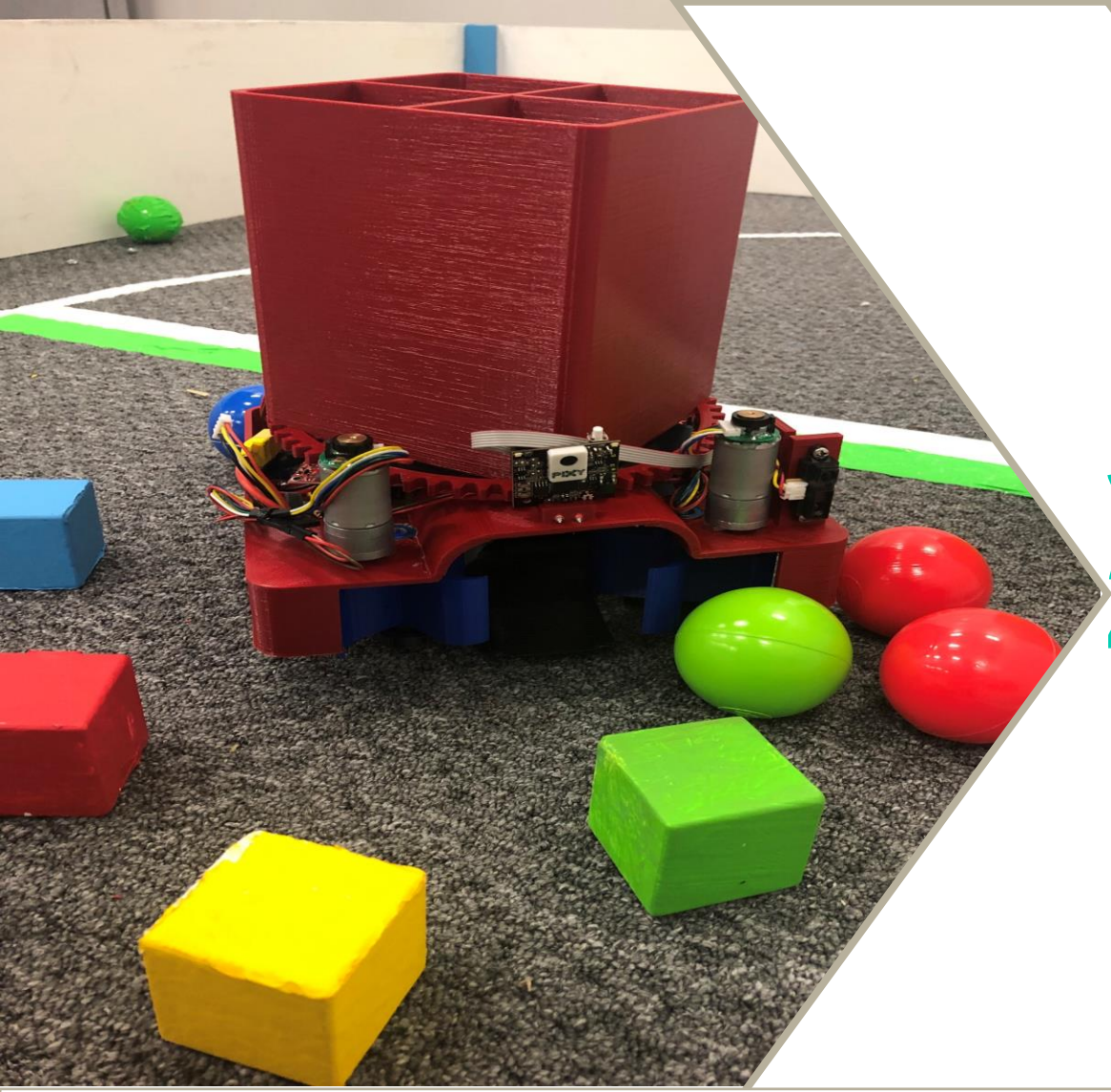


IEEE Southeast Con 2019 Team 305 Presentation

By: Chase Sapp, Kyle Voycheske, Yuan Chendong, Daniel Delgado, and Fabio Trinidad

Department of Electrical and Computer Engineering
Department of Mechanical Engineering

FAMU-FSU Engineering

Team Members

				
Chase Sapp	Kyle Voycheske	Chendong Yuan	Daniel Delgado	Fabio Trinidad
Team Leader/	Lead Mechanical Engineer	Lead Control System Engineer/ Financial Advisor	Lead Software Engineer	Lead Electrical Engineer

VDR 6 Itinerary

Topic	Person
Southeast Con Recap	Daniel Delgado
Budget Update	Yuan Chendong
Previous Robot Versions to Current Design	Chase Sapp
Overall Software Architecture	Fabio Trinidad

