INDUSTRIAL SCENARIO

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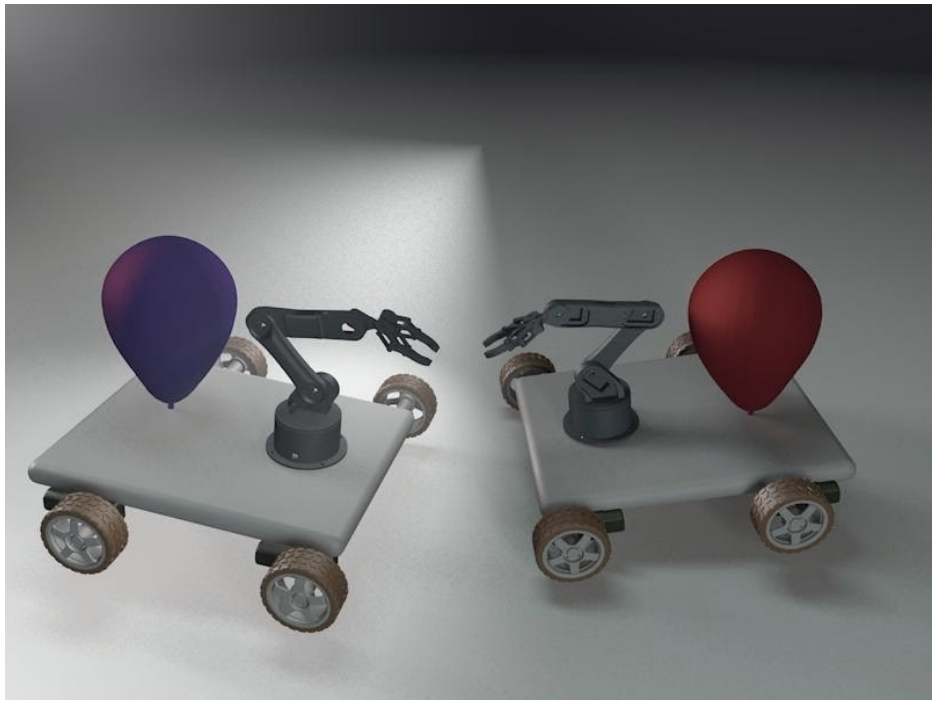


01
Operation

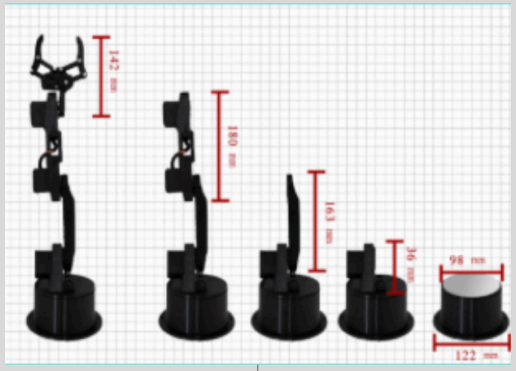
In this project we have 2 robots, each of them has a robotic arm, a base and a balloon attached to each of them, and we will make a competition between them. The goal of the competition is to determine the fastest robot to pop the balloon attached to the other.

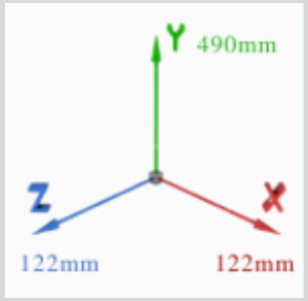
The tools are a 3D printer, and we will also use programming languages to control and connect the parts.

01
Operation

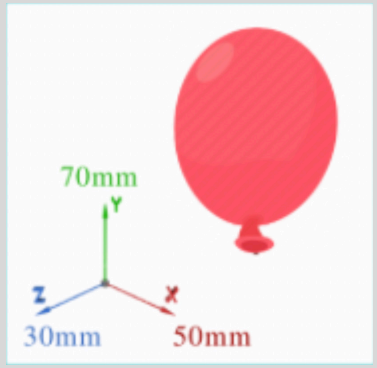
❖Robot dimensions

The arm:

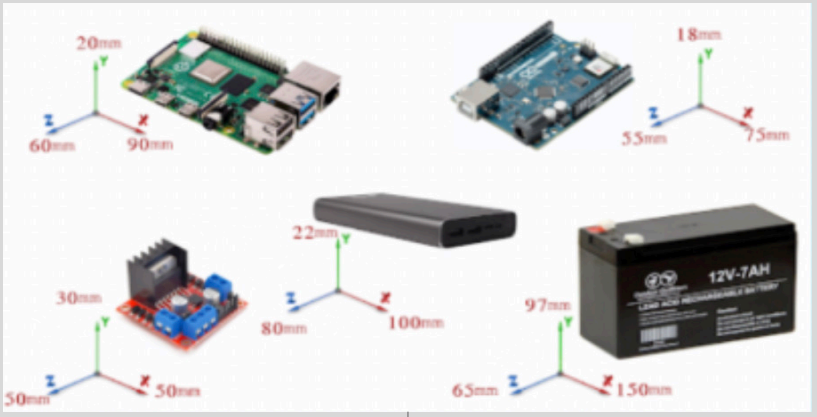


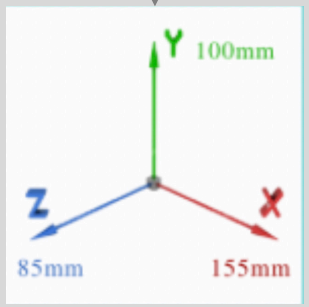


The balloon:



The body, (Base, Wheels, Mooters):



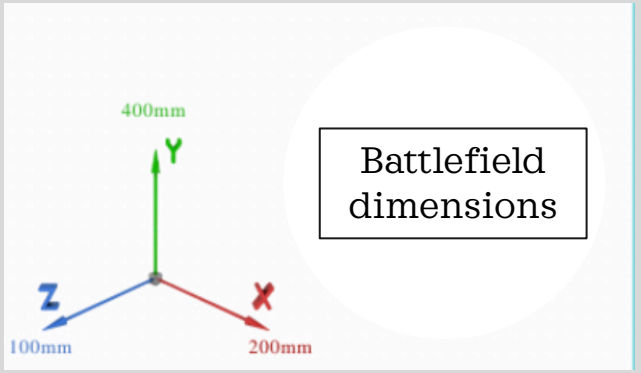


01

Operation

❖The dimensions of the ring

The ring will be square to make it easier for the robots to move and take a full turn. The dimensions of the ring will be 1 meter * 1 meter to fit the dimensions of the robot.



