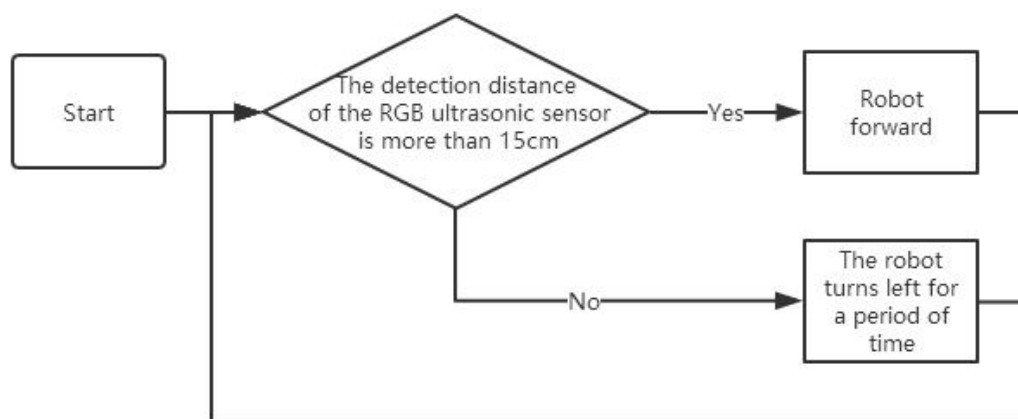# D.   Detection Robot

Material

1. Detection Robot
2. Computer

## Project #1: Obstacle Avoidance Robot

Task: Use RGB ultrasonic sensor to detect whether there is an obstacle in front of the robot. If RGB ultrasonic sensor detects a small value, it means there is an obstacle in front, and the robot will turn. If RGB ultrasonic sensor detects a large, it means there is no obstacle ahead and the robot will move forward.

Program Idea

Reference Code

|	
ultrasonic PortB ▼	The block reports the distance between the ultrasonic sensor and object in front of it in center meter (cm).
◯ > 50	The block checks if the first value is greater than the other value. If the second value is less, the block returns true; if not, it returns false. This block works with letters too, not just numbers. Letters at the top of the alphabet (e.g. a, b, c) are worth less than letters at the end (e.g. x, y, z). Other rules of alphabetical order apply (e.g. zach > az).
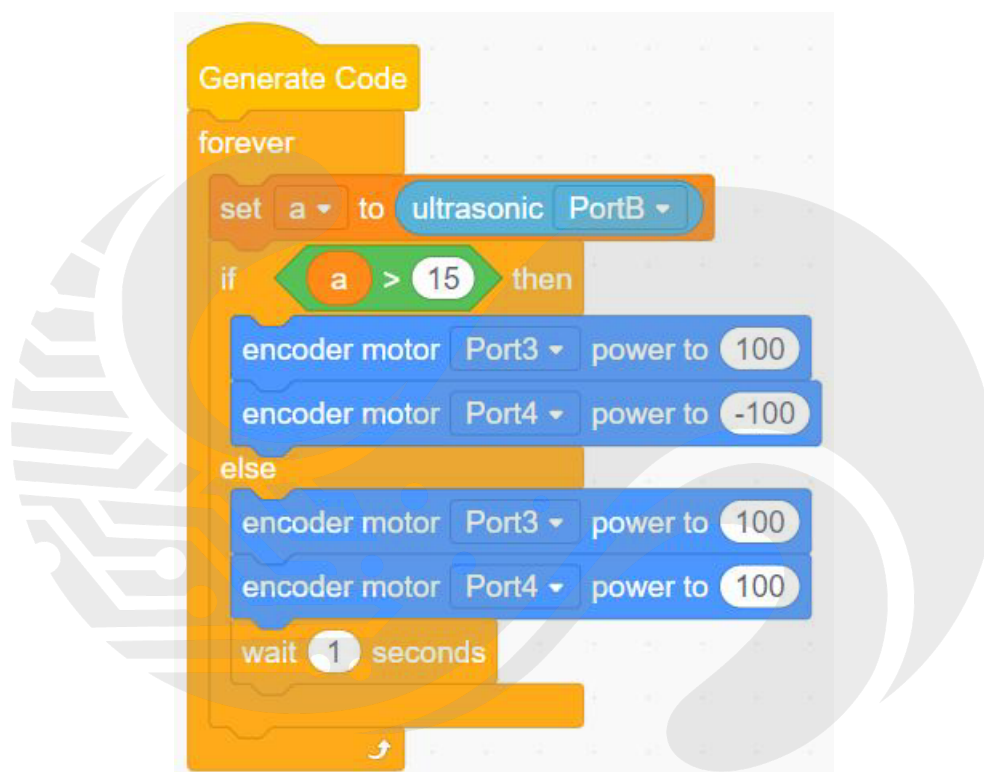
# Project #2: Following Robot