Southeast Con 2019

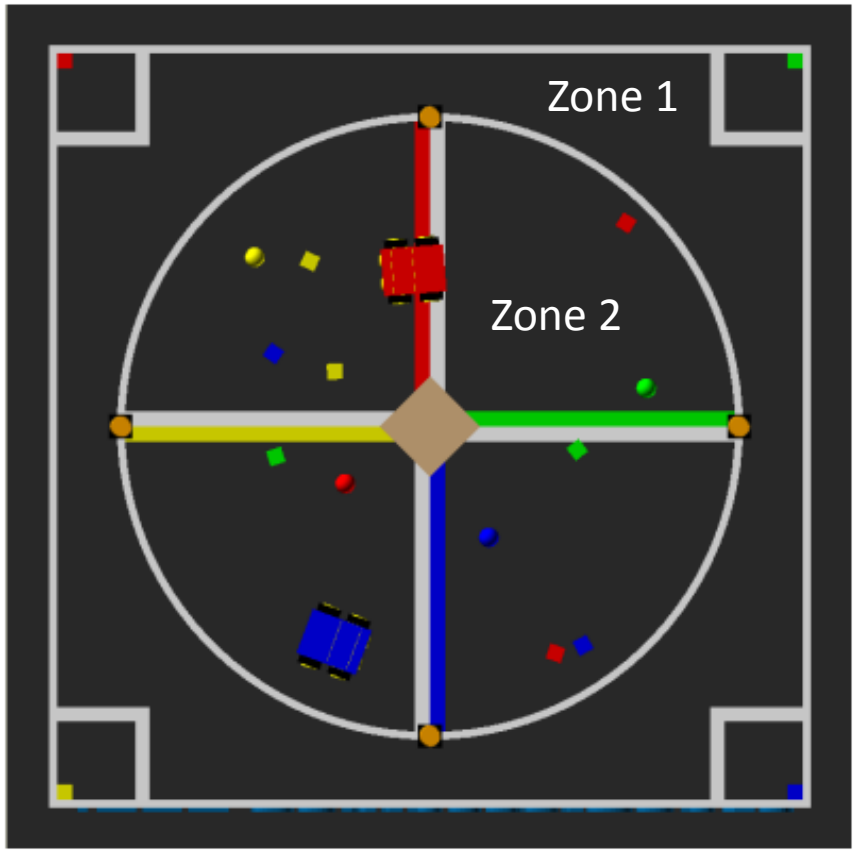
- IEEE Region 3 for: Technical, Professional, and Student conference
- Focuses on sharing ECE latest information
- Events
  - A technical program with seminars, tutorials and workshops
  - A student program with student competitions
  - Exhibits
  - IEEE regional meetings
- Conference Location: Von Braun Center in Huntsville, Alabama
- Thursday, April 11th, 2019 through Sunday, April 14th, 2019

[2] "IEEE SoutheastCon 2019." IEEE Future Directions, sites.ieee.org/southeastcon2019/.

How to Earn Points in the Competition

Southeast Con 2019 Hardware competition Point System [1]

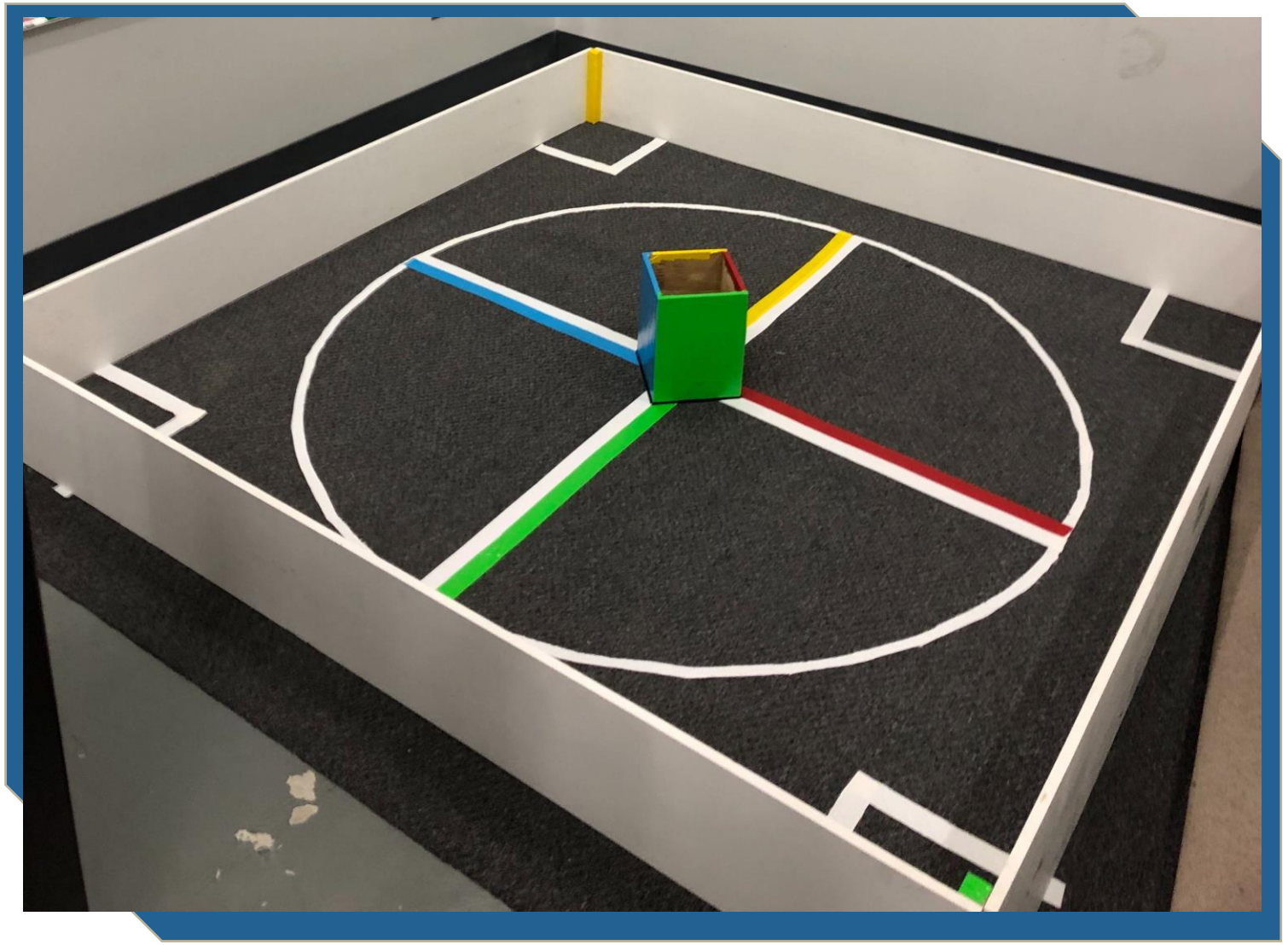
Points	Task
5 pts	Leave home base and enter Zone 1
5 pts	Cross the orbital line into Zone 2 (first time only)
5 pts	For each complete, counter-clockwise orbit within Zone 2, starting from the quadrant closest to designated corner square
10 pts	Debris removed from Zone 2 (each)
10 pts	Debris placed in corner square (additional to removal)
10 pts	Color-matched debris placed in appropriate color corner square (bonus points)
10 pts	Finish in your home base
25 pts	At conclusion of debris removal, raise your onboard flag while in home base
-10 pts	Every collision with a Spacetel



