OTTO Robot: A Comprehensive Guide

This presentation dives deep into the OTTO robot, covering everything from its hardware and software components to assembly instructions and troubleshooting tips.

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INTRODUCTION

The Otto robot is a DIY (Do-It-Yourself) programmable robot kit designed to be easily built and coded by people of all ages, allowing them to learn about robotics through assembly and programming; it is primarily known for being 3D printable, open-source, and customizable, with a focus on educational applications where users can build and code their own walking robot using readily available components and simple coding interfaces like Blockly or Arduino.

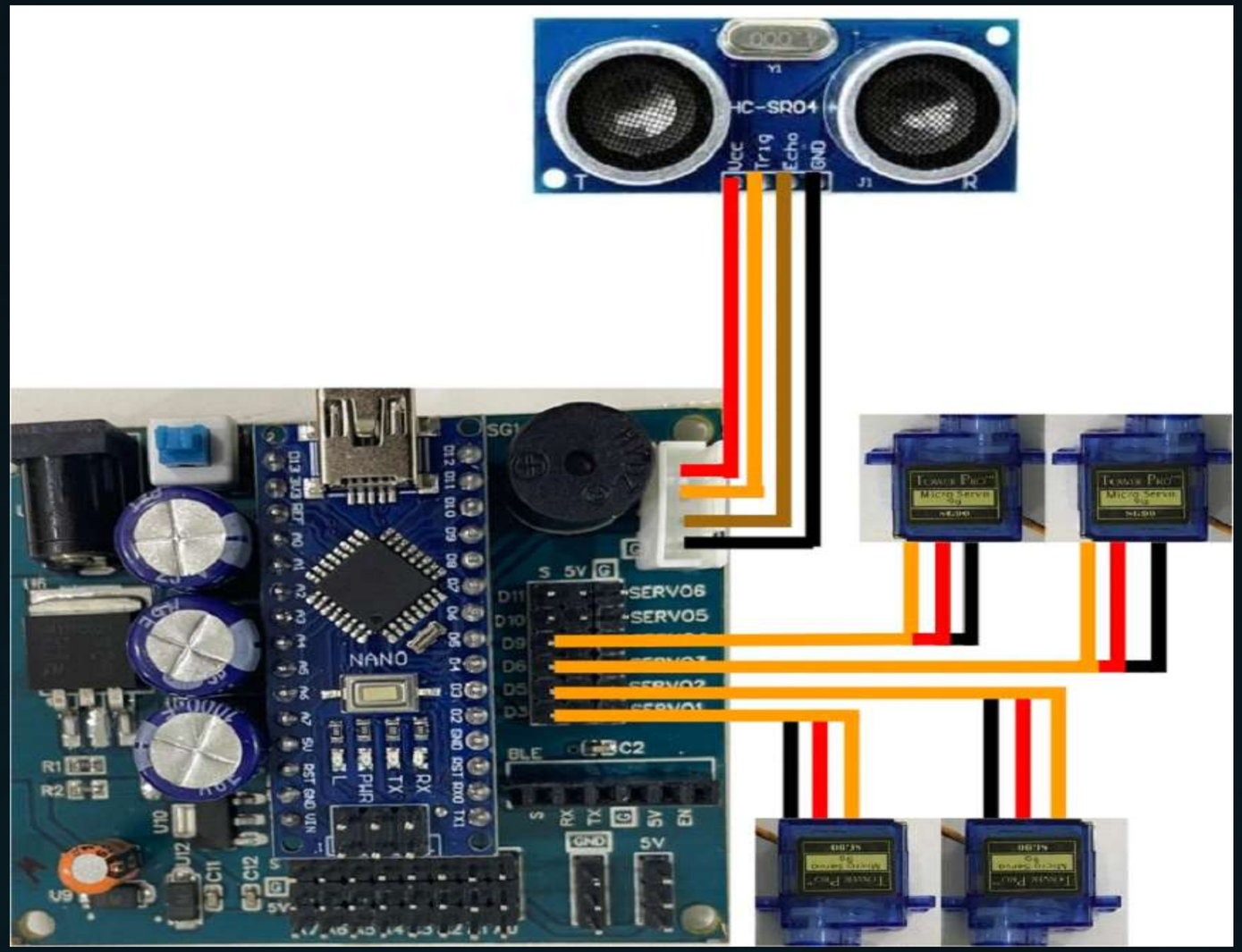
List of Components

Sr. No.	Components Name	Specification	Link	Qty
1	3D Printed Body Parts		link	1
2	Arduino Nano	Operating Voltage (logic level): 5V **With Soldered Connector** 8 analog inputs ports: A0 ~ A7 14 Digital input / output ports: TX, RX, D2 ~ D13 Using Atmel Atmega328P-AU MCU	Link	1
3	Arduino Nano Expansion Board Customized	PHN Customized	Link	1
