

Tetra Ryerson & C2LC

Theatre Bot

Table of Contents

1. Constructing the robot
 - Parts List
 - Putting together the robot
2. How to use the robot
 - Connections
 - How to code/integrate code
3. Integrating Coding Platform
4. Safety & Care

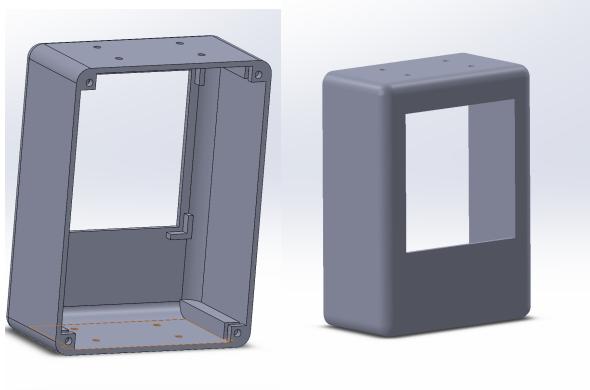
Constructing the Robot

Parts List

Ensure the kit includes the following parts including the various auxiliary components prior to assembly.

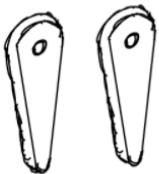
- Back Panel with Arduino & Auxiliary Pieces Connected
 - Auxiliary Pieces:
 - Micro Servo Motors (x4)
 - LCD 16x2 screen with control board (x1)
 - IR remote control (x1)
 - Passive piezo buzzer (x1)
 - Microphone (x1)
 - LED matrix (x1)

- Battery cap (x1)
- Two Wheels
- Two Arms
- Front Panel



Front Panel





Arms



LCD 16x2 Screen



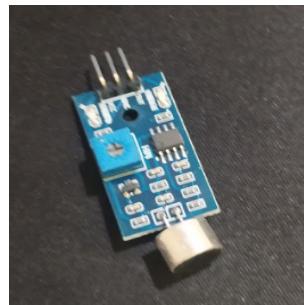
IR remote control



Piezo buzzer



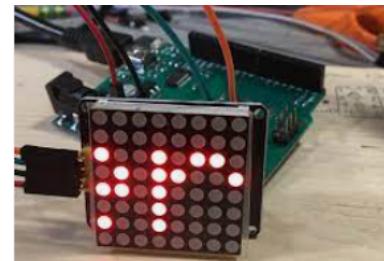
Micro Servo Motor



Microphone



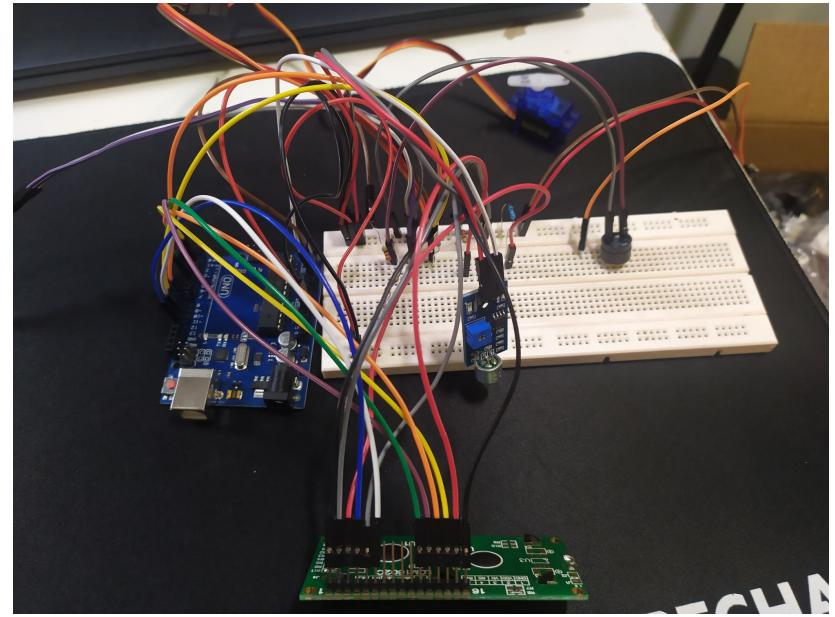
9V batteries



LED matrix



Battery cap



Arduino with Auxiliary Parts Connected*

***Missing LED matrix, 3 motors, LCD controller board**

Connections:

Power and Ground supply:

- Connect 5V arduino to top red row of the bread board
- Connect GND arduino pin to top blue row of the bread board

Servo motors

- Connect brown to the ground
- Connect red to the power
- Connect remaining line to 2,3,4, or 6 for each motor

Piezo buzzer

- Connect the shorter leg to ground
- Connect the longer leg to 5

LCD I2C

- Connect Vcc to power
- Connect GND to ground
- Connect SC to A1
- Connect SD to A2

LED matrix

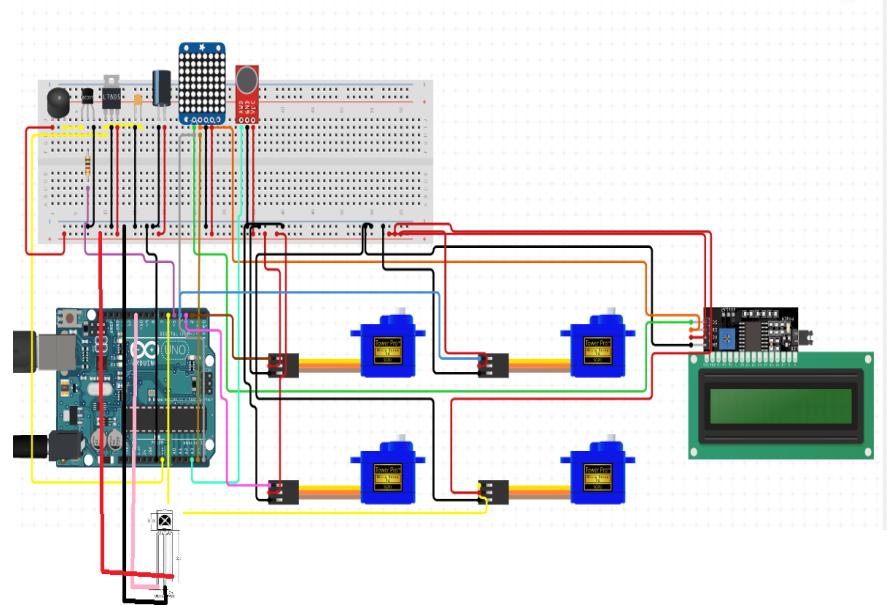
- Connect Vcc to power
- Connect GND to ground
- Connect ... to A1
- Connect ... to A2

Microphone

- Connect Vcc to power
- Connect GND to ground
- Connect AUD to A3

IR remote

- Connect Vcc to Power
- Connect GND to ground
- Connect OUT to 11



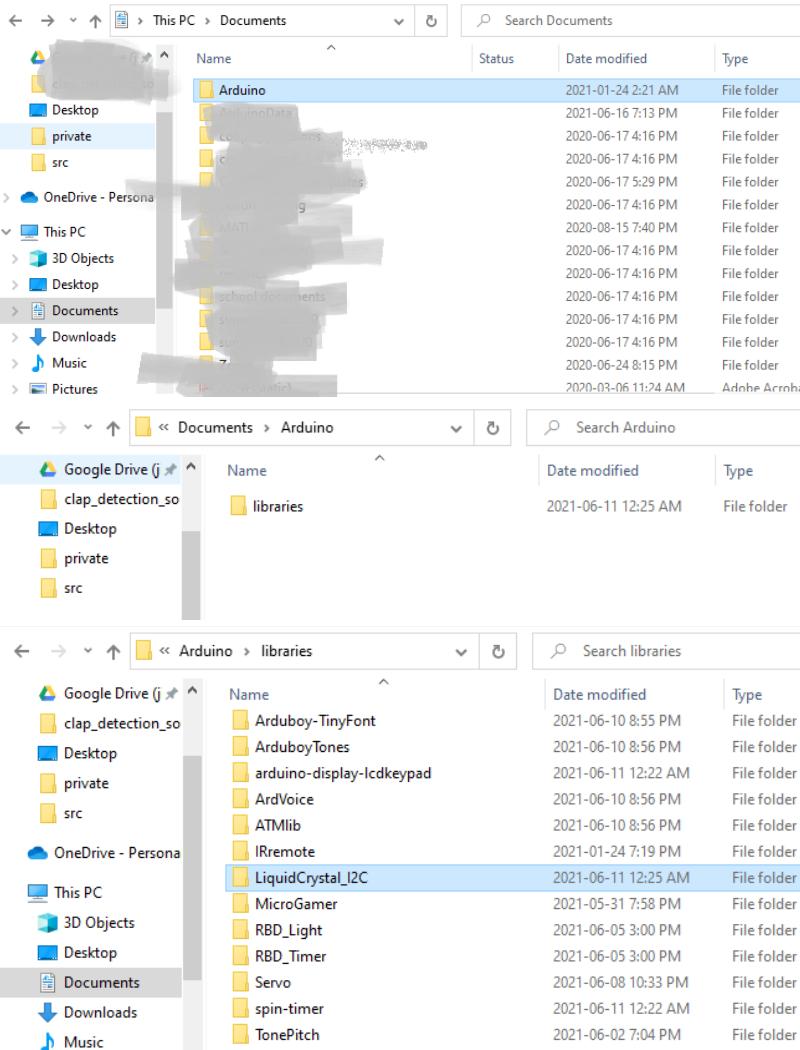
Arduino Digital Circuit Board Connection as a reference