[1] Southeast Con 2019 Playing Field

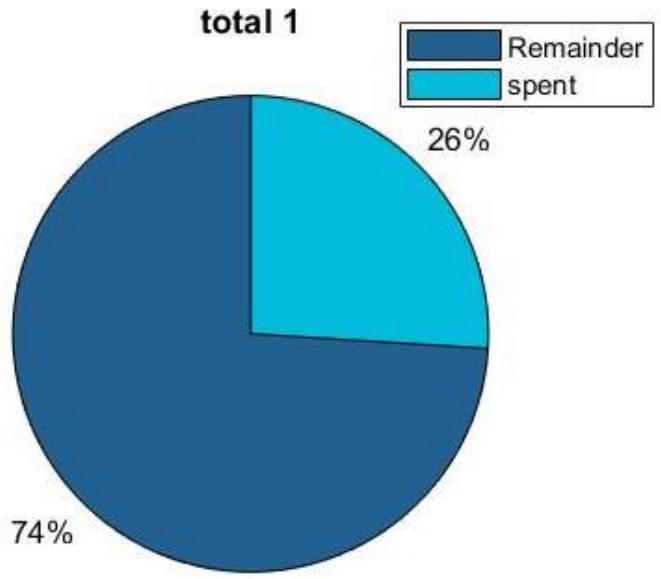
Testing Field

- Design to match the competition's layout
- Paint was used for the center structured and corner posts (based on rules update)
- Space debris (wooden cubes) were painted to match respective home corner

