Final Project Schematic
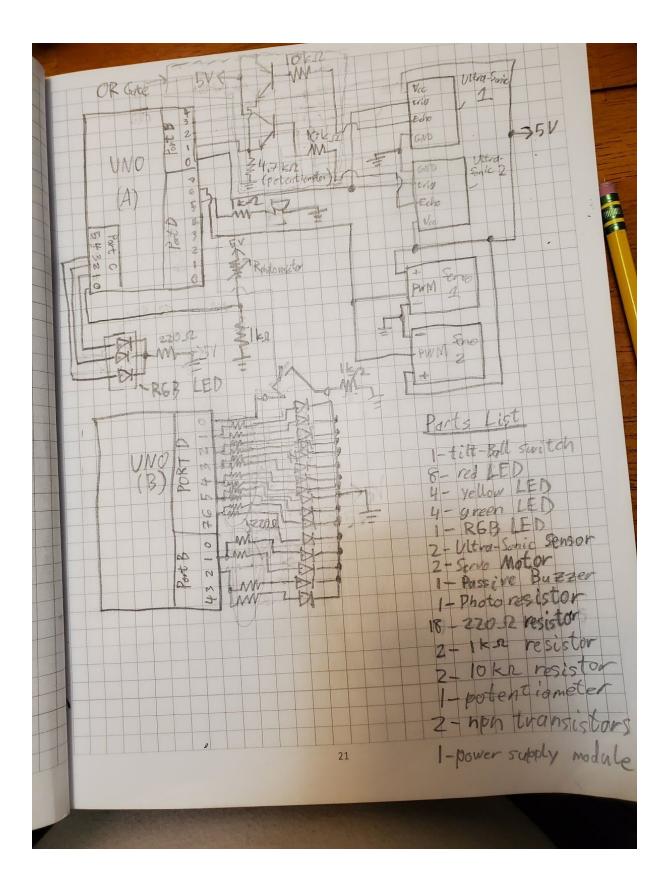
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EGR-3133

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OR Gate

UNO (A)

Port B
4 3 2 1 0

Port D
7 6 5 4 3 2 1 0

Port C
5 4 3 2 1 0

5V

10kΩ

4.7 kΩ (potentiometer)

10kΩ

1kΩ

Photoresistor

5V

1kΩ

220Ω

5V

RGB LED

Vcc
trig
Echo
GND
Ultra-Sonic 1

→5V

GND
trig
Echo
Vcc
Ultra-Sonic 2

+ PWM − Servo 1

− PWM + Servo 2

UNO (B)

PORT D
7 6 5 4 3 2 1 0

Port B
4 3 2 1 0

220Ω

1kΩ

Parts List

1- tilt-Ball switch
8- red LED
4- yellow LED
4- green LED
1- RGB LED
2- Ultra-Sonic Sensor
2- Servo Motor
1- Passive Buzzer
1- Photo resistor
18- 220Ω resistor
2- 1kΩ resistor
2- 10kΩ resistor
1- potentiometer
2- npn transistors
1- power supply module

For this project, two arduino boards are used, where one controls two levers, and at the end of one is a tilt switch, which communicates with the other. Therefore, the communication between the two boards are through mechanical means, rather than electrically. Another thing to note is how the ultrasonic sensors are treated as one sensor. This is possible by ensuring that the input "trig" is connected by short, nearly equidistant nodes that mitigate any delay of a pulse sent to it. It is also important to note that this is not to scale in the schematic. The output "echo" is then entering an OR logic gate. Since there are no OR logic gates provided in the kit, we can use the npn transistors to form it, and a potentiometer to help tweak the resistance value of 4.7 kiloohms. Similarly, the two servo motors are wired such that the PWM will be nearly the same, mitigating the delay between them with short, nearly equidistant nodes. The output of both are mechanical, so no transistors are required to communicate back with the board. For board (A), the components, not including the photoresistor and RGB LED, will be powered through a power supply module, since a sufficient amount of computing will be required. As for board B, since it is just cycling through LEDs, waiting for an interrupt signal, it will not require assistance through the power module.

Below is a parts list of the required materials for the circuit assembly only:

- 1 tilt-ball switch

- 8 red LED lights

- 4 yellow LED lights

- 4 green LED lights

- 1 RGB LED light

- 2 ultrasonic sensors

- 2 servo motors

- 1 passive buzzer

- 1 photo resistor

- 18 220 ohm resistors

- 2 1 kiloohm resistors

- 2 10 kiloohm resistors

- 1 potentiometer

- 2 npn transistors

- 1 power supply module