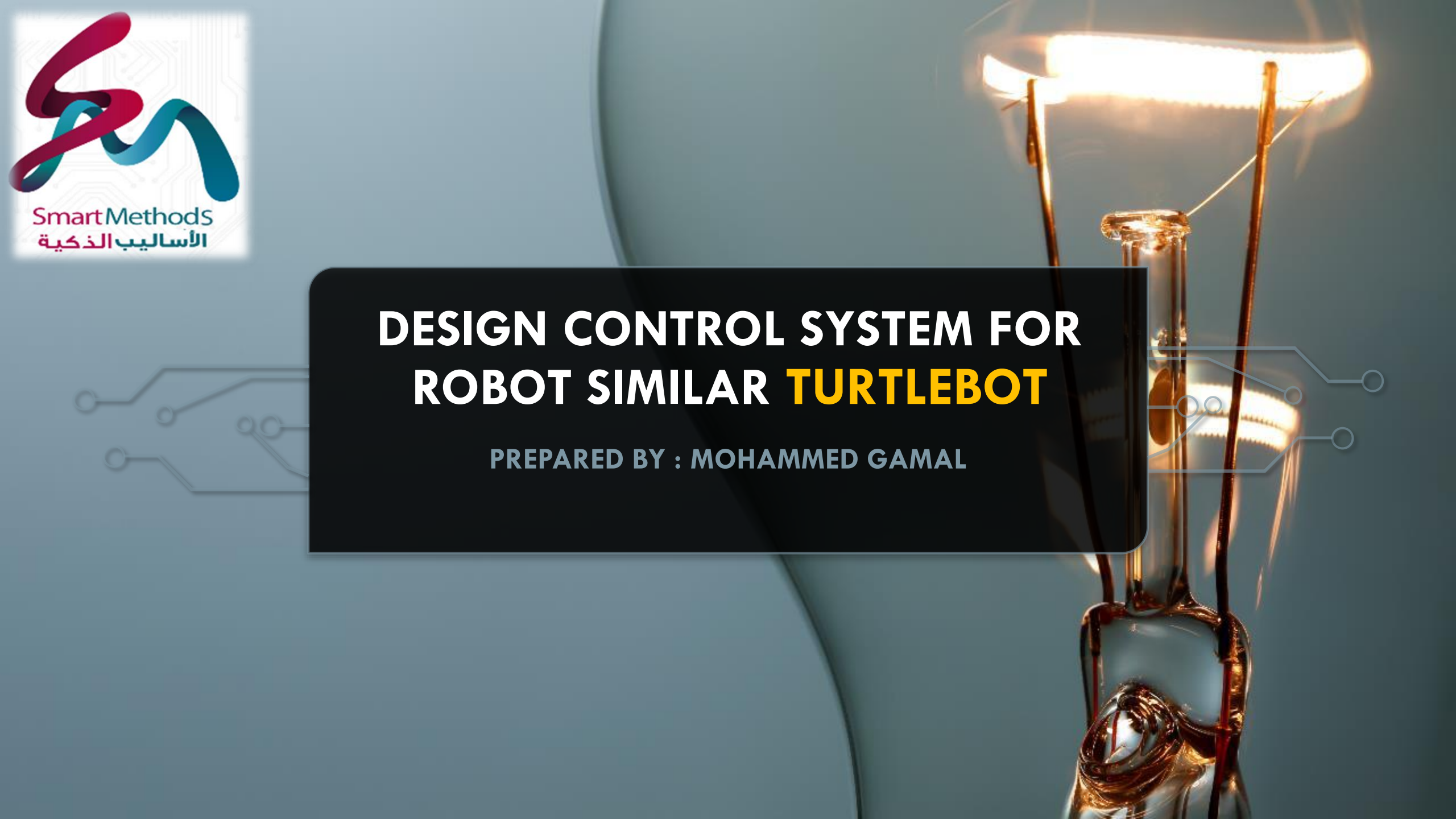
