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# Explorer Post 1010

Team 0160





# Team Knowledge

# Structure and Organization

## Demographics

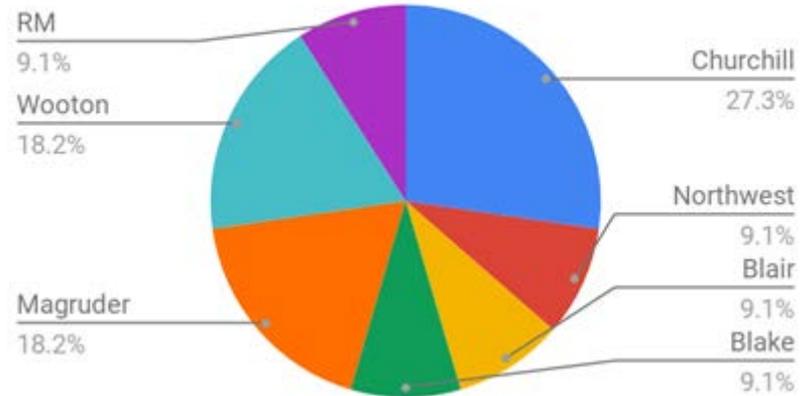
Gender Split:

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

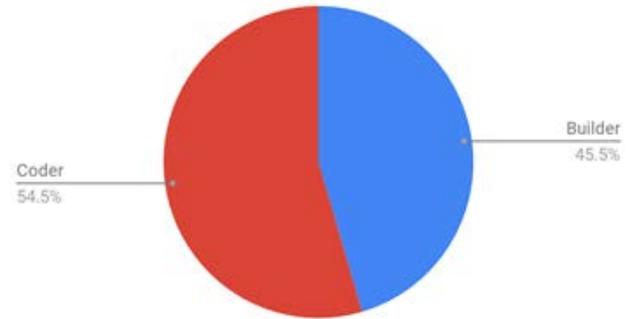
# Structure and Organization

## 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
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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

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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

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# Project Iteration

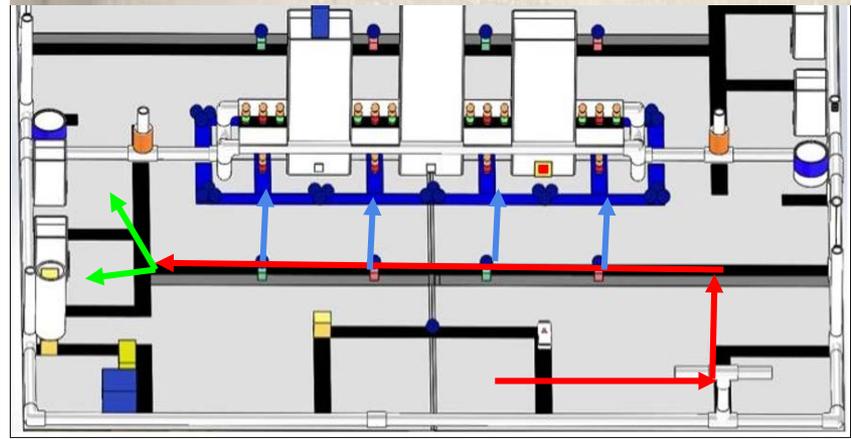
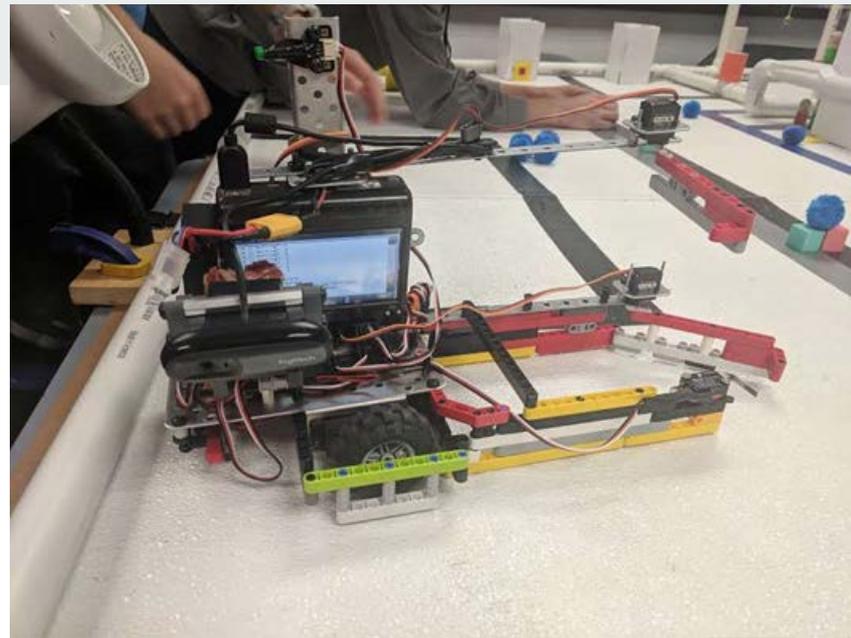
# Initial Strategy