4	Ultrasonic Sensor - HC SR04	Operating Voltage: 5V DC Operating Current: 15mA Measure Angle: 15° Ranging Distance: 2cm - 4m	Link	1
5	Servo Motors(MG 90), 180 Degree	Model: MG90S **Rotation 180 Degree** Operating voltage: 4.8V~ 6.6V Servo Plug: JR Stall torque @4.8V : 1.8kg-cm Stall torque @6.6V : 2.2kg-cm"	Link	4
6	Double End 4 Pin XH JST Female to Female Wire Connector	XH series double end female JST connector Number of holes : 4	Link	1
7	M2*8 Self Tapping Screw	M 2/8 Self Tapping Screw	Link	2
8	Fewiquick(5Rs)	Brand Pidilite	Link	1

List of Components

Sr. No.	Components Name	Specification	Quantity	Image
9	Bluetooth Module - HC-05	Bases at CSR BC04 Bluetooth technology. with build-in 2.4GHz PCB antenna It's at the Bluetooth class 2 power level. Range test: 10 meters Operating voltage: 3.3V to 6V DC Operating current in pairing is in the range of 30~40mA.	Link	1
10	Jumper cables(F-F)			6
11	Touch Sensor - TTP223B module	Power supply voltage(VCC): 2.0, 3, 5.5 V. Output high VOH: 0.8VCC V Output low VOL: 0.3VCC V Response time (touch mode) : 60 mS Response time (low power mode) : 220 mS	Link	1
12	Jumper cables(M-F)		Link	3

