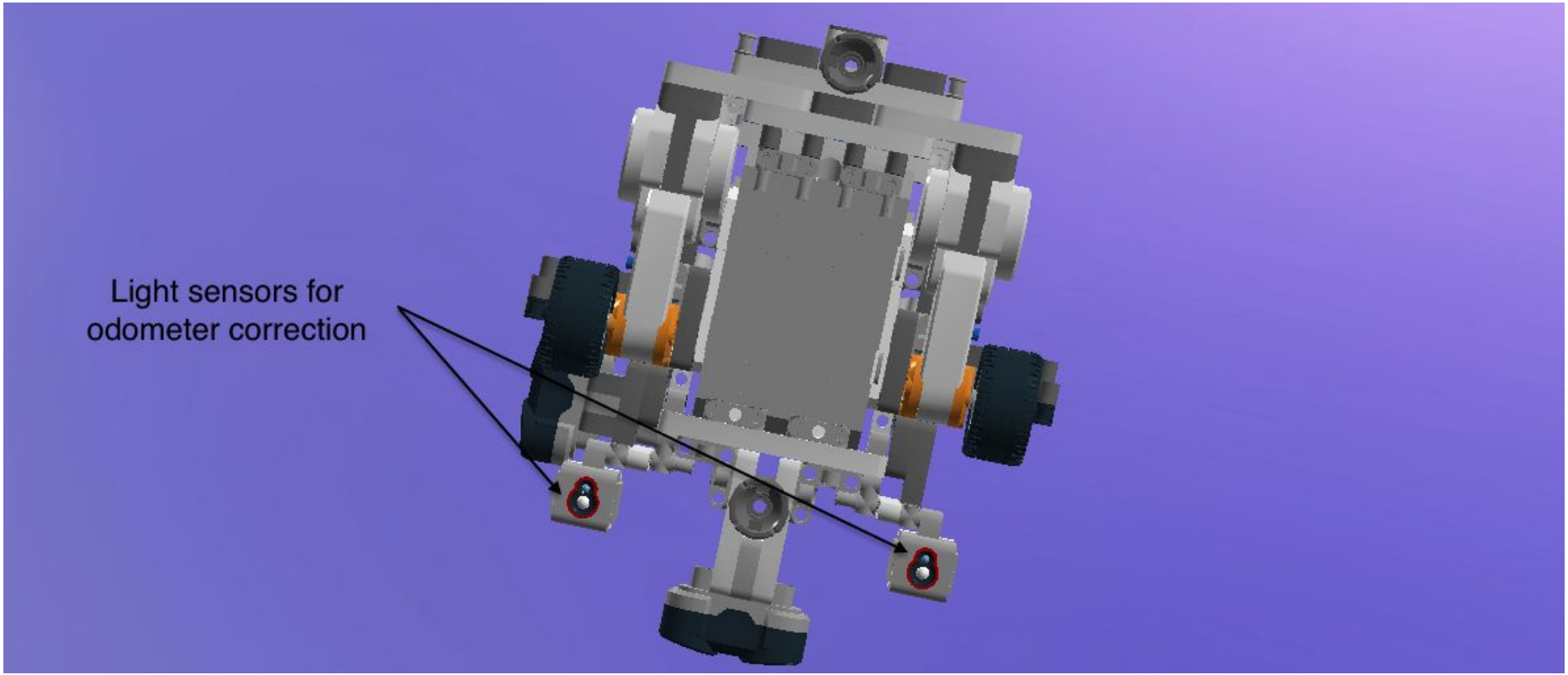
- Increased stability of tower holding launch motors
- More precise light sensor locations (nearer to wheels)
- Rubber band attachment to launch arm improved
    - ‘Scores’ up to 10 tiles from target

Major Differences from Initial Design:

- Orientation of launching mechanism
- Hard-mounted Ultrasonic sensors






Light sensors for
odometer correction

Next Week

Ball Retrieval

Finish writing software & Testing

Complete Offensive Method

Create autonomous offensive method; combine components

3 Days: Component Software

4 Days: Integrative Methods

Obstacle Avoidance

Finish writing software + testing

Complete Defensive Method

Write software for simple, effective defensive method