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

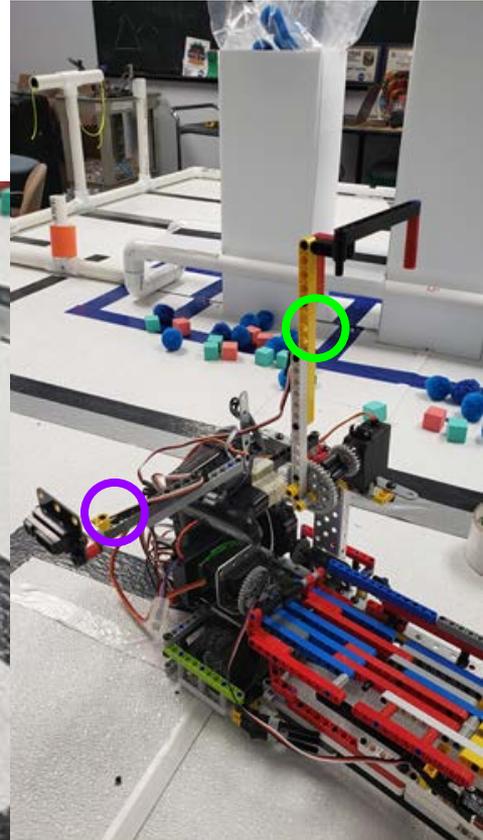
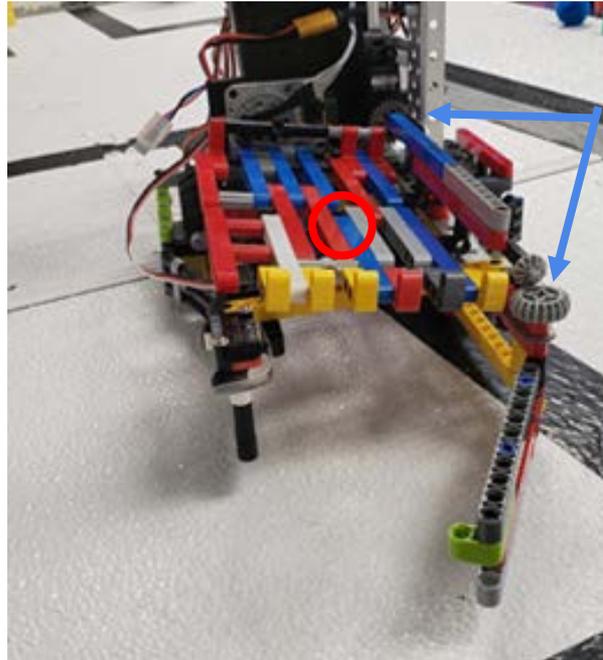
- code had to be changed to implement depth sensor
- code had to be added to move to safe zone to drop more people

## 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);
    }
}
```

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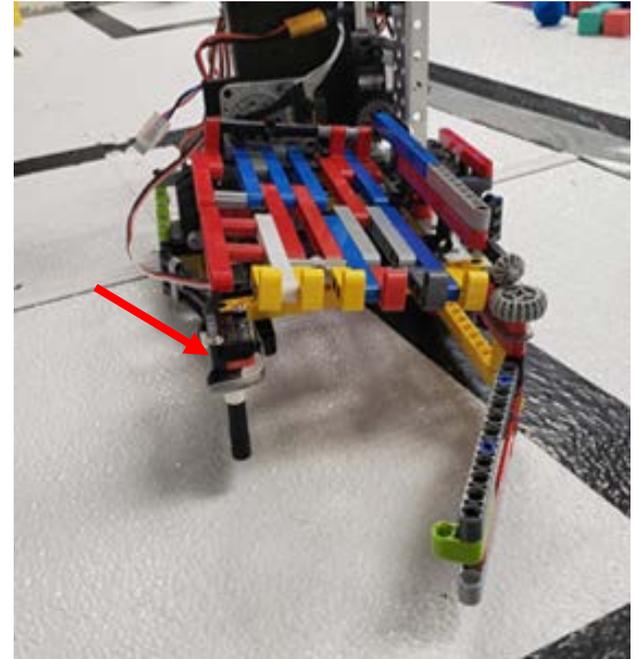
# Risks

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

