
Explorer Post 1010

Team 0160





Team Knowledge

Structure and Organization

Demographics

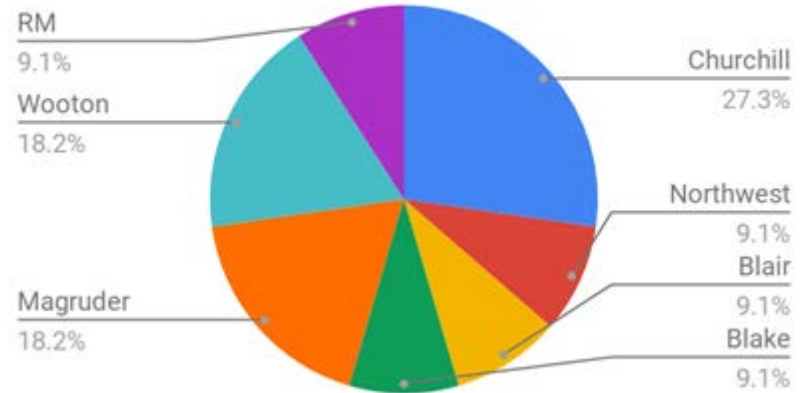
Gender Split:

Boys: 10 (91%) Girls: 1 (9%)

Grade Levels:

9th: 2 10th: 3 11th: 5 12th: 1

Schools:





Structure and Organization

Meetings

Location: Johns Hopkins - Potomac MD (non-school based team)

During School:

Monday:	6-9 PM
Wednesday:	6-9 PM
Saturday:	10 AM-4 PM

During the Summer:

Monday:	3-7 PM
Wednesday:	3-7 PM
Friday:	3-7 PM

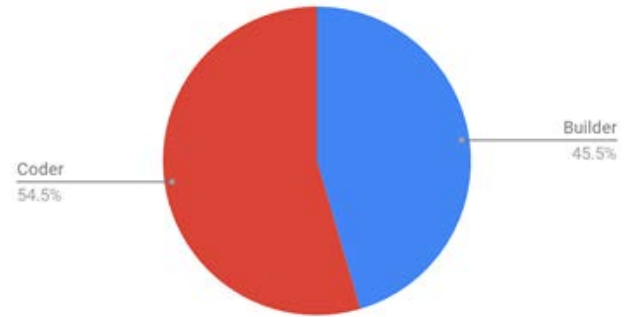
Structure and Organization

Team Roles

- Team Captain (elected) delegates work and strategizes
- Builders are assigned to build and improve robots
- Coders are assigned to a robot and focus on designing the robot path
-

For our 2 robots, coders and builders were evenly spread out

Teams





Learning Goals

- Learn to write efficient and clean programs
- Develop sturdy and simple designs that are easily implemented
- Cultivate ability to work as a team

Over the building period, the goals were generally completed - we worked very well together and although our robots were not as “simple” as originally planned, they turned out well.



Division of Labor and Conflict

paired experienced members with new ones

- individuals were taught in their area of interest

example of conflict: deciding on a strategy for the robots.

- coders and builders tried to decide on a solution that would be easy for both to implement
- pros and cons of each idea
- everyone votes - in case of a tie, captain has final say

