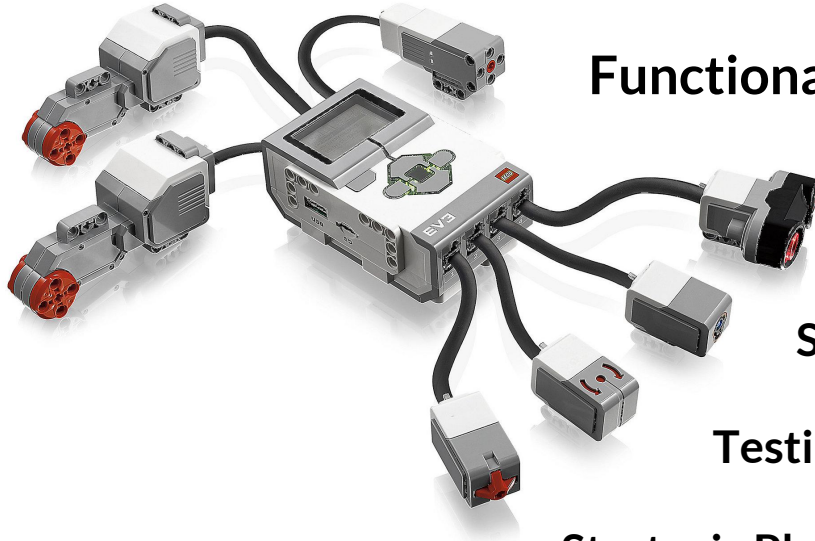

DPM Design Group 11:

Alex
Durham
Ethan
Ian
John

ECSE-211: Design Principles & Methods
Design Project

Tasks Completed:

February 25 - March 10



Functionality: Localization, Odometry, Navigation

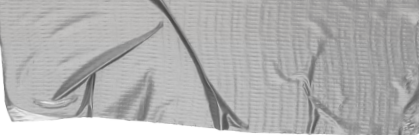
Hardware Designs (3x) + One Design Built

Software Architecture Design

Testing Document + Procedures

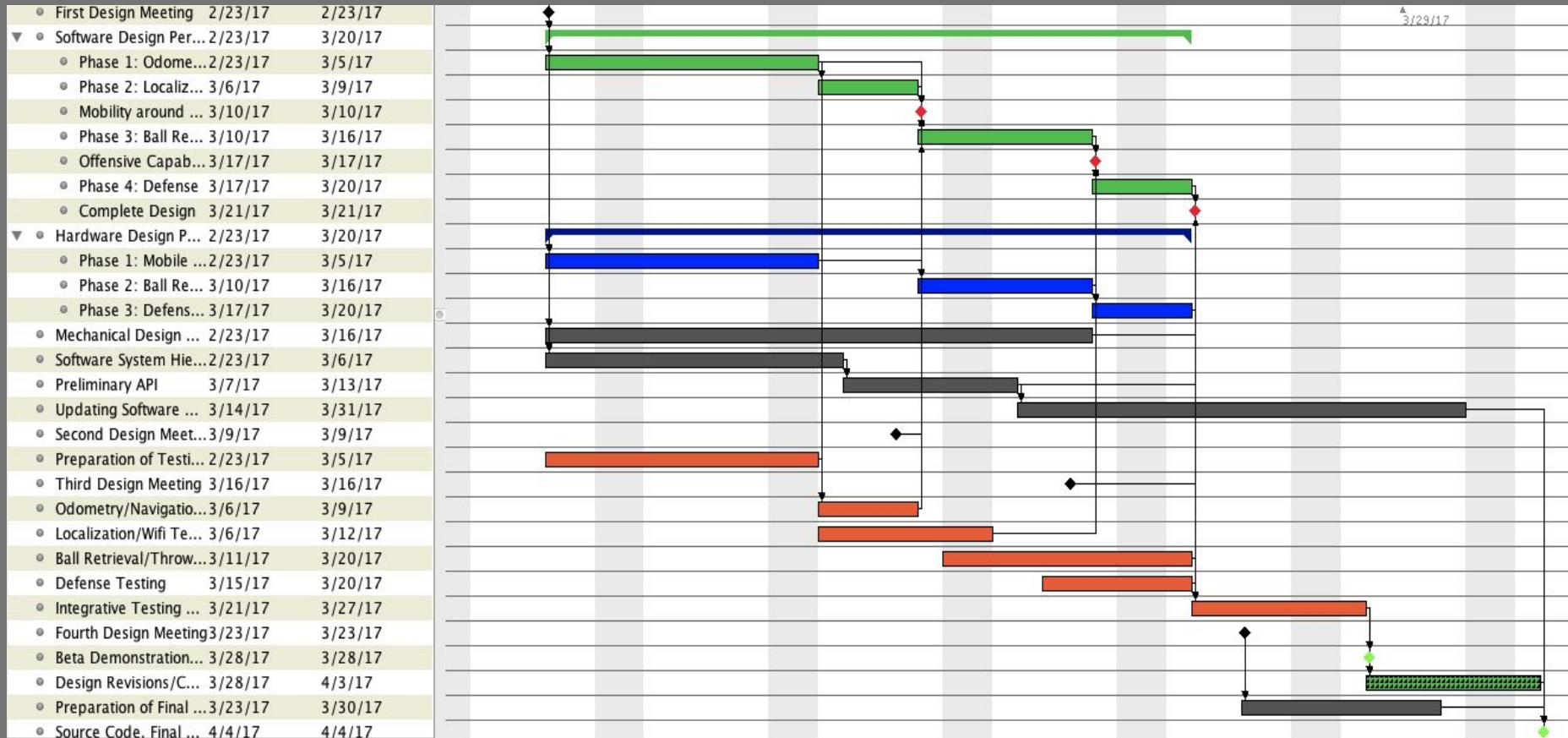
Strategic Planning (Ball Retrieval, Throwing, Defense)