Task: Make a following robot.

The robot changes its motion state according to the detected distance of the RGB ultrasonic sensor. When the RGB ultrasonic sensor detects a small value, it means the robot is close to the object in front, then the robot moves back. When the detected value remains unchanged within an interval, then the front object can be considered stationary, and the robot stop. When the RGB ultrasonic sensor detects a large value, it means the robot is far away from the front object, then the robot moves forward. In this way, the effect of the robot following the movement of the object is achieved.

Program Idea
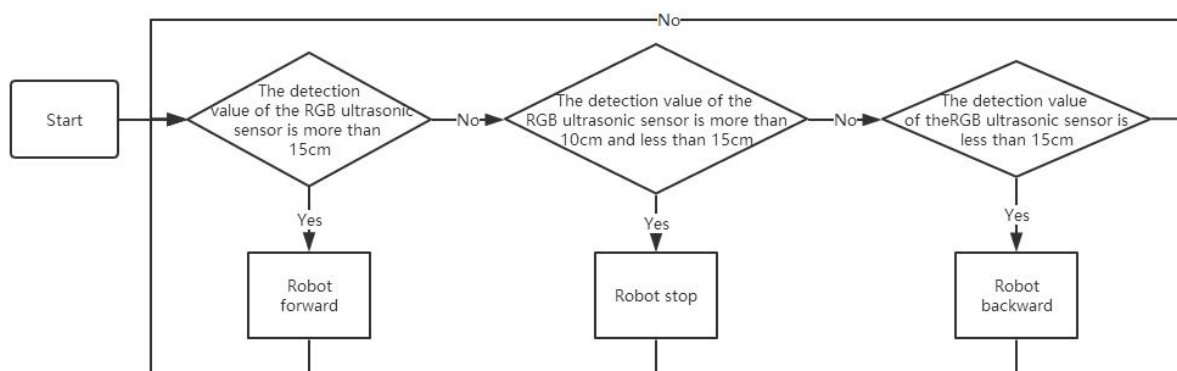
Reference Code

⬭ < 50	The block checks if the first value is less than the second value. If it is less, the block returns true; if not, it returns false.
⬡ and ⬡	The block joins two boolean blocks so they both have to be true to return true. If they are both true, the block returns true; if they are not all true or none true, it returns false.
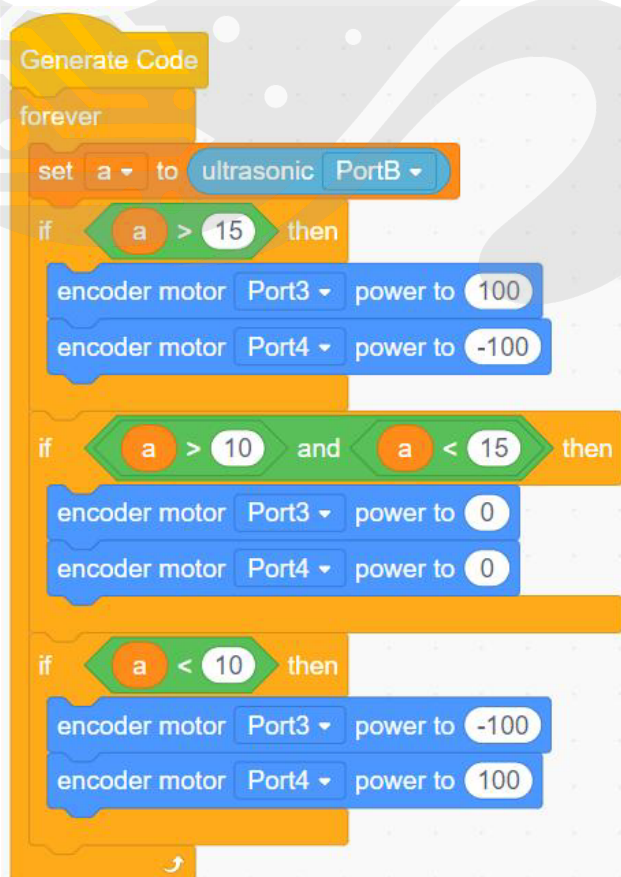
Note: The RGB ultrasonic sensor detected value, which can make robot stop moving, must be an interval. Because RGB ultrasonic sensor detected value will wave, if it is not a range but a specific value, the robot will move back and forward instead of being static.