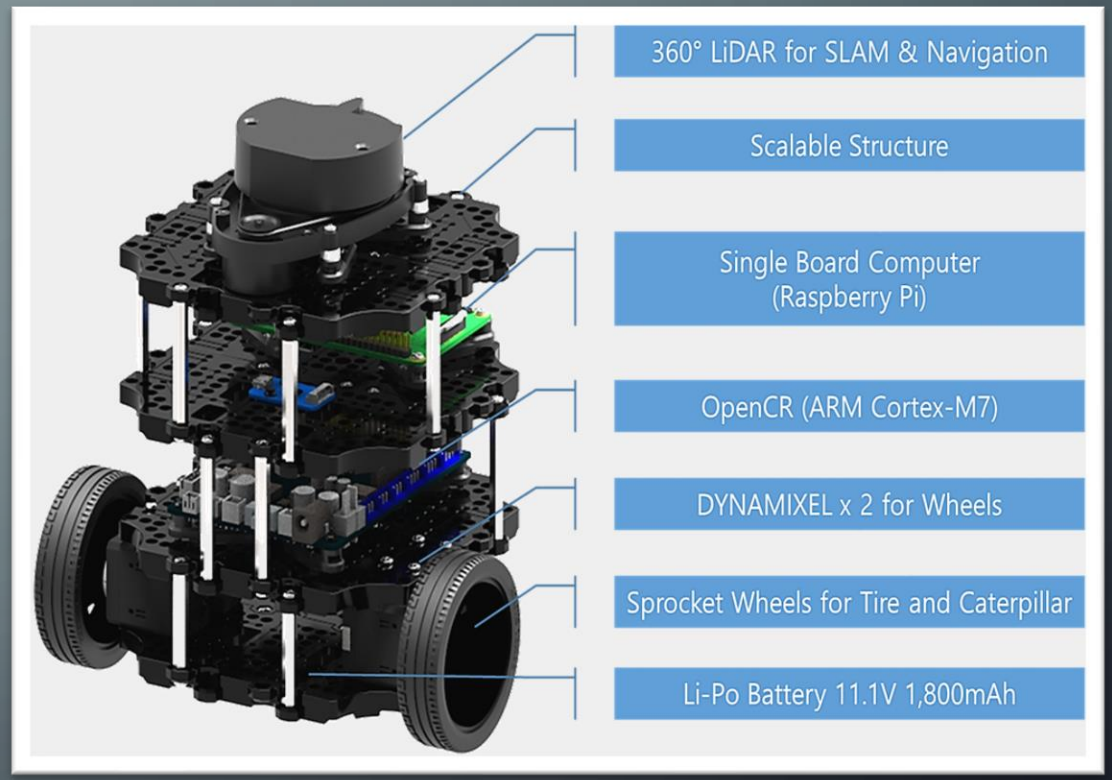