Recent Tasks:



| Task: | Gantt Due Date: | Completed? | Incomplete? | On Schedule? |
|------------------------------|-----------------|------------|-------------|--------------|
| Mechanical Design | 3/16/17 | | X | Yes |
| Software Hierarchy | 3/6/17 | X | | Yes |
| Preliminary API | 3/13/17 | | X | Yes |
| Testing Document | 3/5/17 | X | | Yes |
| Wifi/Localization Software | 3/5/17 | X | | Yes |
| Odometry/Navigation Software | 3/9/17 | X | | Yes |
| Obstacle Avoidance Software | 3/9/17 | | X | No |
| Mobile Robot Hardware | 3/5/17 | X | | Yes |
| Ball Retrieval Hardware* | 3/11/17 | | X | No |

Gantt Chart V2.0

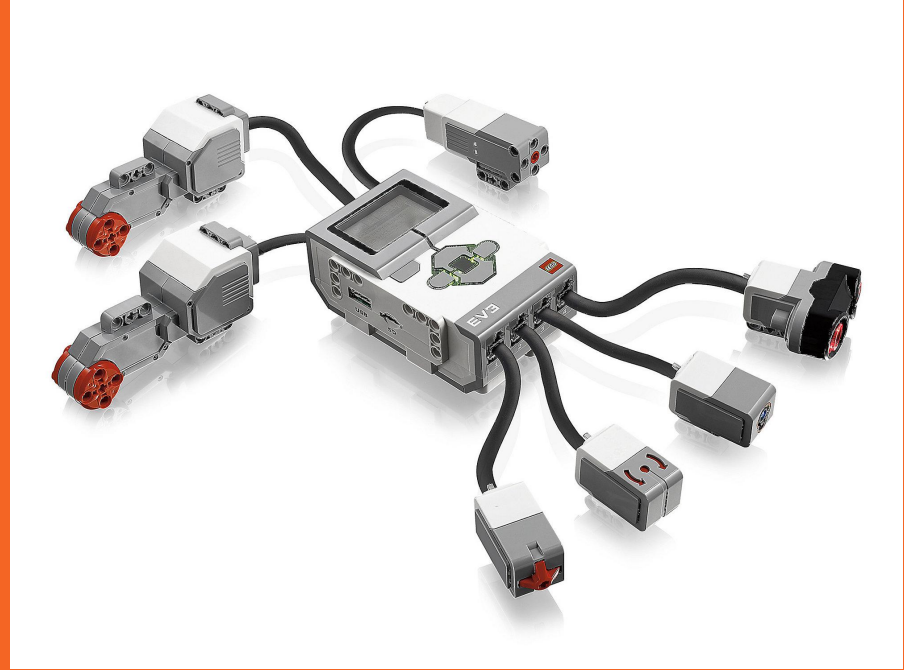


Budget Update:

| Team Member: | Week 1 | Reading Week (Overtime) | Week 2 | Week 3 | Week 4 | Week 5 | Total: |
|--------------|--------|----------------------------|--------|--------|--------|-------------|--------|
| Alex | 7 | 5 | 3 | | | | 15 |
| Durham | 8 | 2 | 4 | | | | 14 |
| Ethan | 2 | 4 | 7 | | | | 13 |
| Ian | 5 | 4 | 3 | | | | 12 |
| John | 8 | 6 | 2 | | | | 16 |
| | | | | | | Team Total: | 70 |