Expansion: You can make a more intelligent robot: when there are obstacles in front of the robot, the robot don't go forward even if the remote controller buttons were pressed, and the RGB light will turn on the red light, the buzzer module will sound an alarm to remind the operator that there are obstacles in front of the robot, the robot can't go forward.

ARDUINO

Project #1: Obstacle Avoidance Robot Arduino

Task: Use RGB ultrasonic sensor to detect whether there is an obstacle in front of the robot. If RGB ultrasonic sensor detects a small value, it means there is an obstacle in front, and the robot will turn. If RGB ultrasonic sensor detects a large, it means there is no obstacle ahead and the robot will move forward.
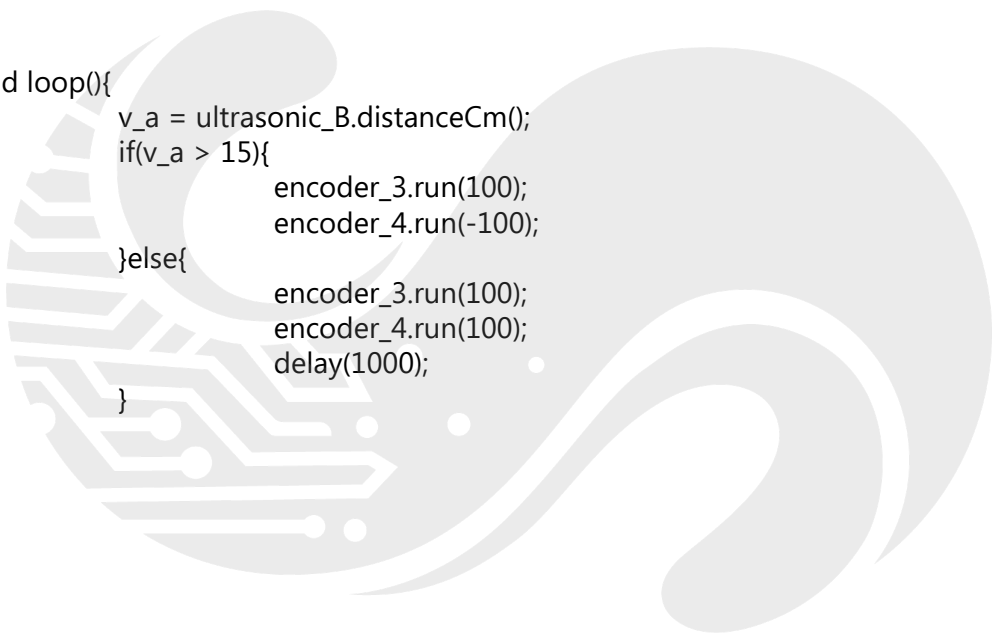
Program Idea
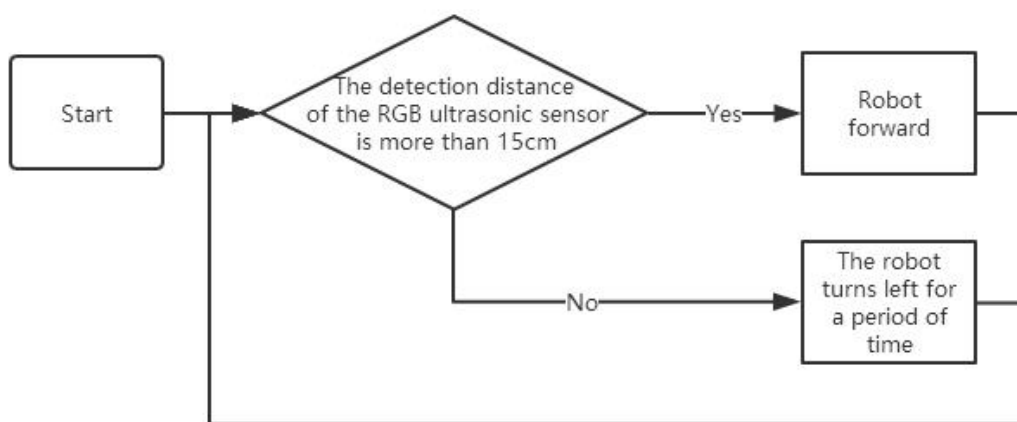
Reference Code

```
#include<WeELF328P.h>

WeUltrasonicSensor ultrasonic_B(PORT_B);
WeEncoderMotor encoder_3(PORT_3);
WeEncoderMotor encoder_4(PORT_4);
double v_a; //a;

void setup(){
}

void loop(){
        v_a = ultrasonic_B.distanceCm();
        if(v_a > 15){
                encoder_3.run(100);
                encoder_4.run(-100);
        }else{
                encoder_3.run(100);
                encoder_4.run(100);
                delay(1000);

        }
}
```