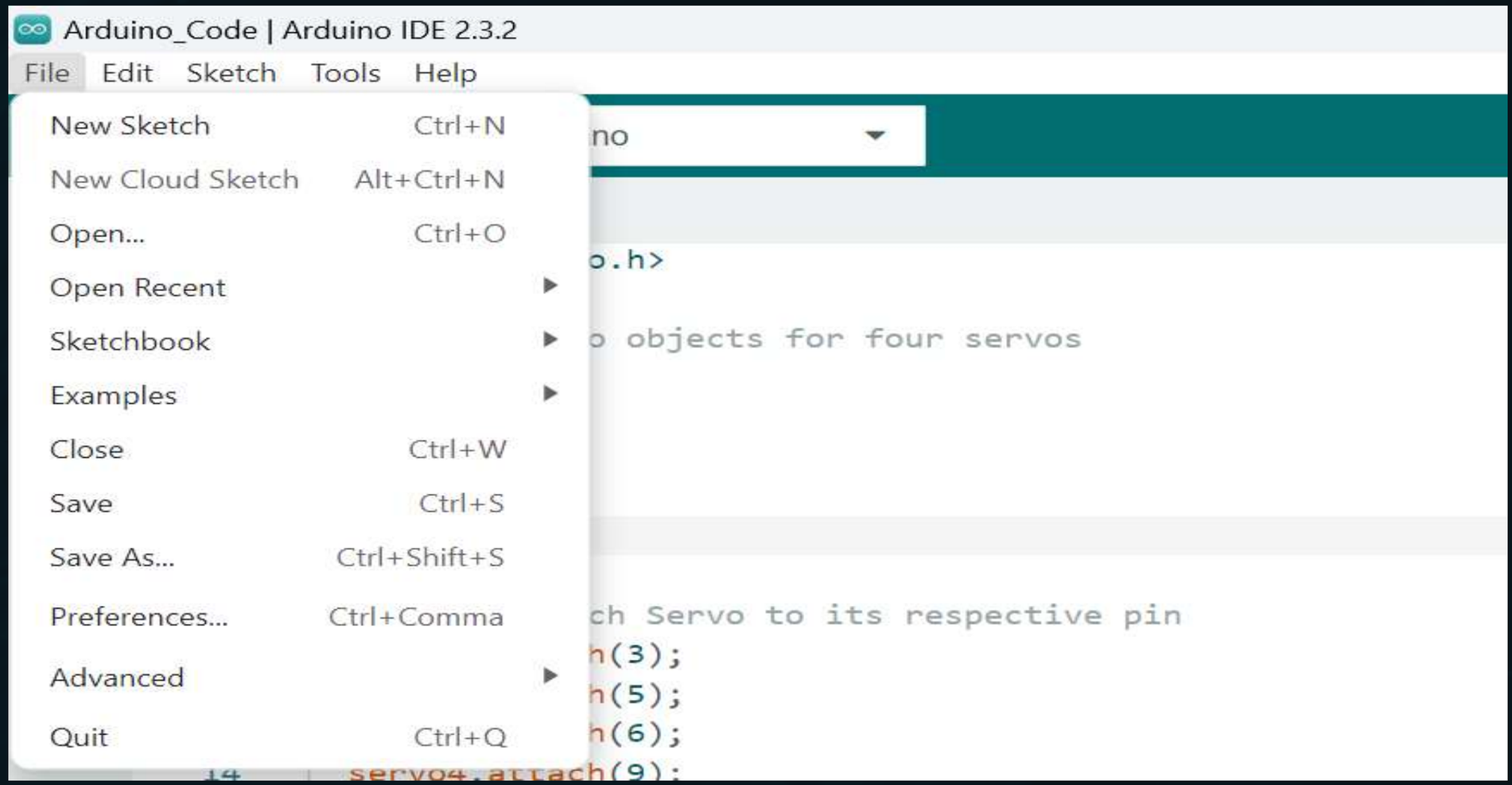
Interfacing Diagram -



Assembly

1.Calibrate all servo motors at 90 Degree

2.Open **Arduino IDE**

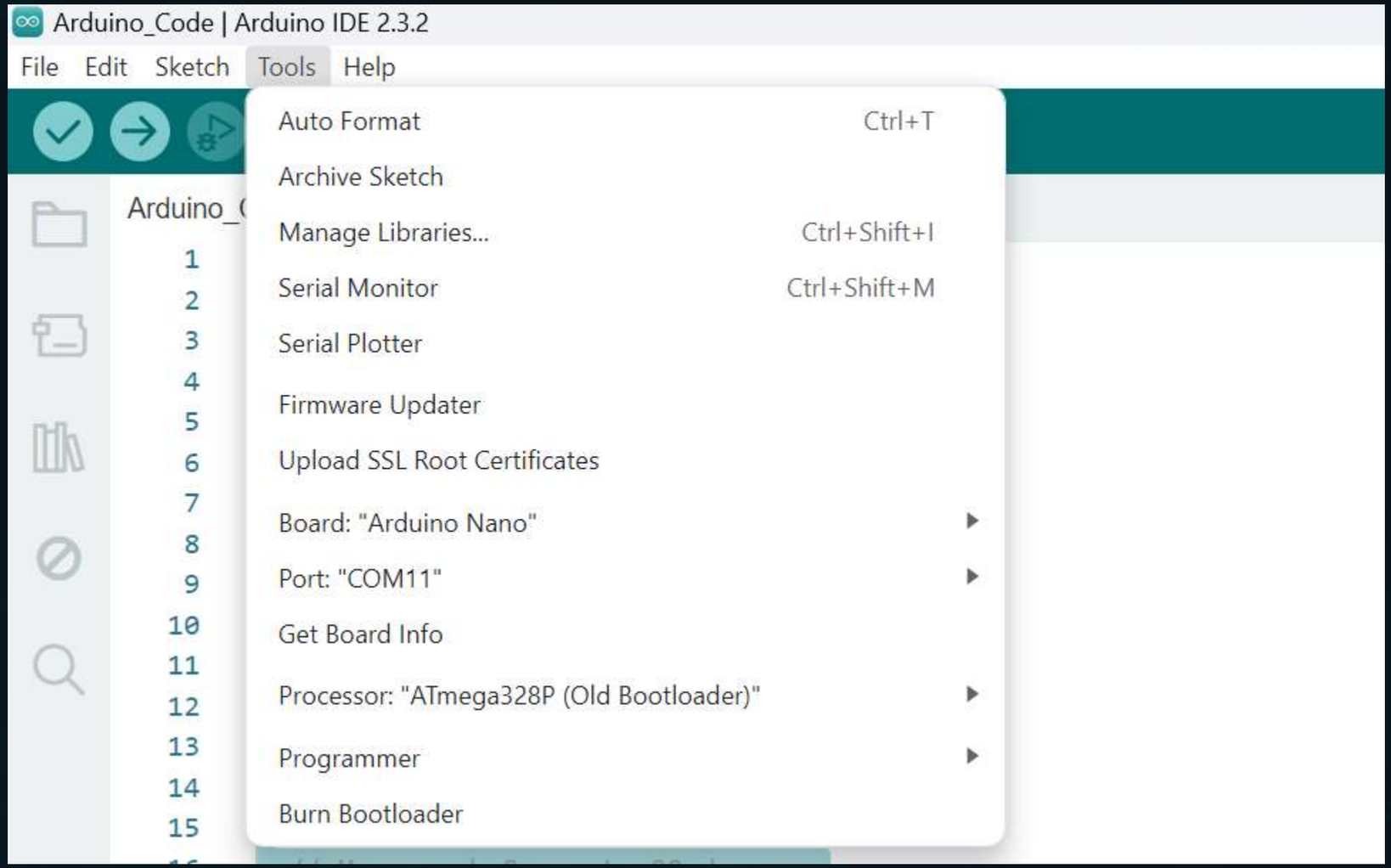


2.Now Click on >> File>>New Sketch

3.Now Paste the Servo Caliper Code.

```
#include <Servo.h>

// Create Servo objects for four servos
Servo servo1;
Servo servo2;
Servo servo3;
Servo servo4;

void setup() {
  // Attach each Servo to its respective pin
  servo1.attach(3);
  servo2.attach(5);
  servo3.attach(6);
  servo4.attach(9);

  // Move each Servo to 90 degrees
  servo1.write(90);
  servo2.write(90);
  servo3.write(90);
  servo4.write(90);
}

void loop() {
  // Nothing to do here
}
```