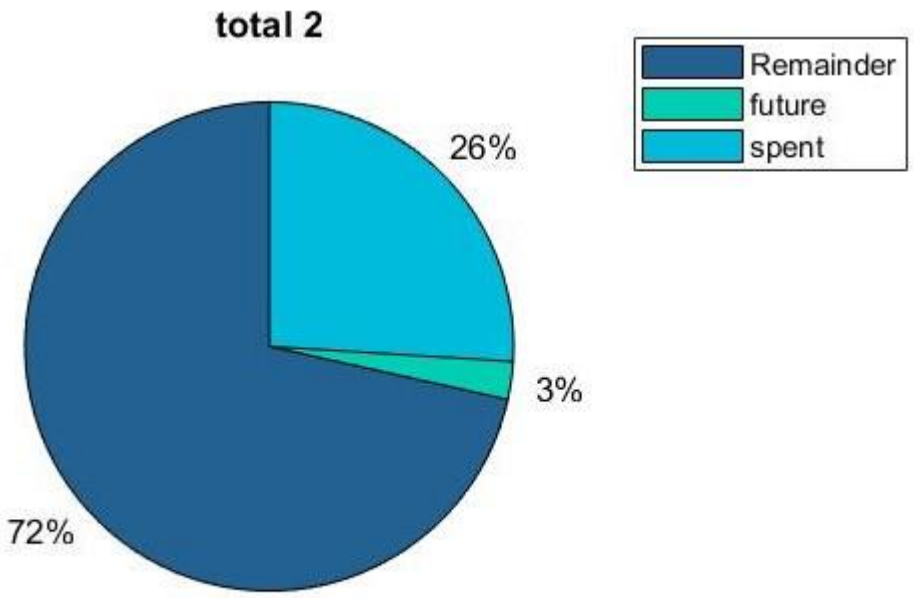


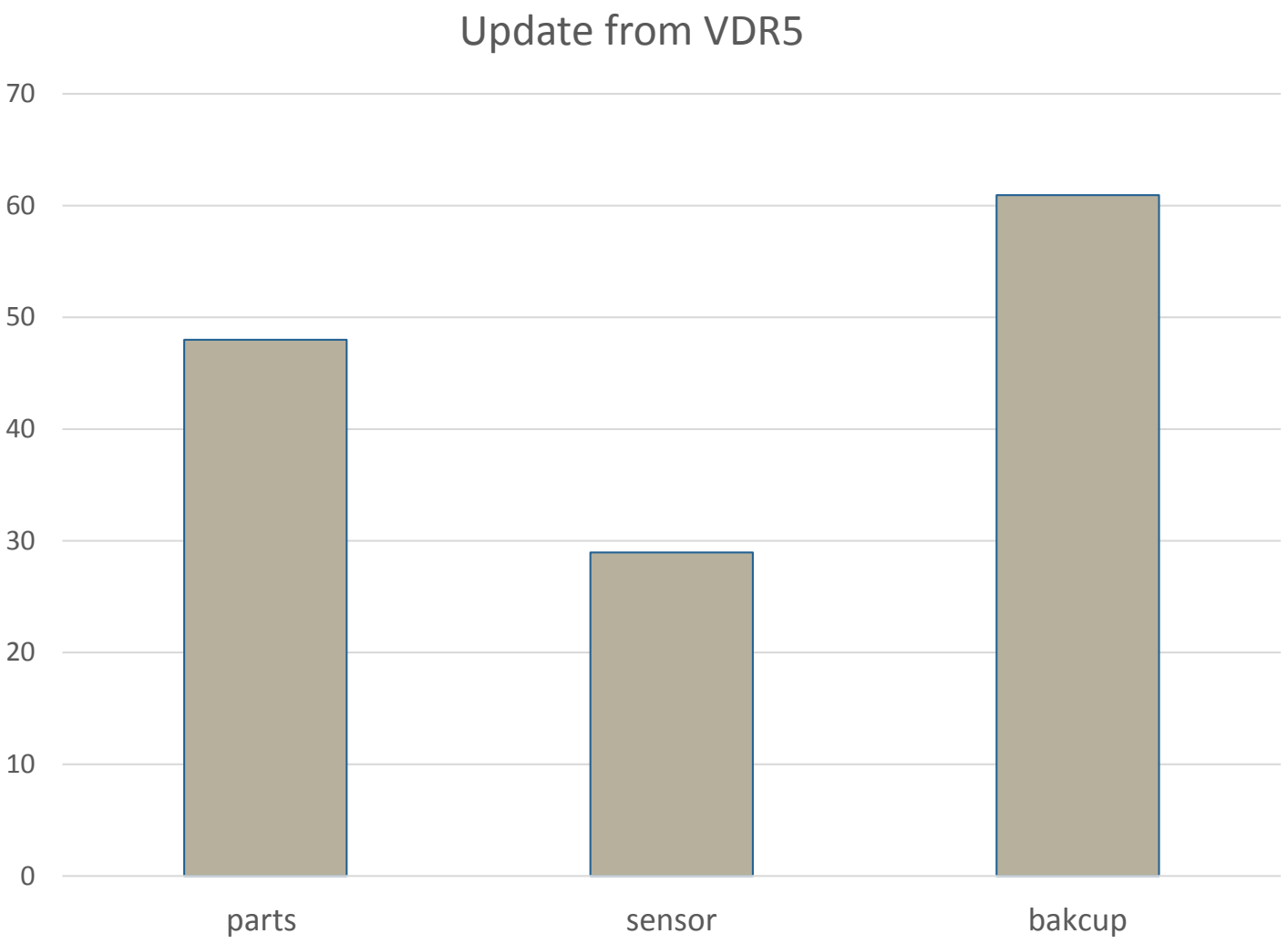
Budget Update

Before VDR 6



Estimate VDR 6

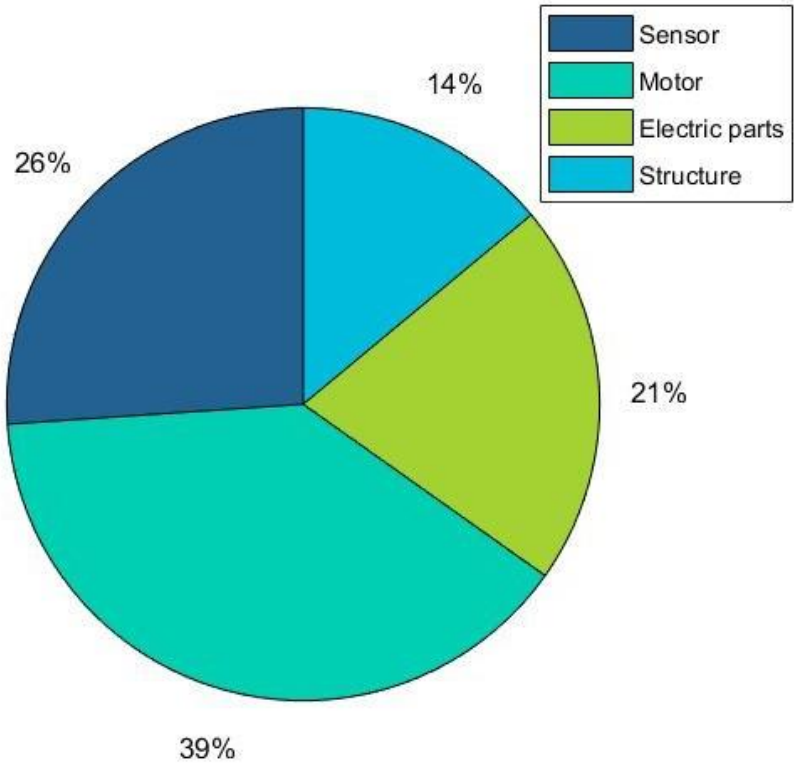




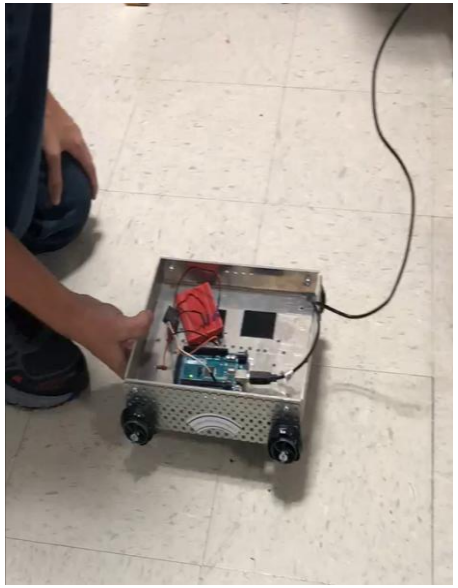
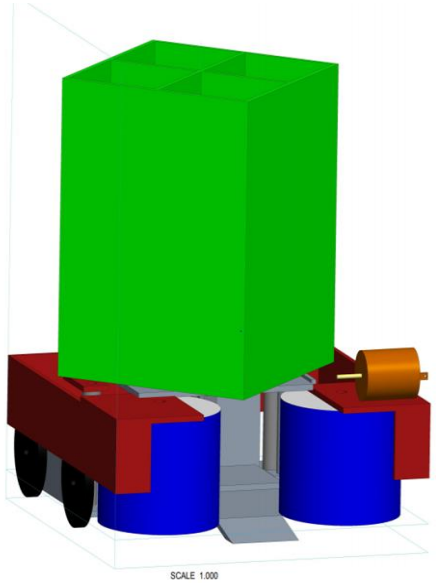