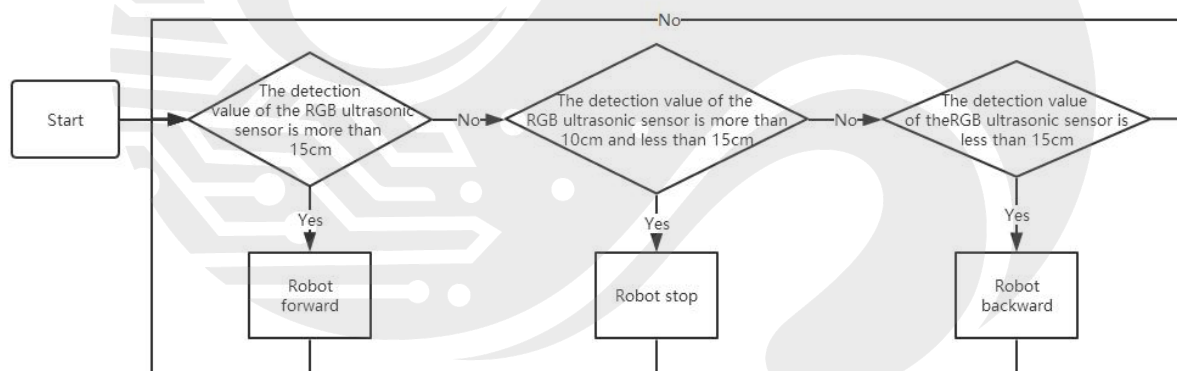
Project #2: Following Robot Arduino

Task: Make a following robot.

The robot changes its motion state according to the detected distance of the RGB ultrasonic sensor. When the RGB ultrasonic sensor detects a small value, it means the robot is close to the object in front, then the robot moves back. When the detected value remains unchanged within an interval, then the front object can be considered stationary, and the robot stop. When the RGB ultrasonic sensor detects a large value, it means the robot is far away from the front object, then the robot moves forward. In this way, the effect of the robot following the movement of the object is achieved.

Program Idea

Reference Code

```
#include<WeELF328P.h>

WeUltrasonicSensor ultrasonic_B(PORT_B);
WeEncoderMotor encoder_3(PORT_3);
WeEncoderMotor encoder_4(PORT_4);
double v_a; //a;

void setup(){
}

void loop(){
          v_a = ultrasonic_B.distanceCm();
          if(v_a > 15){
                    encoder_3.run(100);
                    encoder_4.run(-100);
          }
          if(v_a > 10 && v_a < 15){
                    encoder_3.run(0);
                    encoder_4.run(0);
          }
          if(v_a < 10){
                    encoder_3.run(-100);
                    encoder_4.run(100);
          }
}
```