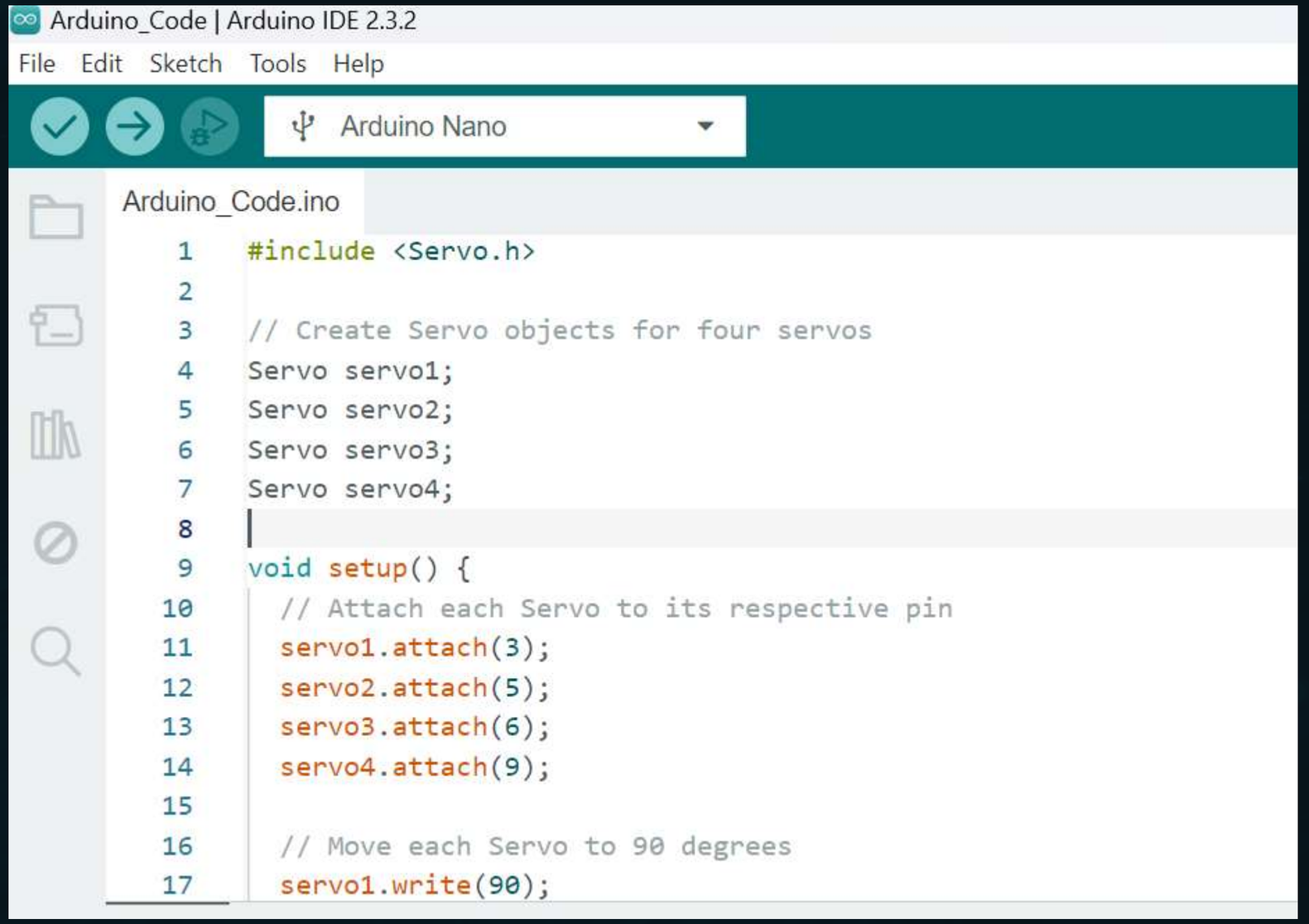
Now click on Tools>>Board>>Arduino Nano



4.Tools>>Port>> (Select Port)

5.Tools>> Processor>>ATmega328P

6.Now it's time to compile the code for compiling click on



7. Connect Arduino Nano with nano cable and push the code, for push the code click on

8.Once you push the code remove the cable and give the 9V 1A current to board by using adapter

9.Output>> All Servo motors are at 90 Degree.

10. Now Take the Otto Robot Head

11. Now fix the servo motor to the lower body of the otto robot

12.Attach the 2 servos motors to the otto robot below body and screw it.

13. Take the servo motor cap and cut according to the size of the leg

14. Servo motor Cap

15.Mount like below

16. Do cutting (according to the the 3d part)

17. Mount servo motor like this, fix the screw and fix the foot to the leg.

18. attach the leg to the lower body.

