Team Name:GMHS Hornets 3 Number: 0247 Region: Greater DC/Virginia

Period One - Project Plan

Goals and Tasks for Botball 2019

Game Goals and Tasks	*Deadlines*
Lego Robot	***4/6/19***
1. Move the firefighters from the Fire Station to the Burning Medical Station.	***2/15/19***
a. Use the claw on the Lego Robot to remove firefighters from the PVC.	***2/12/19***
b. Move the firefighters with the claw on the Lego Robot to the Burning Medical Center by sensing the black tape with the IR sensor and determining which center is on fire with the ET sensor.	***2/15/19***
2. Place water poms in Water Reclamation Unit.	***2/22/19***
a. Move from the Medical Centers to the Water Reclamation Unit using the blue tape of the Flood Zone and IR sensors.	***2/18/19***
b. Move 15 poms from pile made by Create Robot to the volume of the Water Reclamation Unit.	***2/22/19***
3. Move the gas valve to the PVC in the Utility Zone.	***3/4/19***
a. Use the claw of the Lego Robot to slide the gas valve from the PVC on the far left of the board.	***2/27/19***
b. Move the gas valve using the Lego Robot to the Utility Zone where the claw rotates to place the gas valve on the PVC.	***3/4/19***
4. Remove injured citizens from between the Skyscrapers.	***3/11/19***
a. Use the Lego Robot claw to pull the injured citizens from below the Sky Bridges between each of the Skyscrapers.	***3/8/19***
b. Drop the injured citizens near the tape around the flood zone using IR sensors and the Lego Robot claw.	***3/11/19***
Create Robot	***4/6/19***
1. Push the medical supplies and ambulance to the Non-Burning	***2/18/19***

Medical Center.	
a. Track the black tape on the board that leads to the Medical Centers, using a bulldozer-style plow on the Create Robot to sweep the medical supplies and ambulance.	***2/17/19***
b. Use the ET sensor on the Create Robot to detect which Medical Center is burning and push the supplies and ambulance to the other.	***2/18/19***
2. Push water poms towards the Water Reclamation Unit on the far right side of the board.	***2/22/19***
a. Use the IR sensor to track the blue Flood Zone tape where the 15 water poms begin.	***2/19/19***
b. Use the Create Robot's bulldozer-style plow to push the poms to the corner for the Lego Robot to place in the Water Reclamation Unit.	***2/22/19***
3. Push the Water Reclamation Unit to the Utility Zone.	***3/4/19***
a. Wait for the Lego Robot to gather the poms into the Water Reclamation Unit.	***2/27/19***
b. Move behind Water Reclamation Unit and slowly push it using the plow along the black line leading to the Utility Zone.	***3/4/19***
4. Push injured citizens into into the Non-Burning Medical Center.	***3/11/19***
a. Wait for the Lego Robot to move the injured citizens from beneath the Sky Bridges.	***3/8/19***
b. Push the injured citizens with the Create plow to the Medical Sensor, using the ET sensor to determine the Non-Burning Medical Center.	***3/11/19***
5. Ensure both the Create and Lego Robot can operate together and wait for the other when necessary.	***4/6/19***

Robot Building Goals and Tasks	***Deadlines***
Lego Robot	***4/6/19***
1. Construct the body of the Lego Robot.	***2/15/19***
a. Use a wide metal piece to sit the Wallaby and battery pack on with	***2/13/19***

a mount for a claw.	
B. Create a mount for and attach wheels as well as a third point to balance the Lego Robot.	***2/15/19***
2. Incorporate IR, ET, and Light sensors so the Lego Robot can respond to its environment.	***2/18/19***
a. Use a bolt and Lego piece to secure the IR sensor to the front of the robot about ¼-⅛ inch off the ground so as to read the color beneath the robot.	***2/18/19***
b. Secure other sensors to the front of the robot on a metal piece and test their functionality.	***2/18/19***
3. Create a sweeping claw that can be near the ground but also extend upward and twist.	***2/22/19***
a. Use a servo to open and close the claw on one side while the other side is straight with a slight hook.	***2/20/19***
b. Use additional servos to extend the claw at a joint to reach about 12 inches above the ground and twist 90° left.	***2/22/19***
Create Robot	
1. Build apparatuses for the Create Robot.	***2/15/19***
a. Build a claw with a large chamber for holding scoring objects.	***2/15/19***
b. Build a wide centered plow with edges to ensure no scoring objects slide out.	***2/10/19***
2. Incorporate IR and ET sensors so that red tape (burning medical center) and black tape can be followed.	***2/17/19***
a. Find appropriate values of white board and black tape for the IR sensors and ensure the sensors are not blocked.	***2/16/19***
b. Position the ET sensor so that it can be used to detect objects.	***2/16/19***
c. Add distance sensors to the robot.	***2/17/19***
3. Complete construction of Create including a claw/plow.	***2/18/19***
a. Add 3 servos to move claws and grab scoring items. (Claws will move up/down, side/side, and twist.)	***2/18/19***

b. Test the claw and plow to see if they can successfully transport supplies.	***2/18/19***

