Autonomous Robot War

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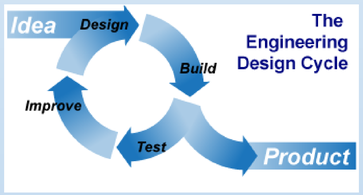
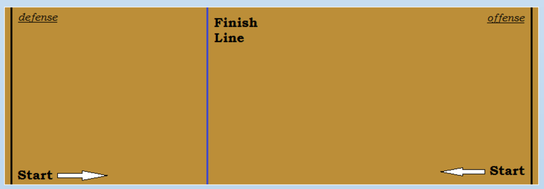
Overview

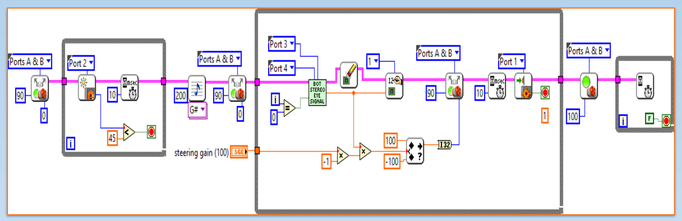
There are two categories of robots: offensive and defensive. Six robots were made; three of each. There are three teams; each team with one of each type of robot. The battlefield is an alleyway with walls on each side and a blue finish line in between. The goal of the offensive robot is to cross the finish line. The goal of the defensive robot is to prevent the offensive robot from crossing that line. None of the robots are allowed to be remote controlled. They must be programmed to do it themselves, autonomously. The robots were periodically tested and improved accordingly. The final results are displayed.

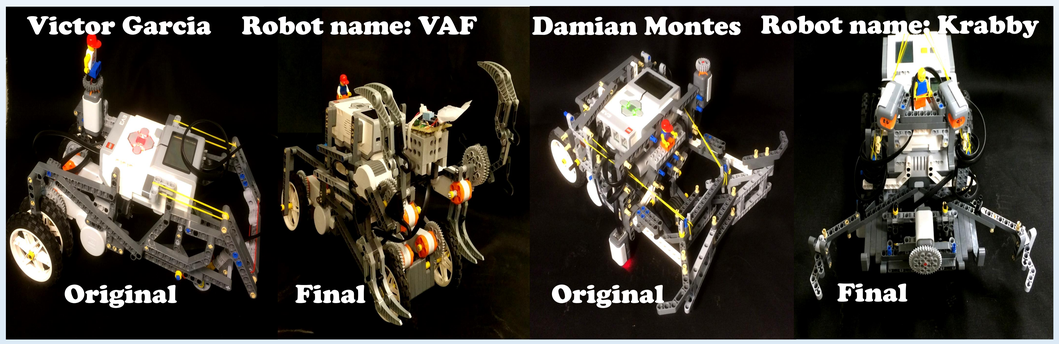




LabVIEW

All the coding we did for the Lego EV3 robots was done through the LabVIEW software. LabVIEW is a coding program that uses icons with specified functions and values that wire to each other to make the program run, rather than normal text coding. LabVIEW allowed us to use the robot's touch sensors, light sensors, and motors to fulfill the tasks assigned.