19. Mount Ultrasonic sensor to the upper body of the otto robot.

20. Then Place the Expansion board with Expansion Board.

21. Make the connections as follows.

Pin Connections

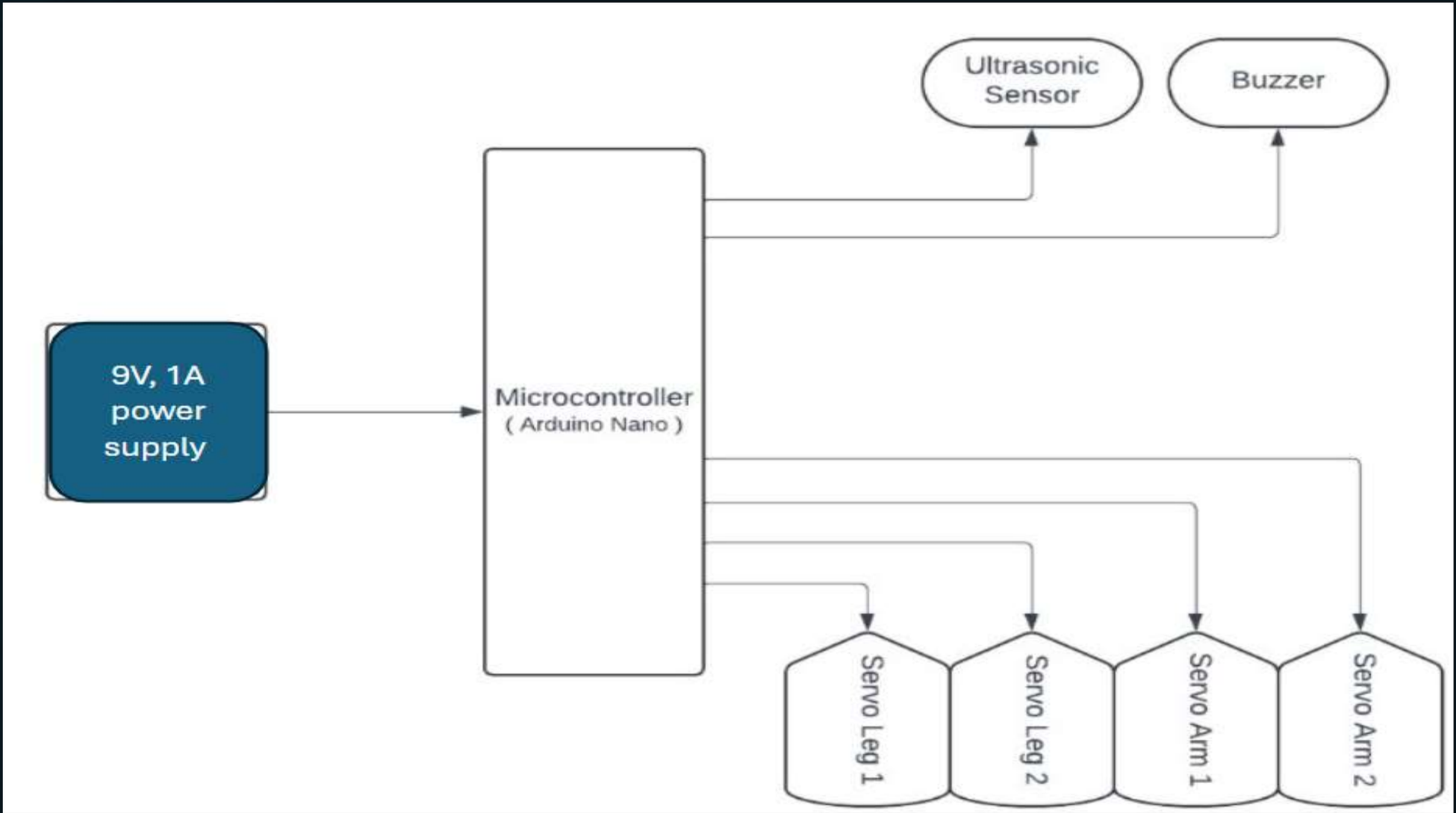
Servo Pins

- Left Leg: Pin 3
- Right Leg: Pin 5
- Left Foot: Pin 6
- Right Foot: Pin 9
- Buzzer: Pin 12

Ultrasonic Sensor

- VCC - VCC
- Trriger - 8
- Echo Pin – 7
- GND – GND

Block Diagram



Troubleshooting

1. Check for loose connections or faulty wiring.
2. Verify that all components are properly installed and connected.
3. Review the software code for any errors or inconsistencies.
4. Consult the user manual or community forum for assistance.

OTTO in Action: Debugging and Testing

- Run test programs to verify the robot's functionality.
- Identify and address any bugs or unexpected behavior.
- Refine the software code to enhance performance and efficiency.

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Conclusion

This concludes our exploration of the OTTO robot. You've learned about its components, assembly, troubleshooting, and functionality. Now, it's your turn to build your own OTTO and explore its capabilities. Happy building!

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