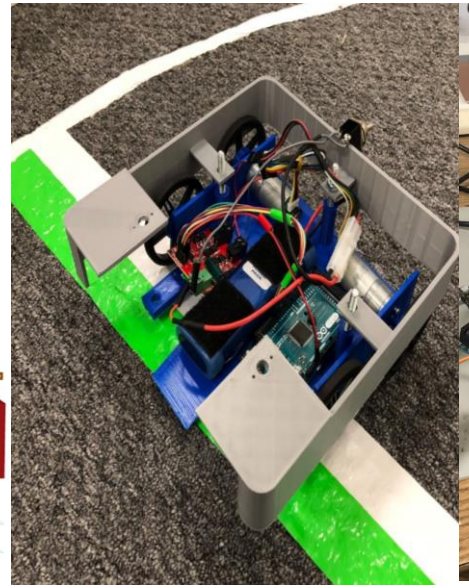
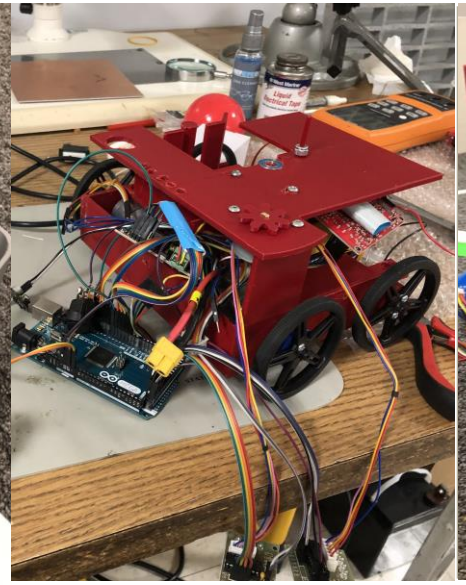
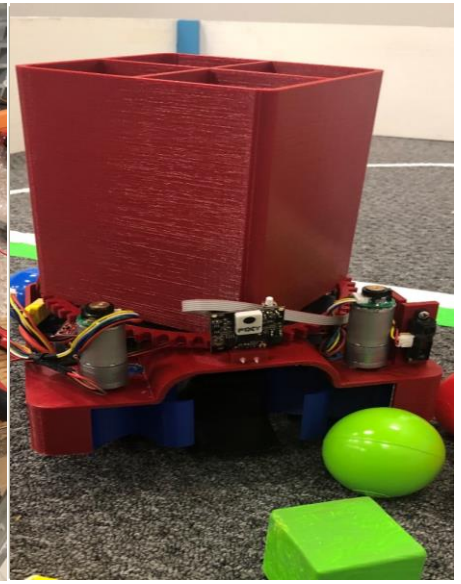
Item	Price
Bearings	10.48
Cable	5.79
LED	12.99
Switch	6.78
Voltage regulator	11.95
IR sensor	18.99
RGB sensor	9.97
Gear motors	36.95
Wheel set (2 sets)	16.98
H-bridge	7.01