# DESIGN CONTROL SYSTEM FOR ROBOT SIMILAR TURTLEBOT

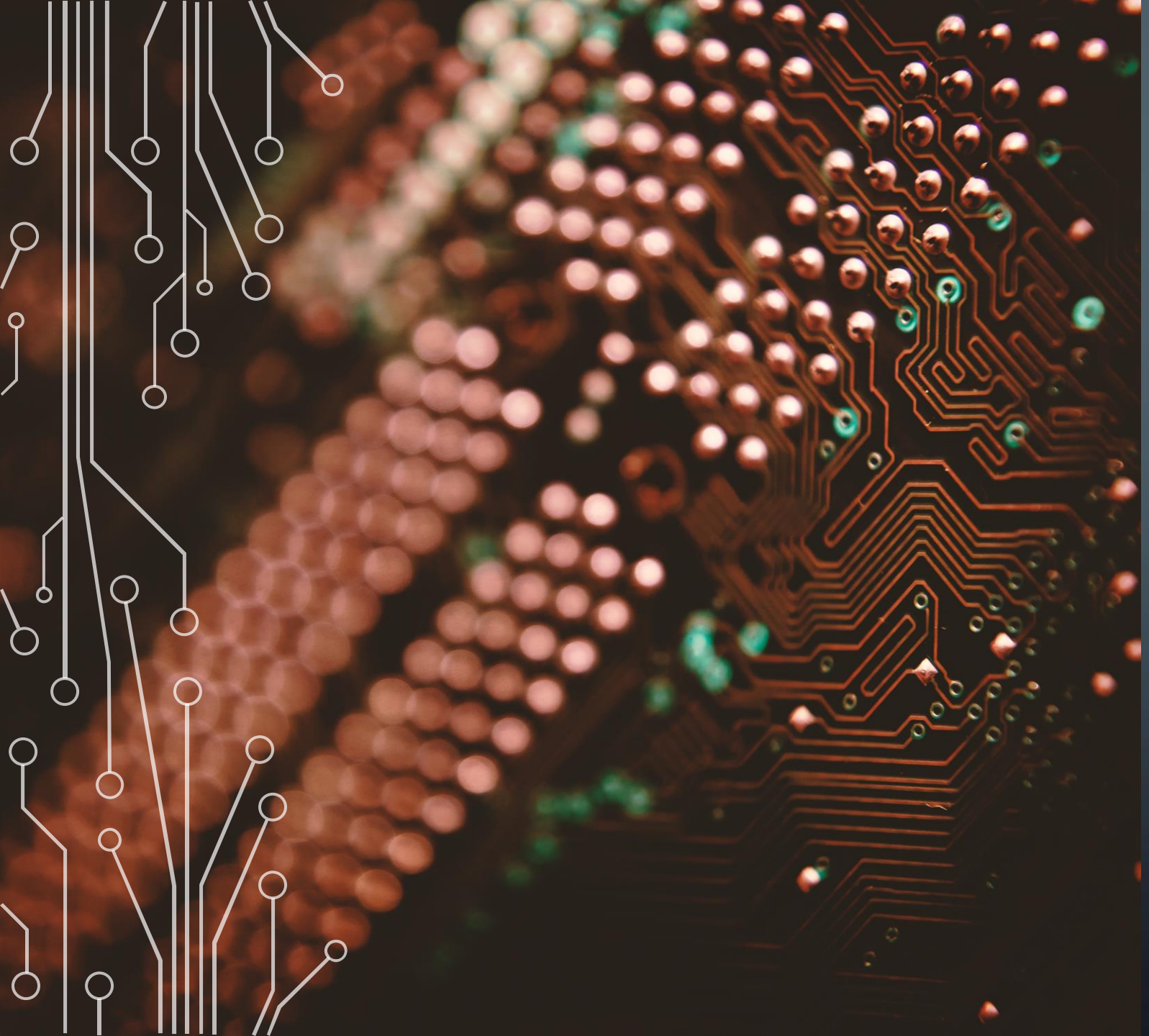
PREPARED BY : MOHAMMED GAMAL

# WHAT IS TURTLEBOT ?

- TurtleBot is a ROS standard platform robot. Turtle is derived from the Turtle robot, which was driven by the educational computer programming language Logo in 1967. In addition, the turtlesim node, which first appears in the basic tutorial of ROS, is a program that mimics the command system of the Logo turtle program. It is also used to create the Turtle icon as a symbol of ROS. The nine dots used in the ROS logo derived from the back shell of the turtle. TurtleBot, which originated from the Turtle of Logo, is designed to easily teach people who are new to ROS through TurtleBot as well as to teach computer programming language using Logo. Since then TurtleBot has become the standard platform of ROS, which is the most popular platform among developers and students.




- TurtleBot3 Introduction Video :
  https://www.youtube.com/watch?time_continue=2&v=9OC3J53RUsk&feature=emb_logo