Battlefield dimensions

❖Operating Laws

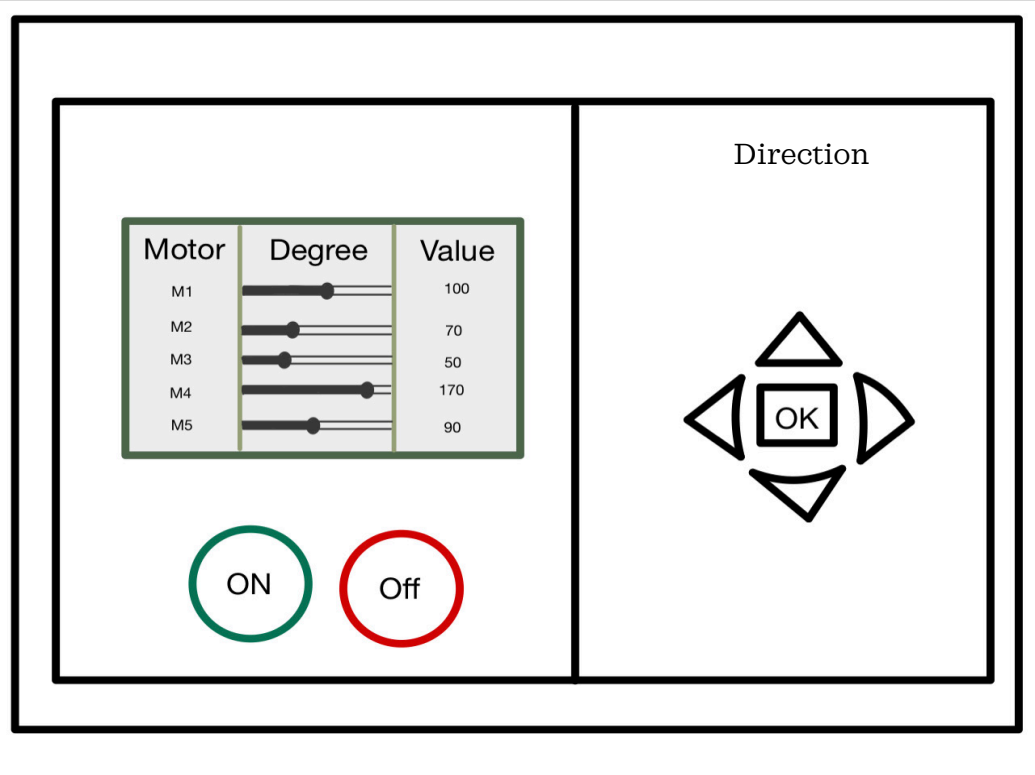
1-The robot is inactive for 10 seconds

2-The speed of the protein is relatively close

3-The hit is only on the balloon

4-The robot stays in the ring

5-Players stay outside the ring



01 Operation

❖Control panel

ON button:

To turn on the controller

Off button:

To turn off the controller

Motor colume:

To select the motor to be started.

Degree colume:

The player chooses the degree of the engine range slider

Value colume:

To show the degree choosen.

Direction colume:

After selecting the motor, the direction is moved.

❖Technical operation details:

The circuit is designed to be composed of a 10VDC source, a 6VDC source, a microcontroller, a Servo Motors, two motors(DC), one stick for direction and one for the speed. The battery will be 12 volts and is a rechargeable battery, so all these parts will be connected to the database.

02

Testing: Unit Testing

The Part	Test Result
First arm motor	Works very well.
Second arm motor	Works very well.
Third arm motor	Works very well.
Base	Its area is suitable for installing the arm and the balloon on it without any problems.
Balloon	A high quality balloon was selected and inflated well.
First base wheel	Installed fine and working.
Second base wheel	Installed fine and working.
Third base wheel	Installed fine and working.
Fourth base wheel	Installed fine and working.
Temperature sensor	Works very well.
Body sensor	Works very well.
Speed sensor	Works very well.

02

Testing: Integration Testing

The Part	Test Result
Arm motors	Each motor has been tested individually, and now we put them together. After installing it, we tested it and found that it works together very well and smoothly.
Balloon	After testing each wheel individually, we will now test all the wheels together after we install them on the base. We found the wheels work great together and can handle the weight of the arm and the balloon.
Third arm drive	After installing the arm and wheels on the base, we now install the balloon so that it is away from the arm at a distance that allows the arm to move without popping its balloon.
sensors	We tested all sensors together and they work well.

02

Testing: System Testing

We will test the system in two stages as follows:

1- The first stage (testing the system on the base motors):

We have previously tested the four wheels that drive the base individually and also tested them after installing them on the base, we find that all wheels work perfectly together and bear the weight placed on the base, and the base motors can walking long distances without any problems.

2- The second stage (testing the system on arm motors):

We have previously tested the arm drives individually and after assembly. We find that the arm drives have no defects and they operate at the required speed and directions with ease and flexibility.

Finally, we tested the system on both the base motors and the arm motors, and we found that it is a complete system and free of defects.

02

Testing: PerformanceTesting

1) **Load Testing:** The robot can withstand a force of up to 450 volts. The arm does not break easily in the event of a collision, except in the case of the presence of more than two enemy robots.

2) **Stress Testing:** We found that the robot could not withstand more than 450 volts. Where we tested the robot under high pressure and gradually we found that the robot was enduring in the first attempts, but when the pressure became too high on the fifth attempt, the robot crashed.

3) **Scalability Testing:** At first we had our robot duel against one robot and it defeated it. After that we made the robot duel against two robots and beat them with difficulty. In the end, when we made him duel against three robots, he could not defeat them all, which means that our robot can expand to only two robots.

4) **Stability Testing:** We tested our robot in several different conditions to determine its stability. After a lot of tests, we found that the robot is stable as long as the climate temperature does not exceed 54 degrees Celsius. It is also stable unless the number of enemy bots is more than two. It is also stable until it walks a distance of 15 km, after this distance it loses its stability.