Material Bulk Bot Cost

Sensor		Motor	
Pixy2	59.9	Gearmotor*2(wheel)	73.9
IR sensor*2	37.98	stepper motor*2(sorting)	13.99
RGB sensor	9.97	Gearmotor*2(brush)	73.9
Total	107.85	**Total**	161.79
Electric parts		**Structure**	
Voltage regulator	11.95	Wheels	16.98
Switch	6.78	Bearings	10.48
H-bridge*2	33.98	Plastic sheets	29.27
Arduino board	33.5	Screw	1.05
Total	86.21	**Total**	57.78
Grand Total	**413.63**		

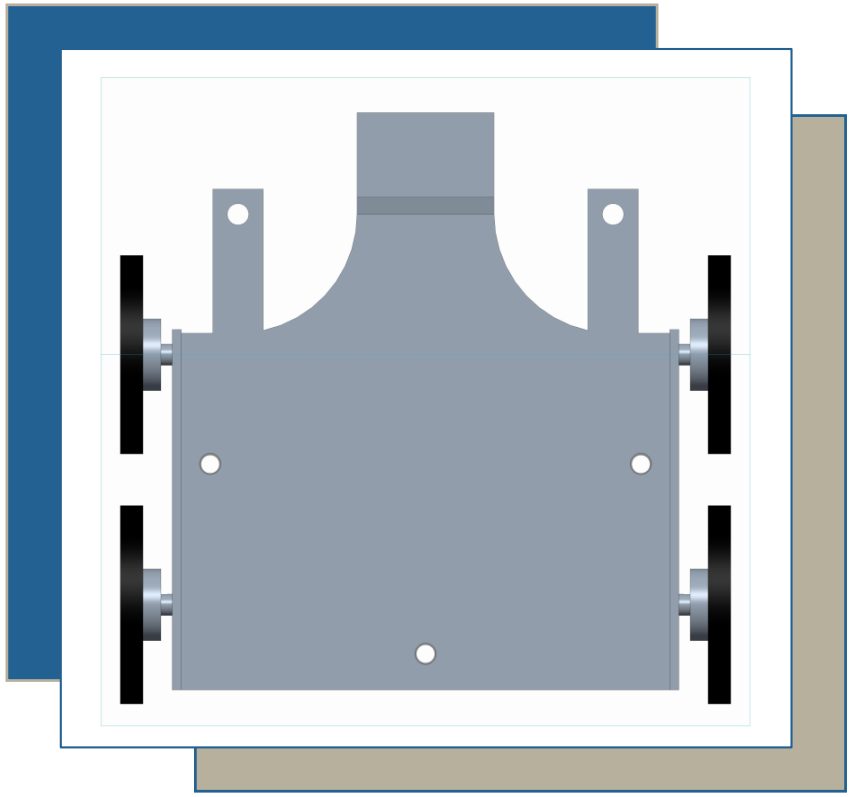


Robot Versions to Now

Version 0	Version 1	Version 2	Version 3	Version 4
				

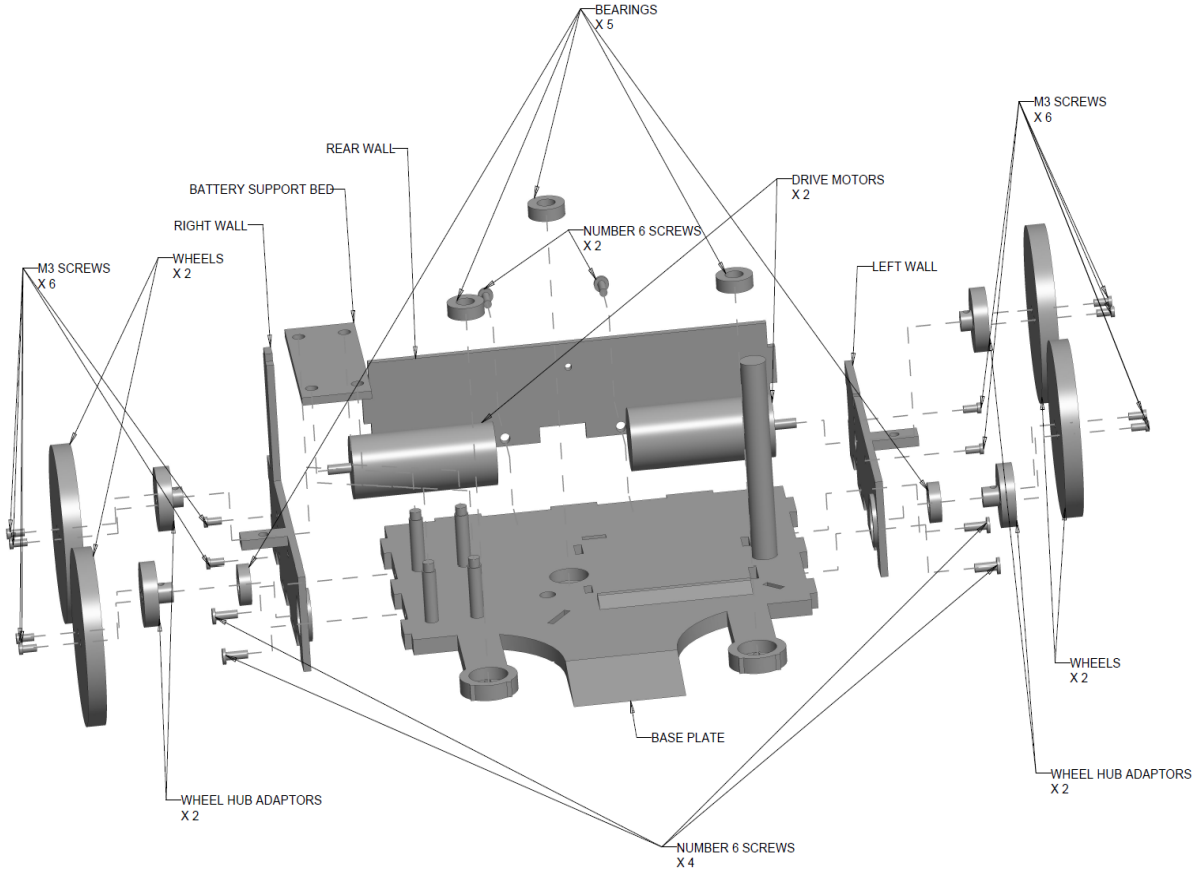
Version 3 to Version 4

- Base plate broken into multiple parts
  - Modular assembly
  - Less 3D printing time overall
- Redesigned bumper attachment to base plate
  - Robot now supports flat-plane bracket opposed to L-bracket
- Battery permanently fixed to robot



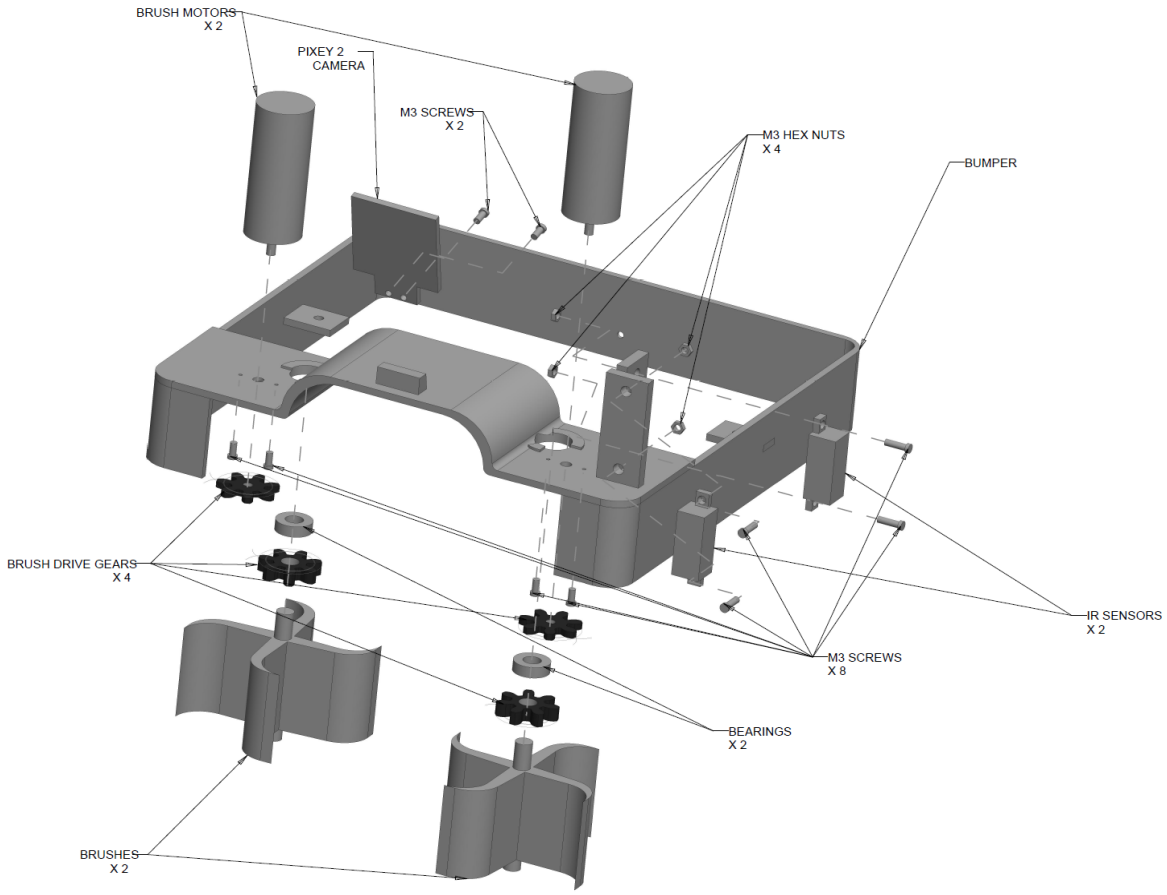
Breaking the Mold

- Broken the base into 9 parts
- Easy access to electronic hardware
- Internal gear box for the elevator did not print excess supports