How to use the robot

How to integrate code

There are two methods of controlling the robot; sound control and remote control. Each method has a different main code file and 1 or 2 function files.

Before uploading the code files into arduino, the LCD 16x2 display library needs to be set up first. First, open the program fold for the Arduino IDE. Then open the folder named *library*, and upload the folder *LiquidCrystal_I2C* there.



Sound control input:

Upload the **sound.ino** file as well as the **pitches.h** file into the arduino IDE as shown below. The code would initiate by taking numbers of claps

as input and display desired output sequences in the form of sound (Piezo), (LED matrix), motion(motors) and verbal display (LCD display).

```

File Edit Sketch Tools Help
Sketch
Sound sketches.h
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
#include "pitches.h"
#include <LiquidCrystal.h>
#include <Servo.h>

//assigned for the clap detection
int micIn=A1;
int submitTime=0;
const int spaced=100;
int clapCount=0;

//assigned for motor
Servo servol;
Servo servo2;
Servo servo3;
Servo servo4;
int pos = 0;
int sc[]={106,52,0}; //ccw/stop/cw

//assingned for LCD
LiquidCrystal_I2C lcd(0x27, 16, 2);

```

Remote control input:

Upload the **remote.ino** file as well as the **pitches.h** and **remotes.h** files into the arduino IDE as shown below. The code would initiate by pressing assigned buttons as input and display desired output sequences in the form of emotion (LED matrix), motion(motors) and verbal display (LCD display).

The screenshot shows the Arduino IDE interface with a sketch named "remote". The code is written in C++ and includes libraries for serial communication and servo control. The sketch initializes four servos (servo1, servo2, servo3, servo4) and sets up an IR receiver (irrecv). It then enters a loop where it decodes IR codes and performs actions based on the button pressed. The code uses Serial.println to output hex values and LCD.print to display text on a connected LCD screen.

```
remote | Arduino 1.8.15 (Windows Store 1.8.49.0)
File Edit Sketch Tools Help
remote.ino [remote] sketches.h
remote.ino (1000)

remote.remote();
servo1.attach(10); // servo1 at pin10. Servo1 and Servo2 is for the robot arm
servo2.attach(11); // servo2 at pin 11
servo3.attach(6); // servo3 at pin 6. Servo3 and Servo4 is for the robot wheels
servo4.attach(5); // servo4 at pin 5
irrecv.enableIRIn(); // start the receiver
}

void loop(){
remote(irrecv.decode(&results));
}

void remote(char button) {
if (irrecv.decode(&results))
{
Serial.println(results.value,HEX);
if(results.value == Button_1)
{
lcd.begin();
lcd.clear();
lcd.print("good morning!");
servo3.write(180); //make a turn
servo4.write(0);
}
else if (results.value == Button_2)
{
Serial.println(results.value,HEX);
lcd.begin();
lcd.clear();
lcd.print("arm stretch");
servo1.write(180); //raising arm
servo2.write(180);
}
else if (results.value == Button_3)
{
}
```