# Vehicle Design:

For the robot we decided to go with a sturdy design because the robots might fight for the ball in the open space and we don't want our robot to break. Similarly, we decided to go with a gear ratio of 1:3 for increased speed for pushing the ball while still having some torque to push other robot. We have used 2 IR seeker sensors, one color sensor, two large motors, and one gyro sensor.
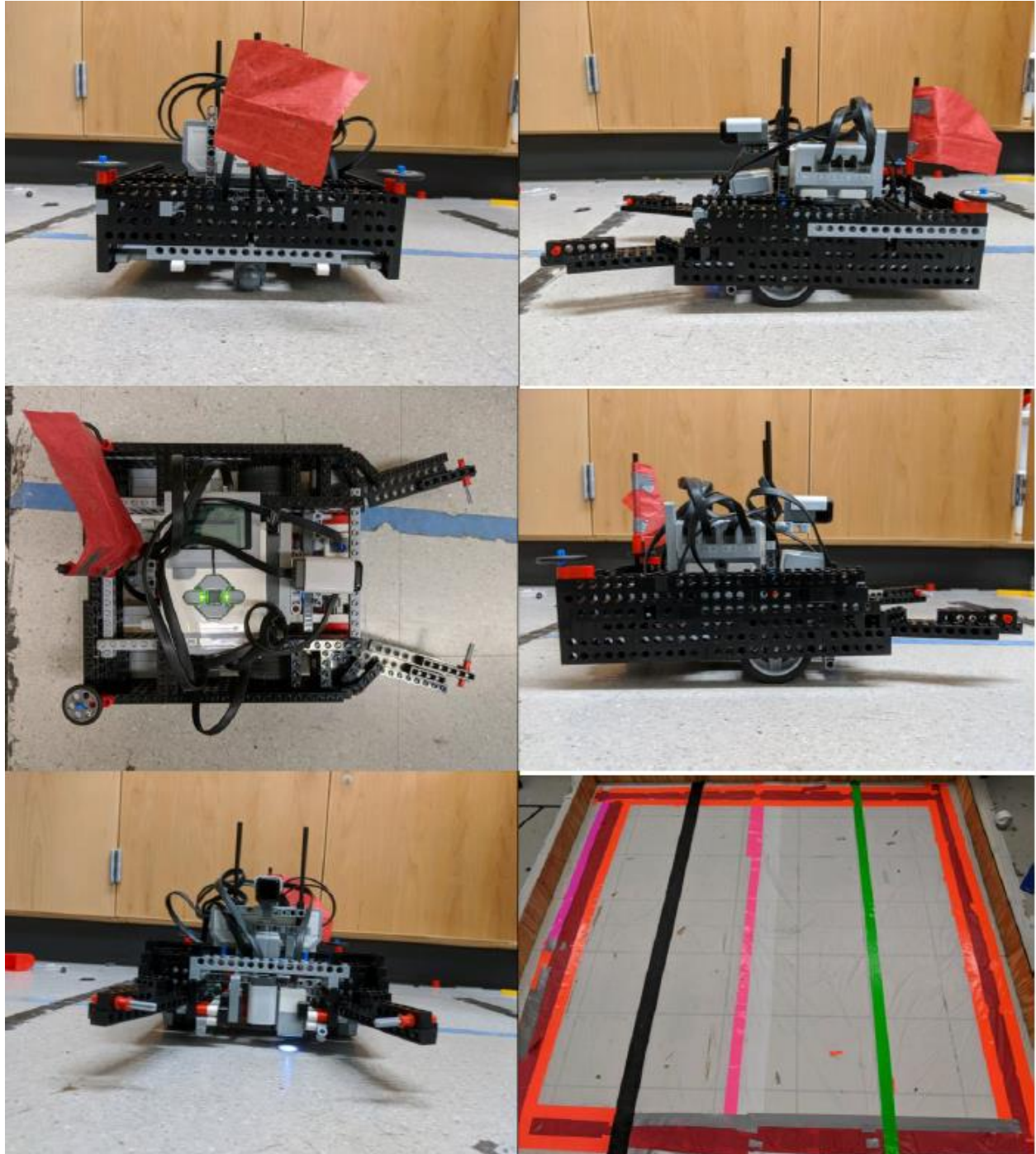
Control Module

Control module contains all the movement functions – move forward, move backward, rotate clockwise, rotate anticlockwise, stop – that were used for previous projects, as well as other new functions added specifically for this project. New functions include:

moveTowardsBall(): Once the IR ball is detected this function is called. What is essentially does is take the input from the IR seeker and moves the robot accordingly until the input '5' is read from the IR seeker.

pushToGoal(): Once the IR seeker that is pointed down return a 4, 5, or 6, the robot assumes that the ball has come withing the gripper like structure and this function is called. What is essentially does is rotates the robot (along with the ball) towards the opponent orientation (with the help of gyro sensor) and then moves forward with 100 speed giving it the effect of pushing the ball.

executeRetreat(): This function basically prevents of from going to the opponent area. Once the desired color code is read, this function is called. What it does is move backwards and rotate away from the opponent line.

ControlExplore(): This function basically explores the area if the IR seeker is returning 0 (meaning that there is no IR ball around). It will make the robot go around the arc in the own and free area until it detects the IR ball.

Sensor Module

Sensor module is responsible to read sensor data in real time and keep updating it with latest value. We have use two IR sensor, color sensor and gyro sensor for our module

IR sensor 1: Responsible to detect IR ball is circular area.

IR sensor 2: Responsible to detect IR ball if exactly it is front of IR robot.

Color sensor: Responsible to opponent defect area.

Gyro sensor: Responsible to detect with refence to opponent direction.

Behavior module:

We divided behavior in different module depending upon the task robot need to perform to win the march.

Explore: Robot start with explore mode where it searches the area for IR ball. It keeps looking it unless it finds one.

Follow the ball: Once IR ball detected we switched into follow the ball mode. Depending upon the IR sensor reading follow the ball move forward toward ball or move forward clockwise or anti clockwise direction.

Push the ball: Once robot reach near the ball robot behavior change to push the ball. According to gyro reading robot move clockwise or anticlockwise toward opponent defense. Once robot turn towards opponent it pushes the ball towards opponent.