Programming Goals and Tasks	***Deadlines***
Lego Robot	***4/6/19***
1. Ensure reliable basic movements based on encoder outputs.	***2/6/19***
a. Move forward on the game board using encoders for both wheel motors.	***2/6/19***
b. Turn the robot on the game board using encoders for both wheel motors.	***2/6/19***
2. Be able to open and close servos consistent and reliable amounts.	***2/11/19***
a. Open and close the robots claws to pick up and drop objects.	***2/11/19***
b. Raise and lower aparatises to reach scoring objects.	***2/11/19***
3. Integrate IR and ET sensor outputs into robot movements.	***2/25/19***
a. Detect burning buildings using ET sensors.	***2/22/19***
b. Follow black, grey, and blue tape to navigate the game board using IR sensors.	***2/25/19***
4. Use light sensor code to begin and stop the robot.	***3/4/19***
a. Begin the competition and code when a light turns on.	***3/4/19***
b.Stop the robot at the end of the competition or after 120 seconds.	***3/4/19***
Create Robot	***4/6/19***
1. Push the ambulance and medical supplies to the Non-Burning Medical Center using encoders, msleeps and ET sensors to move and identify the non-burning center.	***2/18/19***
a. Consistently use msleeps and code for encoders to move along the right path to sweep the ambulance and medical supply packages towards the Medical Centers.	***2/18/19***
b. Integrate code for ET sensor to be able to differentiate the Non-Burning Medical center from the Burning Medical Center and push the supplies into the correct zone.	***2/18/19***

2. Push water poms to the right into a pile, to gather them for the Lego Robot to scoop up.	***2/25/19***
a. Use an infrared sensor to differentiate the black line from the white line to keep the create going in a straight line on the black path to get the water poms.	***2/23/19***
b. A while loop will be used to show that while the create senses the black line, it keeps driving forward and pushing the water poms.	***2/25/19***
3. Push the Water Reclamation Unit (already filled with water poms) to the Utility Zone.	***3/4/19***
a. Use msleeps to drive the create forward and push the reclamation unit as it goes.	***3/2/19***
b. Set the create to drive forward for a set amount of time (using an msleep) so it does not drive too far forward.	***3/4/19***
4. Waits for the Lego Robot to pull out the injured citizens on the ground and pushes them into the Non-Burning Medical Center.	***3/18/19***
a. Using msleeps to drive the create forward to push the citizens.	***3/15/19***
b. Integrate code for ET sensor to be able to differentiate the Non-Burning Medical Center from the Burning Medical Center and push the citizens into the correct zone.	***3/18/19***

Documentation Goals and Tasks	***Deadlines***
1. Submit a pdf containing the team's Project Plan to KIPR.org.	***1/30/19***
a. Meet together in class to prioritize points and create tasks for builders and programmers to achieve those points.	***1/29/19***
b. Decide on team structure as well as a schedule for consistent meetings outside of class time.	***1/30/19***
2. Submit document containing the team's Mechanical and Code Review to KIPR.org.	***2/27/19***
a. Assign a team member to film robots as they navigate the course during a practice game	***2/25/19***
b. Gather information to describe the design, process to reach that design, as well as an assessment of the performance to record in a	***2/27/19***

google document and upload code to Github	
3. Submit the team's Lessons and Survey to KIPR.org.	***4/3/19***
a. Meet after school or in class to take the given survey.	***4/2/19***
b. Collaborate in a meeting to discuss the various lessons learned, ways to improve, and advice for future teams and record.	***4/3/19***

Schedule Conflicts	***Date***
1. Early Dismissal - Shorter In-Class Period	***2/15/19***
2. Presidents' Day - Federal Holiday - No School/Meeting	***2/18/19***
3. Early Dismissal - Shorter In-Class Period	***3/1/19***

Team Organization

- **Schedule of Meeting Times**
  - Each meeting will run from: Duration of Class Period Given or 3-5 After School
  - Regional Tournament Date: April 6th
    - Schedule for January
      - 30th, 31st
    - Schedule for February
      - 1st, 4th, 6th, 8th, 11th, 13th, 15th, 18th, 20th, 22nd, 25th, 27th
    - Schedule for March
      - 1st, 4th, 6th, 8th, 11th, 13th, 15th, 18th, 20th, 22nd, 25th, 27th, 29th
    - Schedule for April
      - 1st, 2nd, 3rd, 4th, 5th
- **Division of Labor**
  - Create Robot Team:
    - Building Team for Create Robot: Makenna Hall & Fatma Fareha
      - The Create Building Team ensures the Building Goals and Tasks for the Create Robot are accomplished by their deadlines.
    - Programmers for Create Robot: Abby Joseph & Ebun Popoola
      - The Create Programming Team ensures the Programming Goals and Tasks for the Create Robot are accomplished by their deadlines.

- Lego Robot Team:
  - Building Team for Lego Robot: Cole Conjelko & Sophie Dorey
    - The Lego Building Team ensures the Building Goals and Tasks for the Lego Robot are accomplished by their deadlines.
  - Programmers for Lego Robot: Ethan Ray & Joshua Robbins
    - The Lego Programming Team ensures the Programming Goals and Tasks for the Lego Robot are accomplished by their deadlines.
- Team Lead: Sophie Dorey

Conflict Resolution

- The team has decided that if any disagreements occur throughout the projects they will be dealt with accordingly:
  - Team Members will first attempt to work out the disagreement alone through allowing the other to express their opinion to reach a compromise or agreement.
  - If this agreement is not reached, the team members may consult the team lead for guidance/advice.
  - If this resolution is still not reached, the adult team manager will be consulted. The manager would then either decide how to resolve the conflict or would allow the team to vote and discuss a solution. This decision or vote would be final.
- The team will follow the Golden Rule in treating others, and their opinions, with respect to illustrate the Spirit of Botball in sportsmanship and conduct.