

# SCRIPT OF INDUSTRIAL ARM ROBOT

## ● Operation

We will make a robot for the Balloon competition, and it will contain 4 components:

- 1.The industrial arm robot.
- 2.The wheels.
- 3.The tablet base.
- 4.The balloon.

The competition will be between two robots, the target for each robot is to pop the balloon of the other robot with a sharp stick.

Our steps to make our robot is:

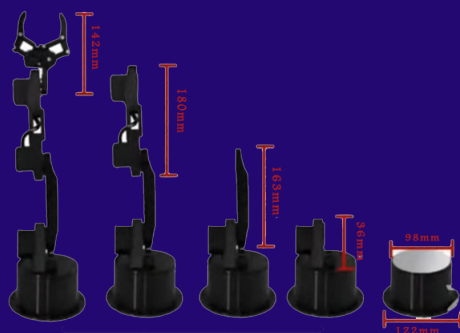
- 1.The arm mad by our mechanical engineer.
- 2.Operated by our electrical engineer.
- 3.Programmed by our AI engineer.
- 4.Controller made by IoT engineer.

The tools:

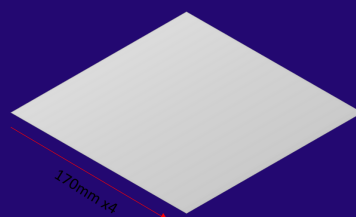
- 1.3D printer to print and manufacturing our robot parts.
- 2.Arduino and servos to operate our robot.
- 3.Web programming languages for the controller.

## The robot dimensions:

### The arm:



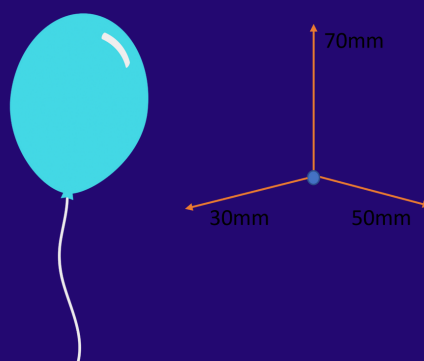
### The tablet base:



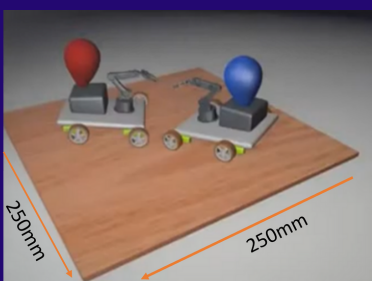
### The motors:



### The balloon:



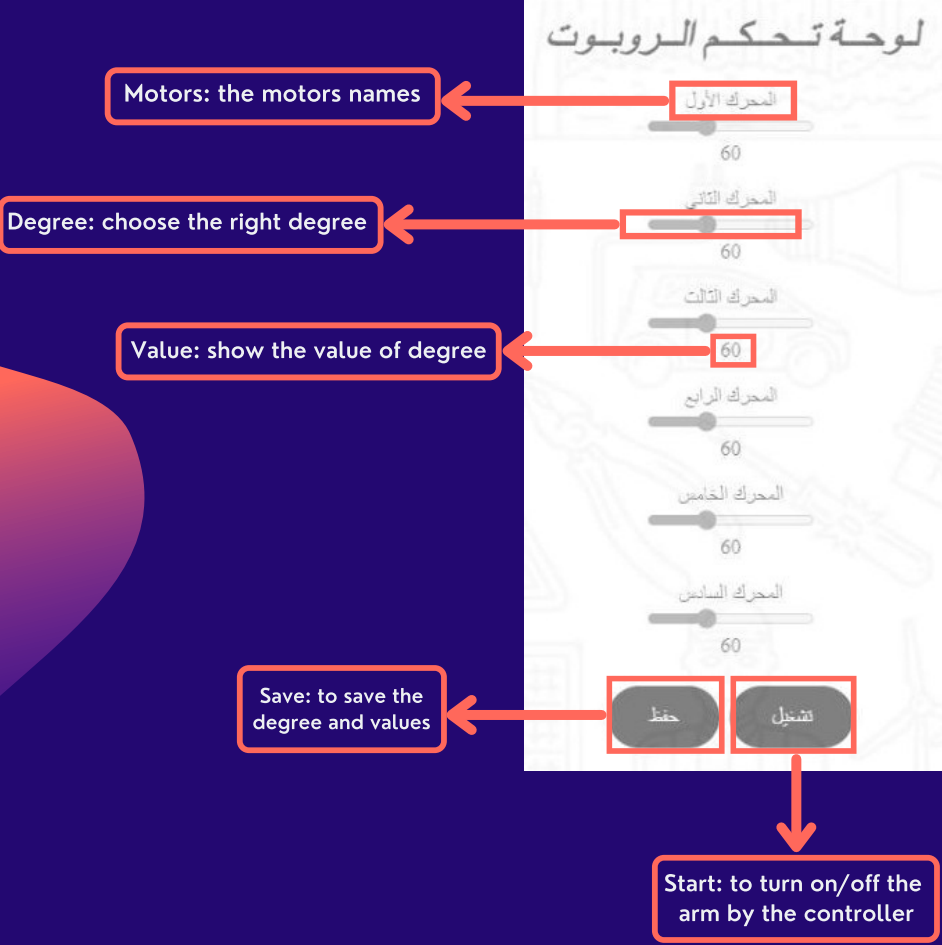
### The battlefield:



## Operation rules:

- press the on button.
- the button will be lighting green
- no one step on the battlefield during the match
- The Robots will be inside the battlefield during the match
- No dangerous tools for the robots to avoid injuries

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## Technical details of the operation process:

- Our circuit will be composed of:
- 1.12V DC voltage source.
  - 2.Two DC motors
  - 3.microcontroller (Arduino Uno)
  - 4.L298n motor driver
  - 5.Remote to control the robots speed and directions

## ● Testing:

### ● Unit Testing

Unit	Results
Motor 1	Working fine
Motor 2	Working fine
Motor 3	Working fine
Motor 4	Working fine
Motor 5	Working fine
Motor 6	Working fine
Balloon	The distance between the balloon is perfect.
The tablet base	The dimensions are perfect for the wheels and the arm robot.
The Wheels	All wheels work fine.

### ● IntegrationTesting

Parts	Results
The Motors	I tested all the motors and
The tablet base	I collected the units together on the tablet base and its <a href="#">fit</a> .
Balloon	I tested the arm with the balloon, the distance between the balloon and the arm was good so the arm can reach the other balloon
The wheels	I tested all the four wheels and one of them has broken then we replace it with a new one.

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## ● System Testing :

### ● The Arm:

I tested the system on the arm motors, it has no errors and work good and very practical.

### ● The Tablet Base:

I tested all the wheels and its work perfect .

Finally i tested the system on the whole Arm Robot and i am sure it has no errors

## ● Usability Testing :

I bring another robot to test my robot and his movements, So i drew a movement for my robot so he will move inside the battlefield like S-shaped, the result was 10 out of 10, we did the test about five time and succeeded.

## ● Compatibility Testing :

I tested each part of my robot in detail , then i collected and tested them with each other, finally i tested my completed robot including software and non software function, everything is good and there is no errors.

## ● Performance Testing :

Load Testing : resist up to 600 v, the arm doesn't break until after a great power .

Scalability testing: I bring two robots measure the scalability of my robot and it was fine , i bring third robot and my robot also was fine , i bring another two robots and it was fine , i bring sixth robot and my robot has be broken and didn't work , my robot can bearing 6 robots.

Stress testing: I tested the arm under a very high pressure , until sixth test it was fine but after seventh test it's start to break

Stability testing: I tested my robot under different conditions, In terms of the environment changing, i tested the robot in high temperature and in very low temperature, the robot couldn't bear the heat and the cold, it's handle until 55 degree C°and the possible distance it's about 11 km.

## ● Tolerance:

- 1.No Internet connection.
- 2.Unable to Locate Host.
- 3.Internal server error.
- 4.Missing data.
- 5.High online traffic leads to crash my website.
- 6.Gateway timeout.
- 7.Cyber-attacks.
- 8.Fail to connect the Data Base.
- 9.Duplicate value on Data Base.
- 10.Giving the robot wrong information.
- 11.The package in the ROS is different.
- 12.Error in the connection between the ROS and Arduino.
- 13.Errors in the motors of the arm.
- 14.Errors in Motor drive.
- 15.Overheats in the DC motors.

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## User Manual (for Robot):

### Description:

The product contain 4 part:

- 1.The robot arm.
- 2.The tablet base.
- 3.The wheels.
- 4.The Balloon.

You will assembly the wheels and the tablet base, then put the robot arm in the circle on the tablet base, Blow the balloon and put it behind the robot arm.

### Controller:

There is USB with the products contain the controller once we plug it into the the computer will show this controller.



Warning : The product has a sharp tool be careful with it and keeping it away for the children and water .

## User Manual (for Player):

You must follow the instructions to win the competition , please clear your mind and read carefully

First Your target is pop the other balloon to win the competition you will set up the controller in your computer and make sure that the connection and everything is good , we have 2 rounds every round will be about 40min and between them 15min for resting, who will pop the balloon first will get point, in the end we will count the points and the winner who got more points.

## Warranty:

The warranty is for 18 months, because the robot can handle the heat in current location (Saudi Arabia) , and based on my testing it will be working good for 18 months .

Done by:

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