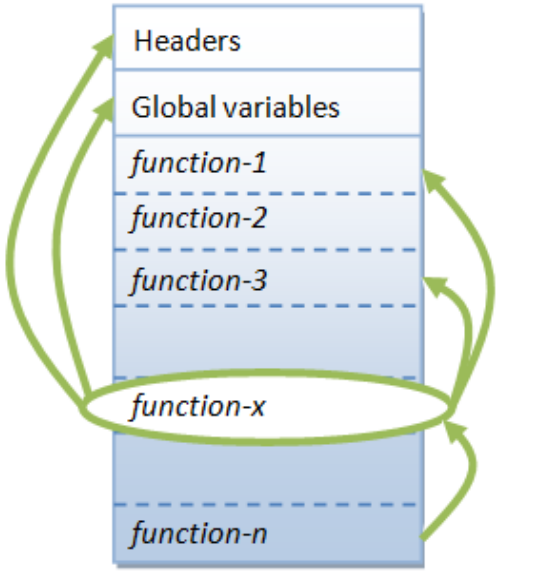


Redesigning the Bumper

- Redesigned bumper attachment to base plate
- Placed the Pixy 2 at a angle
- Completely remove back support structure
- Robot now supports flat-plane bracket opposed to L-bracket

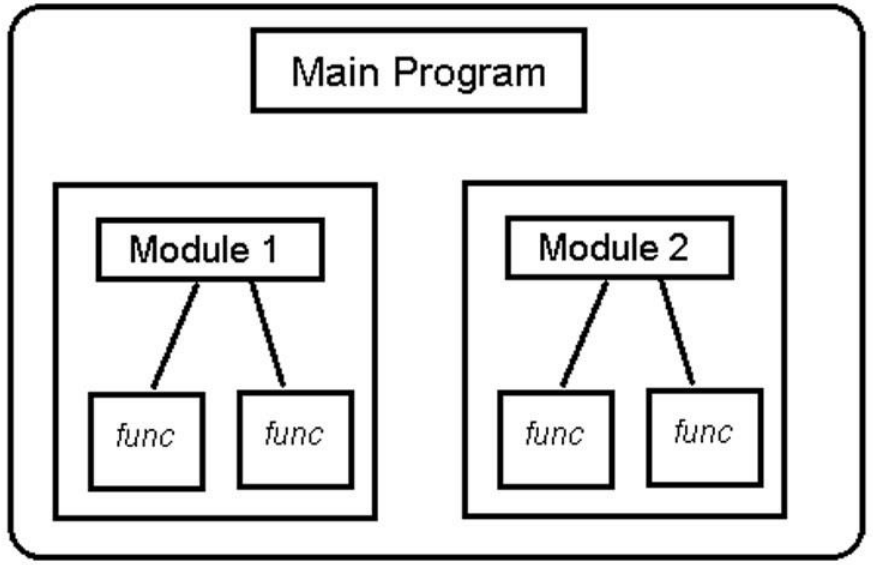


Software Update: Organization



A function (in C) is not well-encapsulated

- Software divided into various modules to allow easy and quick debugging
- Includes all components including motor control, object detection, etc.