Project Iteration

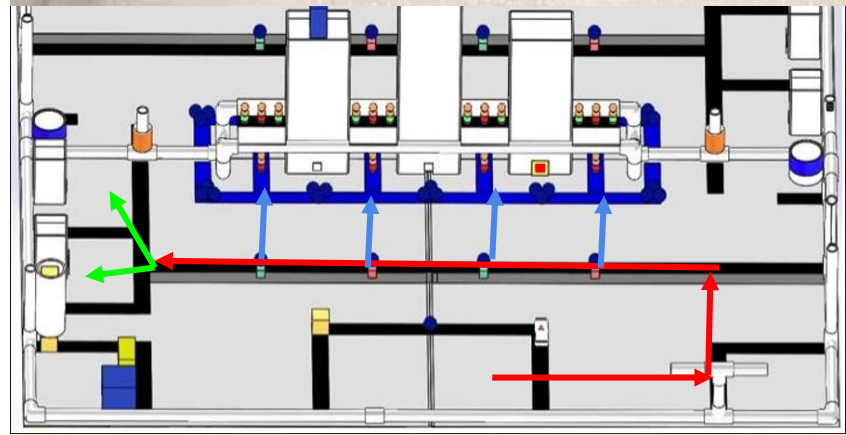
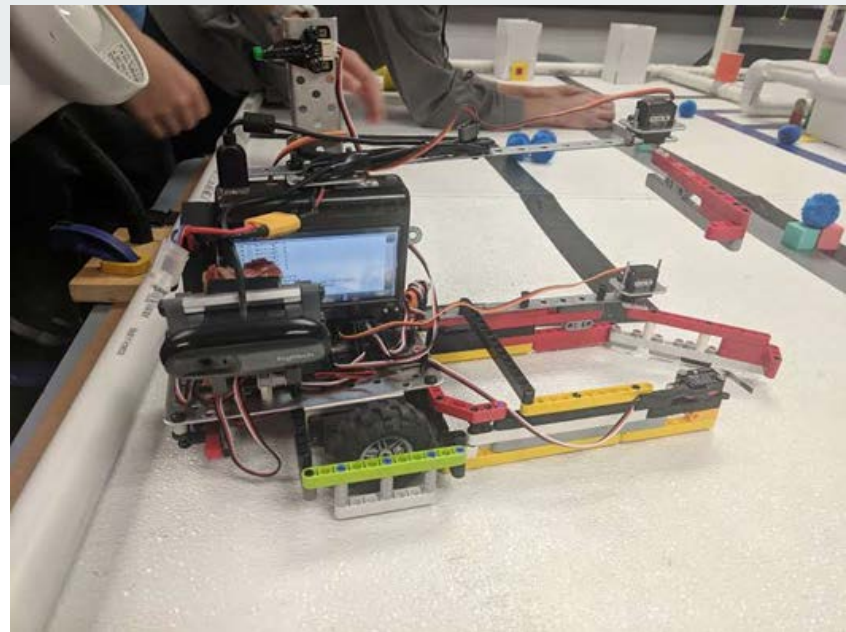
Initial Strategy

Get the pawns from the flood and bridges to the hospital

Design: a container with a mini-servo claw on the top and bottom, using camera to find people and burning buildings

Pseudocode:

- Take path shown using black lines (red)
- Use camera to detect red people and collect (blue)
- Go to medical center to release people (green)





Mid-Season Strategy

Get the pawns from the flood and bridges to the hospital (the same) + use center container to get green people to safe zone (more points)

Design changes: center container for green people

micro servos were unreliable, so we switched to using gear ratio and a long claw instead

Camera was unreliable, so we switched to a depth sensor to get to the people instead

Code development:

Most code for pathing was complete and consistent

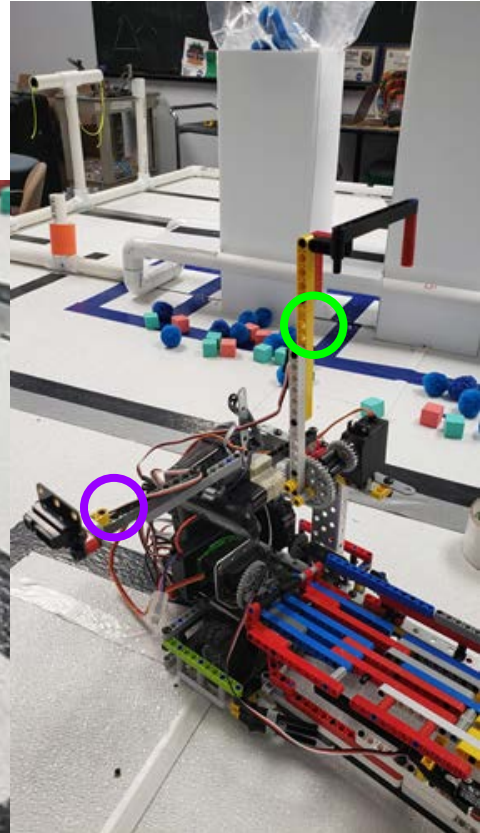
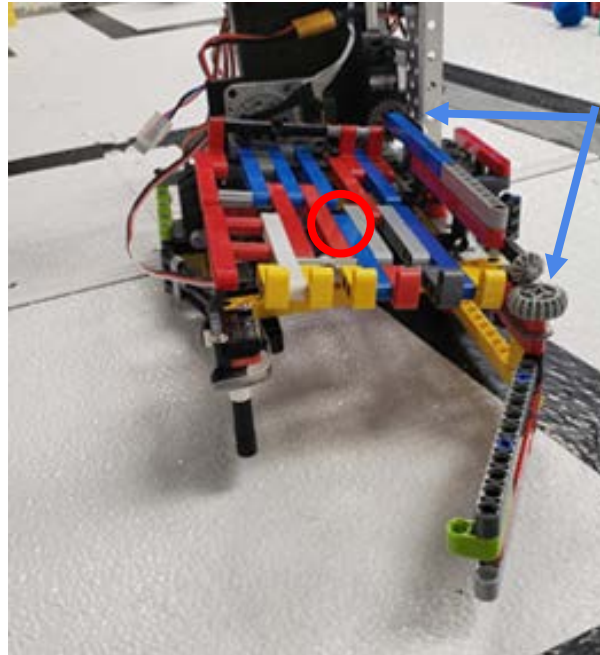
- code had to be changed to implement depth sensor
- code had to be added to move to safe zone to drop more people