- Currently under budget: 26% of budget consumed approx. 40% through the project
 - Saves budget for testing
 - Saves budget for closer to competition date:
 - Updates
 - Revisions
 - Final Documentation

Next up we'll discuss some
Mechanical
Design mock-ups!





- **Pros:**

- Compact Design
- 2 Color sensors for odometry correction
- Low center of gravity (for stability when launching ball)
- Optimal ultrasonic sensor placement

- **Cons:**

- One Ultrasonic sensor relies on a motor
- One Ultrasonic sensor is vertical therefore sees a smaller range of obstacles



- **Pros:**

- All ultrasonics are static
- Compact design
- Optimal ultrasonic sensor placement

- **Cons:**

- Only one color sensor for odometry correction



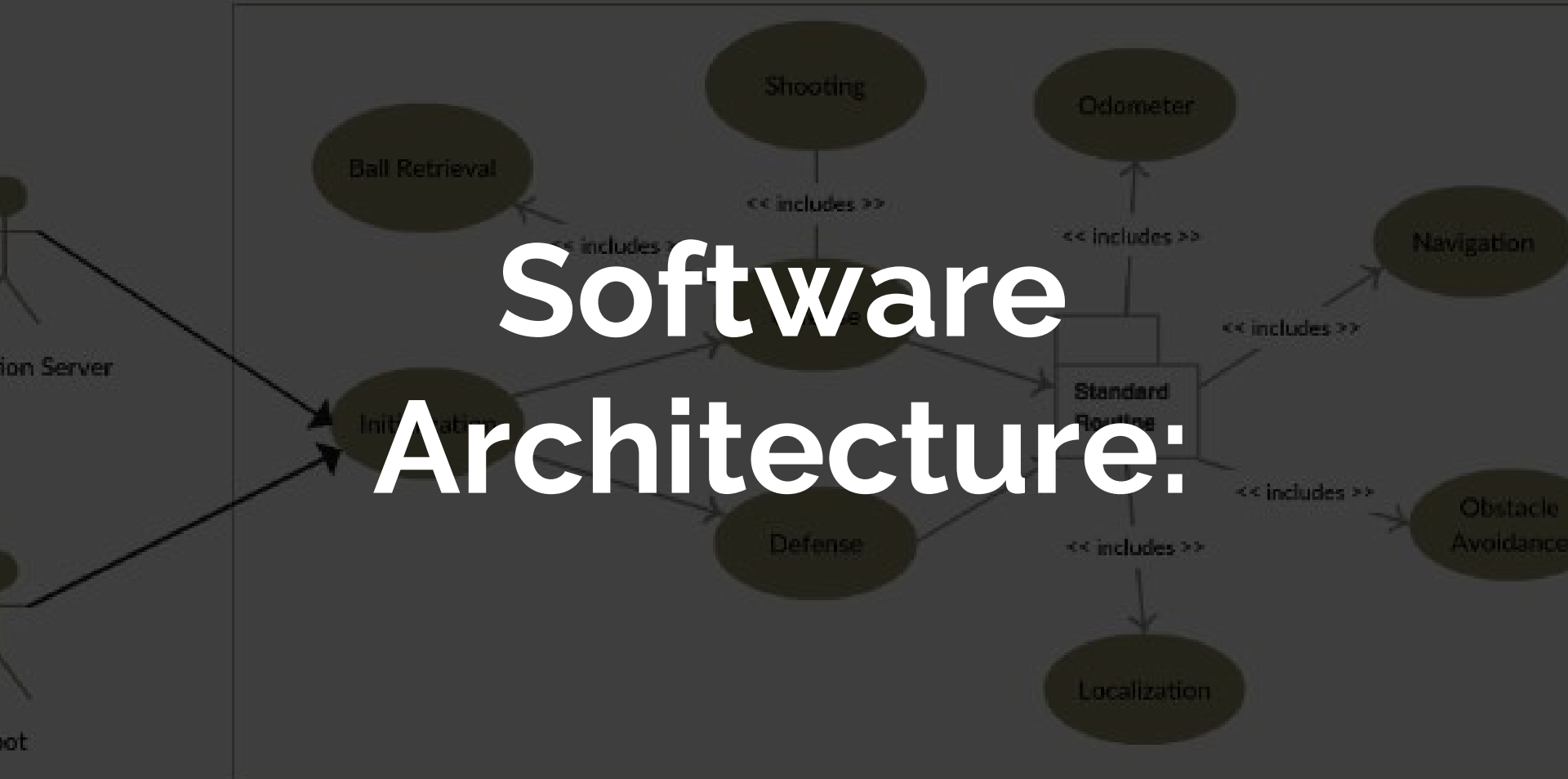
- **Pros:**

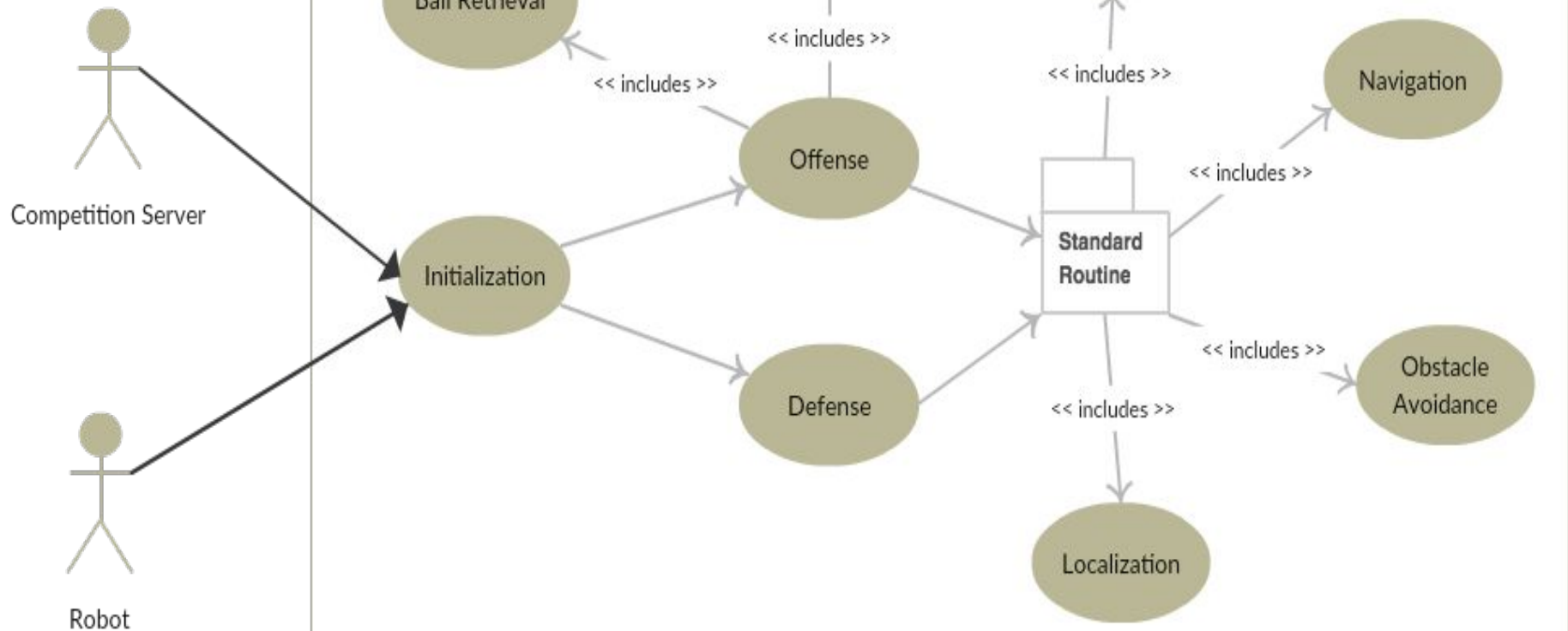
- Two color sensors for odometry correction