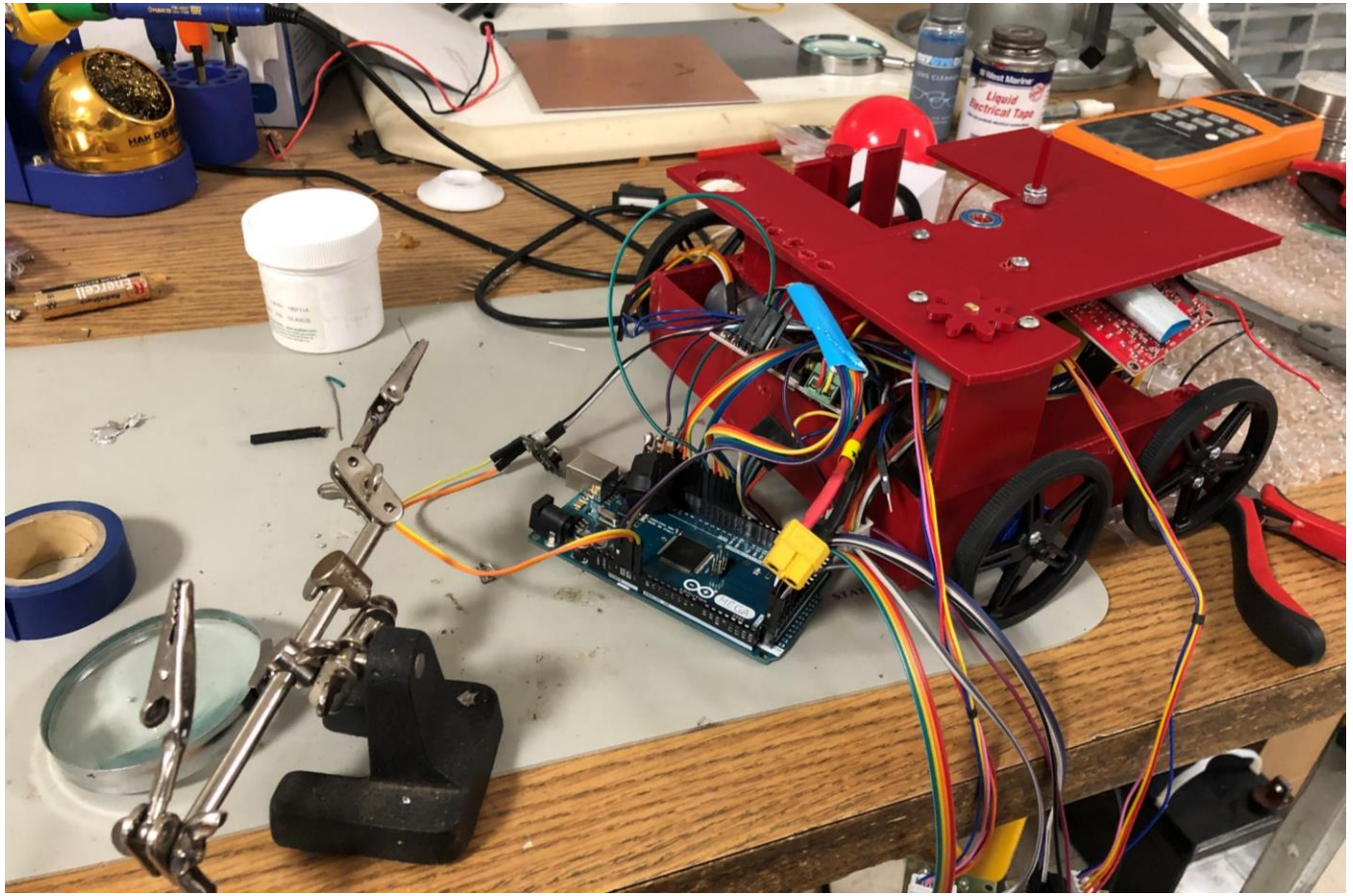


Software Update: Phases

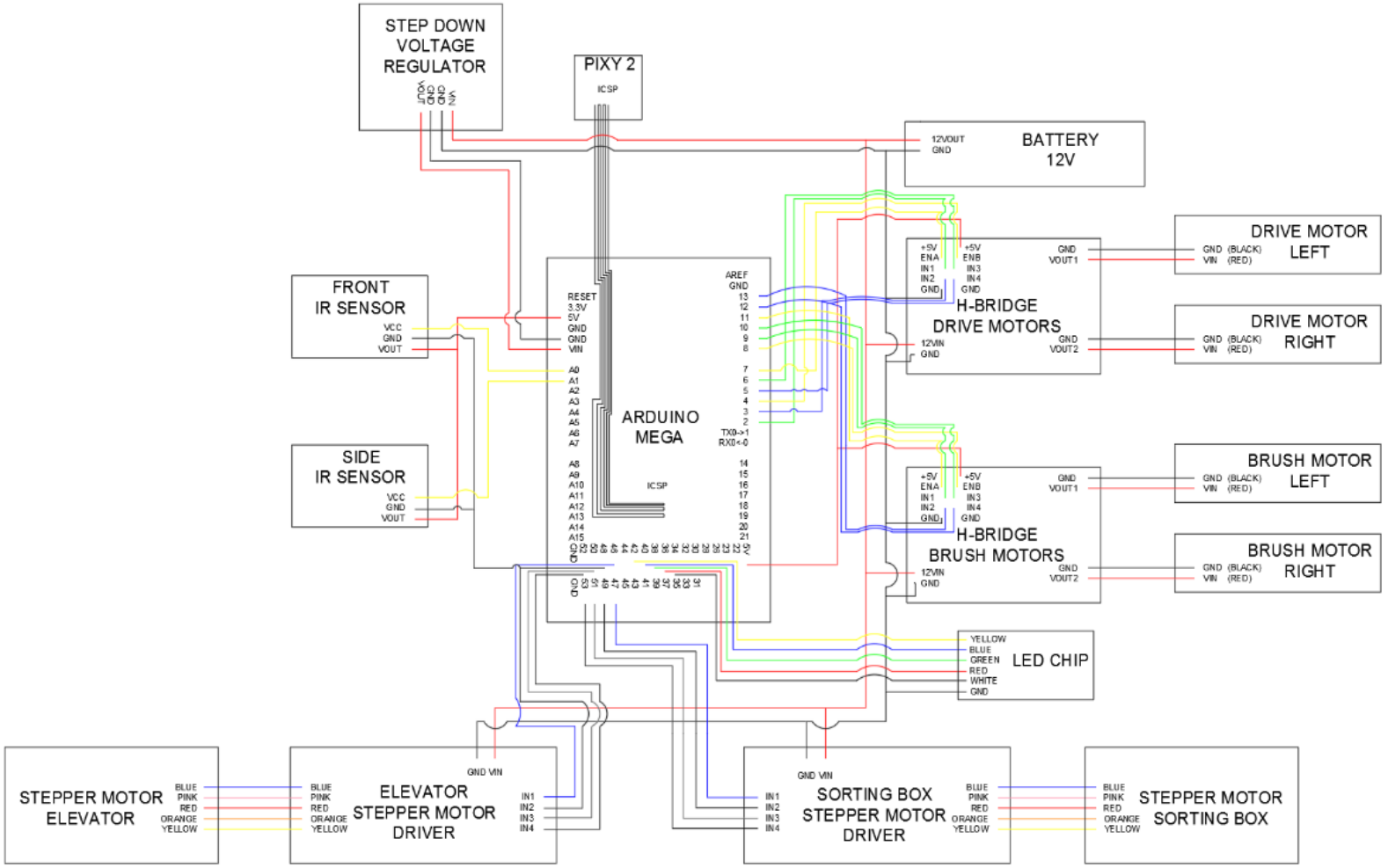
- Phase 1
  - Robot enters zone 2
- Phase 2
  - Robot follows predetermined route
  - Gather debris
  - Avoid other robots
- Phase 3
  - Return home in the last 30 seconds of the round

Software Update: Test codes

- IR Test Code
- LED Test Code
- Elevator Test Code
- Sorting Box Test Code
- Drive Motor Test Code
- Brush Test Code



Wiring the Southeast Con Robot



Reference

[1] *IEEE Future Directions*,
sites.ieee.org/southeastcon2019/program/student-program/

Questions?