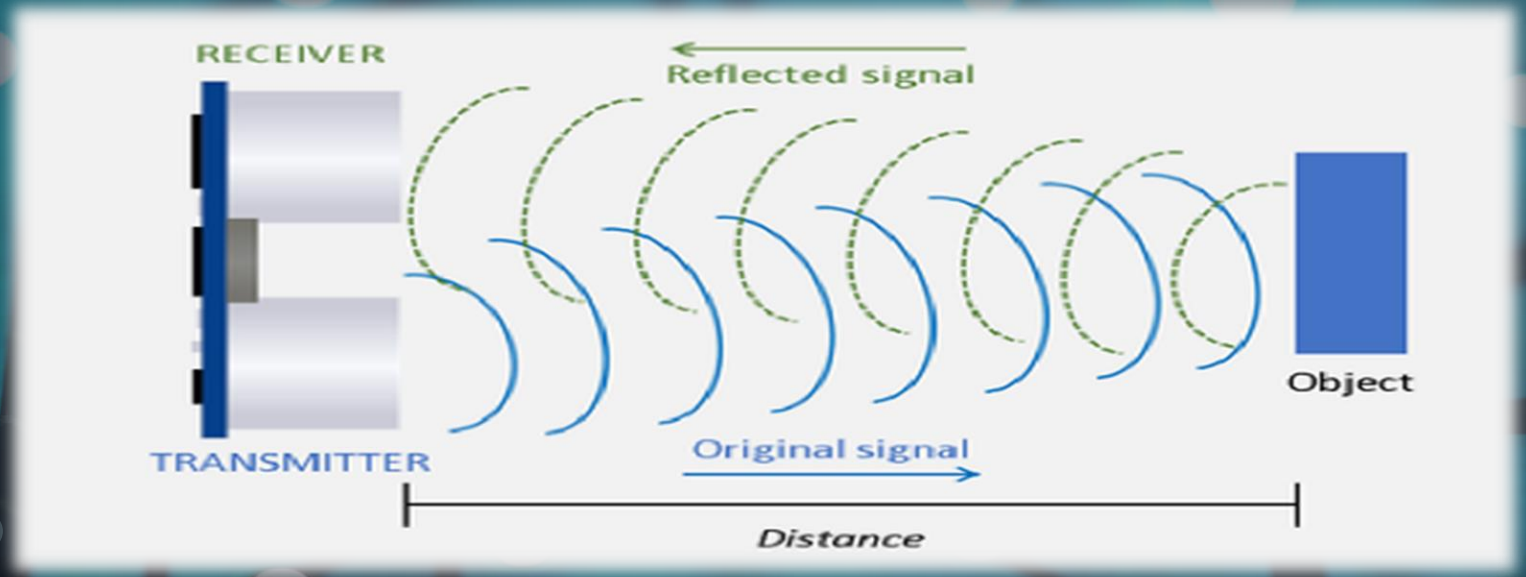


# CONTENTS

# AIM

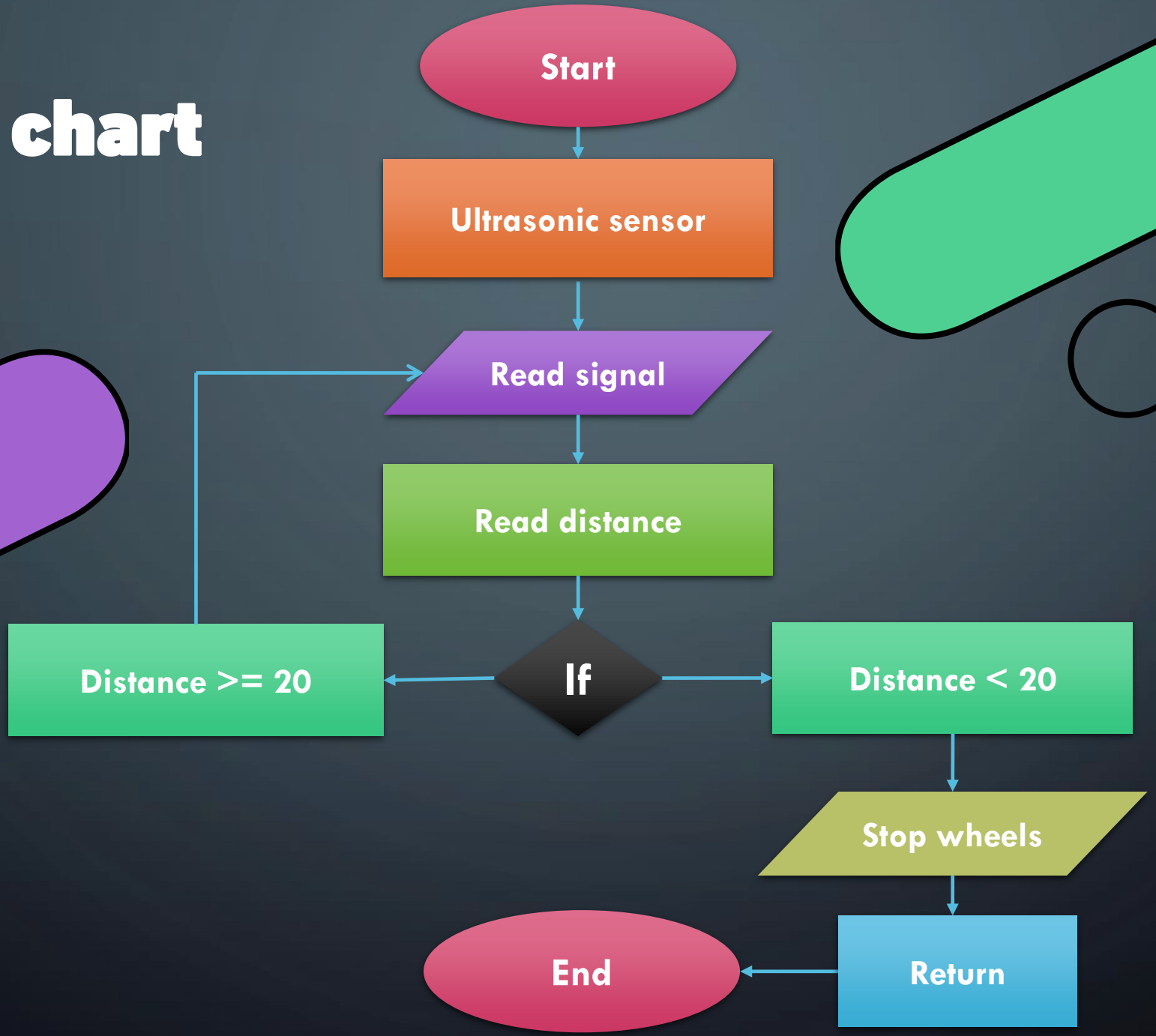
THE AIM IS TO DESIGN A CONTROL SYSTEM FOR TURTLEBOT BY USING ARDUINO UNO, LIKE THAT IN ROS OPERATION SYSTEM.

# TECHNIQUE




- To make the TurtleBot robot move smarter, we will use the ultrasonic sensor.
- Ultrasonic Sensors measure the distance to the target by measuring the time between the emission and reception.
- This will help us avoid hitting the objects

# Flow chart


Start
Ultrasonic sensor
Read signal
Read distance
If
Distance >= 20
Distance < 20
Stop wheels
Return
End

Ultrasonic sensor → Controller → Distance



Distance ↕ DC Motors with encoder

# HOW TO USE THE TECHNIQUE?

# HOW TO USE THE TECHNIQUE?

- We will use DC motors with encoder to find out the number revolution per minute RPM, for that we should knowing the number of pulses per revolution PPR from Specification:

$$RPM = \frac{PPS}{PPR} * 60$$

* PPS = NO. of Pulses per second

| | |
|---|---|
| Hall Resolution | 11PPR X i34.02 = 374.22PPR |
| Reduction Ratio | 1 : 34.02 |

# STAGES OF WORK

- To start with, we should buy two DC motors with encoder and ultrasonic sensor.
- We will also need a transistor and a motor driver - H-Bridge.
- We will be programing the ultrasonic sensor and wheels with the Arduino and insert them into a loop.
- We place an if condition, where if the distance of ultrasonic 20 greater than , the first and second wheels will move clockwise automatically, and the RPM will be printed using the serial monitor.
- Else the distance in the ultrasonic is less than 20, the first wheels will stop and move counterclockwise, while second wheel will rotate clockwise, and the RPM will be printed using the serial monitor.


# THANK YOU

**Done by : Mohammed Gamal**

**In Smart methods**