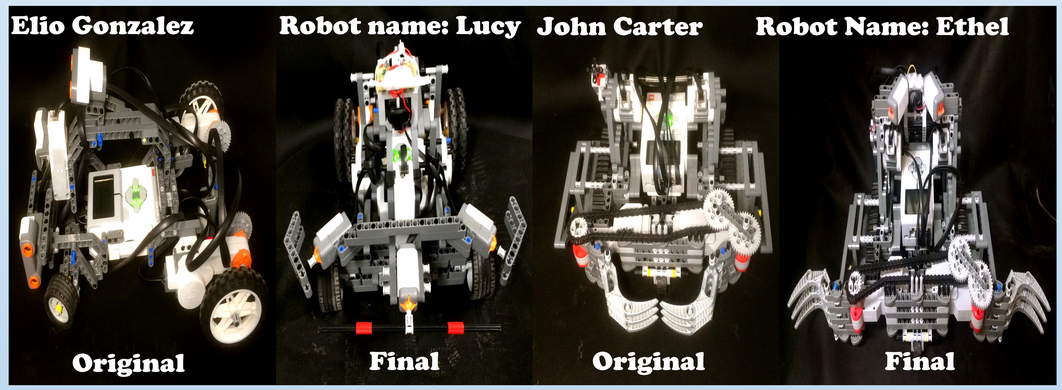


Design Purpose: Offense
- Speed
- Lifting the opposing robot
- Weight for traction

Design Conflicts
- Battery dies extremely fast
- Structure often would cause defects

Design Purpose: Defense
- Strong to withstand hits
- Wide Bumper
- Multiple motors
- Heavy

Design Conflicts
- Steering capabilities
- Light sensor detection
- Medium speed

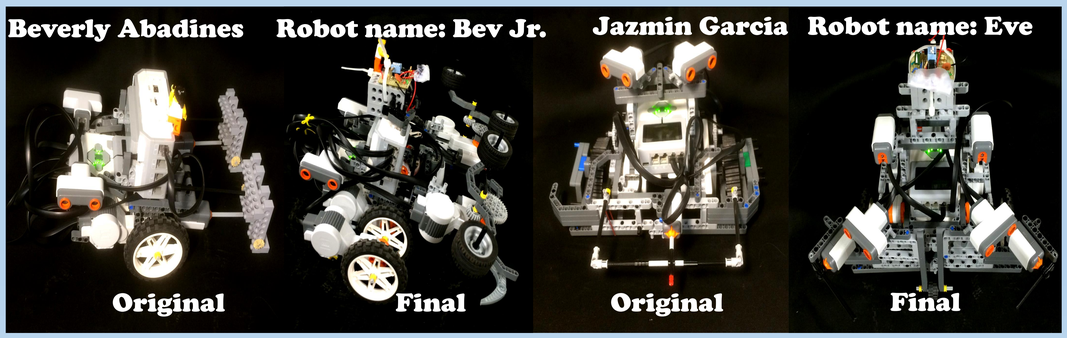


Design Purpose: Offense
- Speed
- Lightweight
- Stability
- Maneuverability

Design Conflicts
- Reduced torque
- Independent Steering
- Response Faulty
- Gear Slippage

Design Purpose: Defense
- Expands to block path
- Heavy weight for traction
- Strong structure for collisions

Design Conflict
- Too large
- Difficulty turning
- Too heavy
- Slow speed



Design Purpose: Offense
- Maneuverability
- Wheels of Death
- Strength
- Overloaded sensors

Design Conflicts
- Delay in communication
- Limited attack range
- Weak sensor sensitivity

Design Purpose: Defense
- Withstand hits
- Sense opponent with light and sonar sensors
- Ram into opponent

Design Conflicts
- Weak sonar sensor range
- Difficult steering

Conclusion

Naturally, the robots underwent iterative design development in an effort to bolster featured strengths, and contrarily, to correct exhibited weaknesses from each battle. It was a progressive competition that combined theory and practice in order to produce not necessarily, the largest, strongest, fastest, and smartest robot, but simply the creation that can achieve the goal of crossing or protecting the blue line most efficiently and flawlessly.

Individual Matches	Offense Stealth	Defense Stealth	No Stealth
Damian vs. Elio	Damian	Elio	Elio
Jazmin vs. Elio	Elio	Jazmin	Elio
Damian vs. Beverly	Damian	Damian	Damian
John vs. Beverly	Beverly	John	Beverly
Jazmin vs. Victor	Jazmin	Jazmin	Jazmin
John vs. Victor	John	John	Victor

Team Statistics	Wins
Damian and Victor	5
Beverly and Jazmin	6
Elio and John	7

Individual Statistics	Wins
Damian	4
Jazmin	4
John	3
Victor	1
Beverly	2
Elio	4

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