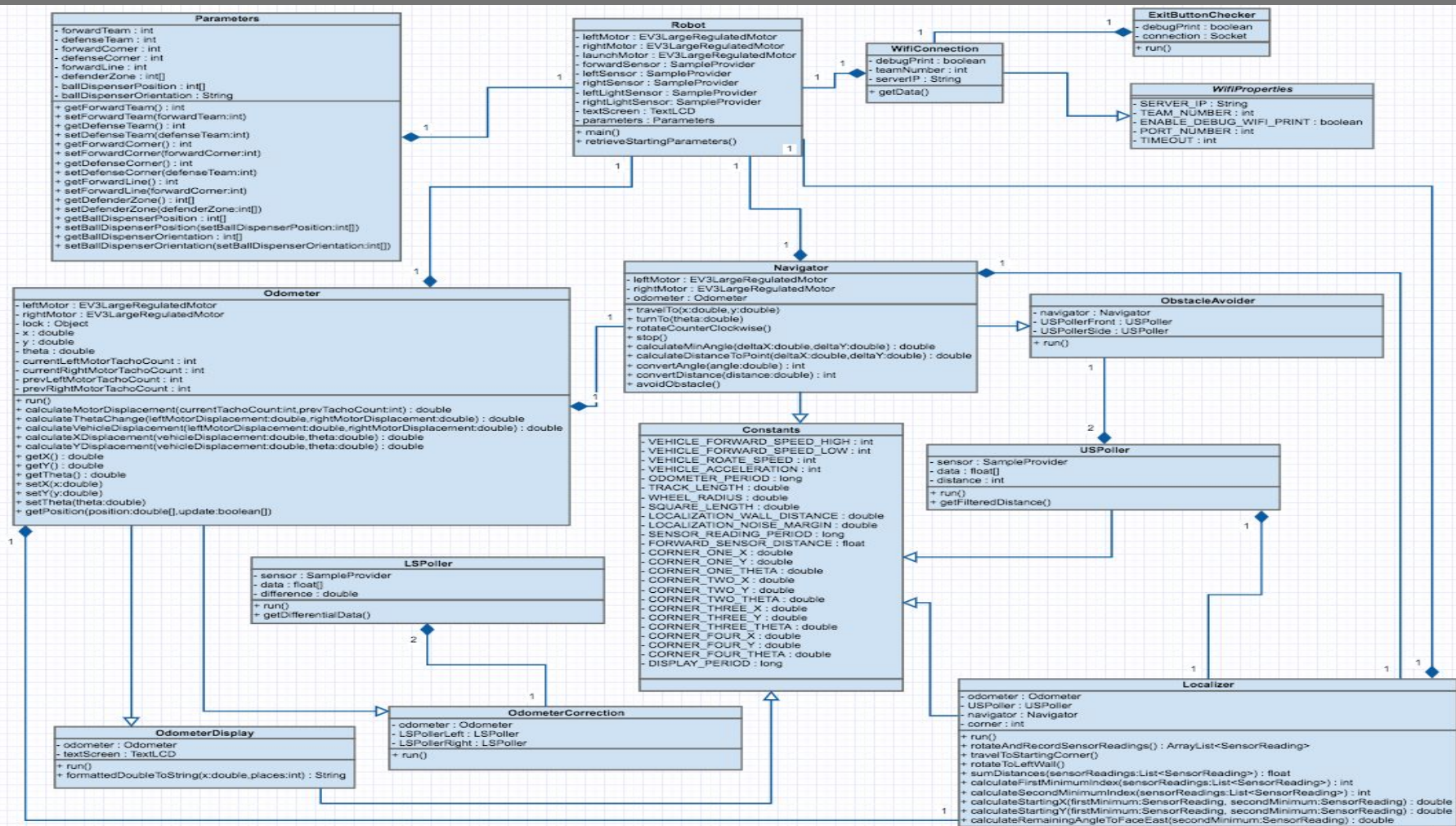
- **Cons:**

- Ultrasonic sensors placed too far in front of robot
- US sensors off center
- Non-compact design
- Not stable for ball launching

Figure 1: Use Case Diagram







What We Learned: Lab 5

STABILITY of robot base is *essential* to throw accurately

SIMPLISTIC THROWING
MECHANISMS work better than
complex ones (easier to control)

Challenge: Throw further with a simple
mechanism and without tipping



Next Week

Ball Retrieval

Obtain ball dispenser
design + plan

2 Days

Software Design

Design software to retrieve
ball

7 Days

Hardware Design

Design hardware for
retrieval

Testing

Test proof of concept for
throwing (can throw the
distance) and retrieval
technique



QUESTIONS

?