02

Testing: Usability Testing

We made our robot compete against another robot to test the robot's usability and mobility. When the competition started, we found that our robot sped towards the enemy robot and then started spinning around it moving the arm towards the enemy balloon with flexibility, in the meantime we plotted the robot's movement path, and we were satisfied with it.

Testing: Compatibility Testing

After we tested each part of the robot separately and tested the parts after installing each part gradually. Now we will test after assembling the parts of the robot to determine the compatibility of the parts with each other, we find that they are compatible, and they work well and there are no problems in the final shape of the robot.

02

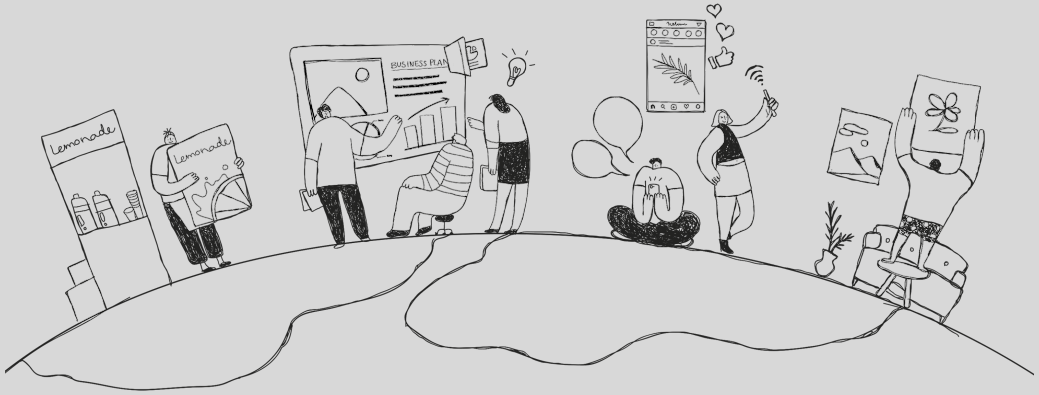
Testing: Additional Testing Project

To conduct this test, we made another robot with the same strength, speed and size as the current robot and we made them fight against each other, the duel lasted for 10 hours, at which time both robots broke down.

Then we made another robot that has more strength, speed, and size than the current robot, and when we made them duel, we found that the current robot broke down after 5 hours.

Therefore, we conclude that our robot has a defect, which is that it breaks easily if the enemy robot has greater strength, size and speed, so we will develop our robot so that it can withstand all forces, sizes and speed.

03
Tolerance



Tolerance help us avoid mistakes and will increase the quality and efficiency of the final product.

Mechanic

1- Installing the parts incorrectly
2- Not placing the pieces in the correct position
3- Use low quality parts
4- The difference in dimensions
5- Differences in the sizes of the pieces

Electronic

1- Connecting the parts incorrectly
2- Applying high voltage
3- Using the wrong engines
4- The motors are connected incorrectly
5- Using the wrong wires or wires of low quality and durability

AI

1- An error in the package
2- Wrong detection
3- Wrong files
4- Change files

IOT

1- Weak or no internet
2- Viruses infecting the system
3- Failed to connect to the database
4- The presence of pressure, which causes the device to hang

Industrial

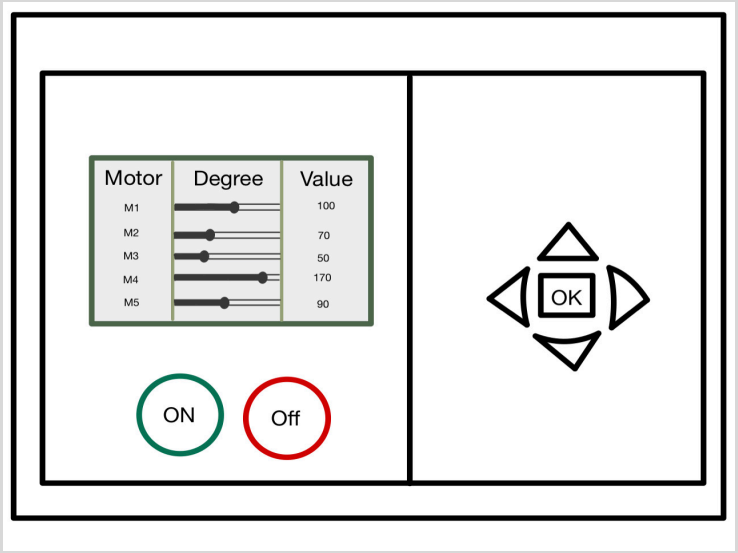
1- Management is unsuccessful among members
2- Disorganization of thoughts
3- Poor time management
4- Poor distribution of tasks to members
5- Failure to follow up and record reports