Mid-Season Strategy

Design changes: center container for green people (red)

micro servos were unreliable, so we switched to using gear ratio (blue) and a long claw (green) instead

Camera was unreliable, so we switched to a depth sensor (purple) to get to the people instead





Final Strategy

Get the pawns from the flood and bridges to the hospital

DO NOT use center container to get green people to safe zone - too difficult to consistently score more

Design changes: none

Programming status:

Code is consistent and uses many checks to ensure correct pathing



Example Code

```
// move forward into container
double t = seconds() + 1.5;
while(seconds() < t){
    if(digital(frontB)) { // if button hits wall
        mav(leftMotor, -powerL);
        mav(rightMotor, -powerL); // back up
        msleep(600);
        mav(leftMotor, -midPowerL); // turn
        mav(rightMotor, 0);
        msleep(200);
        t += 1.4; // make up for time lost turning
    } else {
        mav(leftMotor, powerL);
        mav(rightMotor, power); // move forward
        msleep(10);
    }
}
```

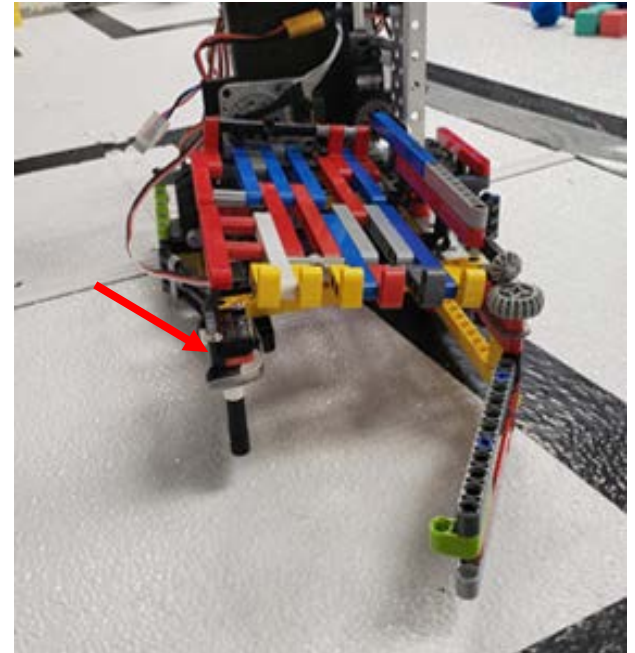
Risks

use of the **camera**

- **ineffective** due to it having a hard time **distinguishing the burning building** from people, and also having **technical problems**.
- mitigated by using **depth sensor**

possibility of **claw** hitting building

- if the robot is inaccurate and hits the building, it can **break**
- mitigated using a **button** to re-align robot



Social Media Impact

- We have an Instagram account (@exp1010botball) where we put up test runs and videos of our robot
- Our doors are open to anyone who wants to come in and look around
- We volunteer at Rockville Science Center