04

User Manual

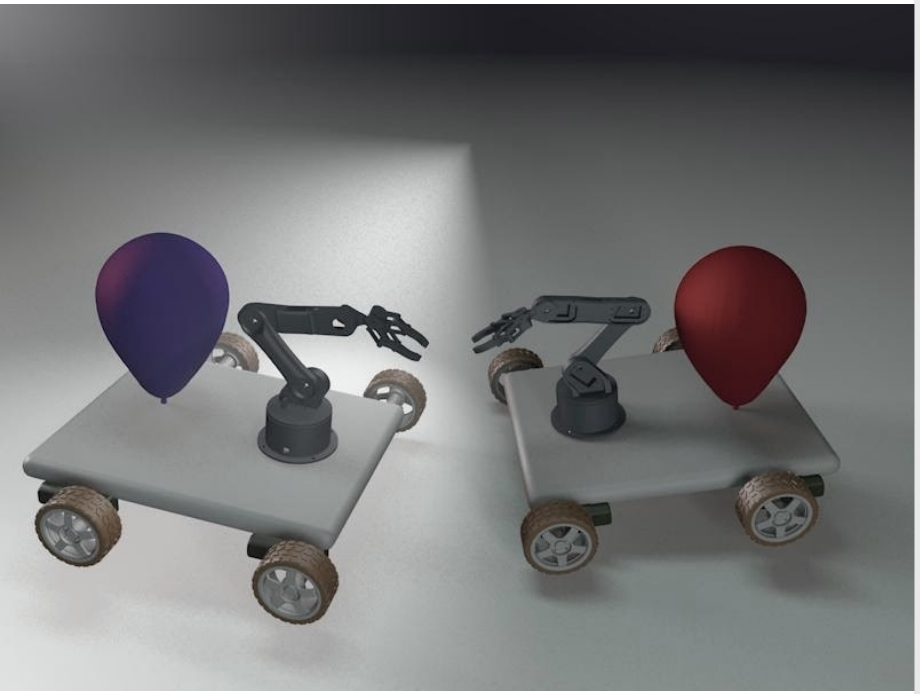
User Manual To The Run Robot:

It will come in 3 pieces: the body and motors, the arm and the balloon. At first you will assemble the parts to the structure and then you will install the wheels on the body, then you will install the arm behind the body and the balloon from the front, and be careful when installing the balloon, and this will complete the robot. You will link the console by installing the program on the laptop and with this you can control the robot through the laptop and you will see this interface:



Warning:

This robot has sharp cuts on the arm, has high electrical waves, be careful, keep it out of children's reach.



04

User Manual

User Manual To The Contest Participant:

All participants must read this guide as it contains the instructions and mechanism of the competition...

All you have to do in this competition is to pop the balloon of the enemy robot, by moving the arm using the control panel that you are introduced to in (User Manual To Run Robot), the contestant who pops the enemy balloon first is the winner.

The competition will consist of 5 rounds, each round lasts for 30 minutes, there are 10-minute breaks between each round. Also, your enemy will be one person in all rounds, so the contestant who wins the most rounds is the winning contestant. All contestants must not leave the battlefield, the contestant who leaves the battlefield will lose the round.

05

Warranty

The robot warranty is for two years, because after conducting many experiments that determine the quality of the robot, we found that the motors of our robot cannot work for more than two years due to excessive friction between the parts for a long period of time.

Our future vision is to increase the warranty period of the special robot. We will work to solve the friction problem either by changing the materials used in the manufacture of the robot or by adding additional parts that reduce friction so that the robot will continue to work for more than two years.