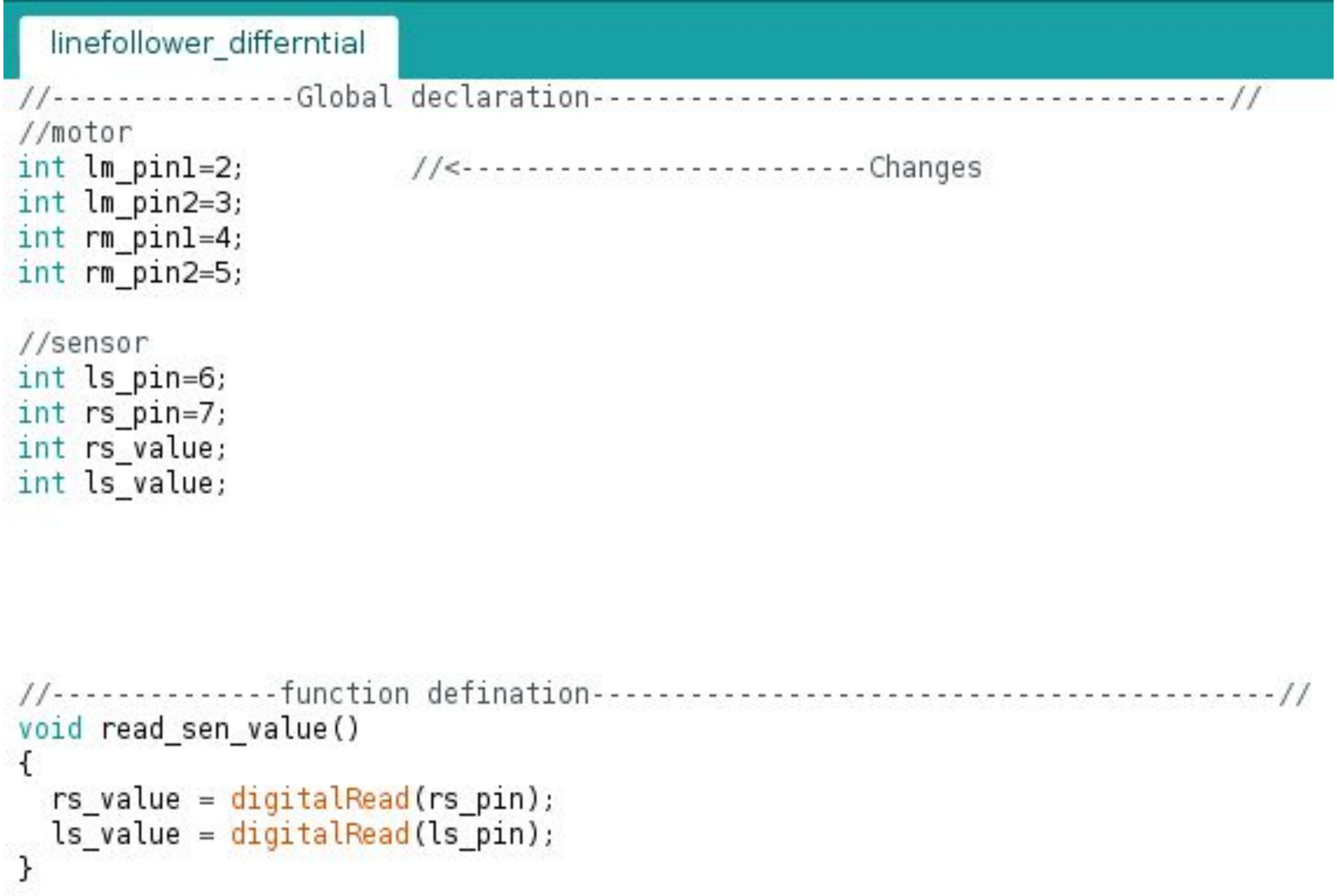
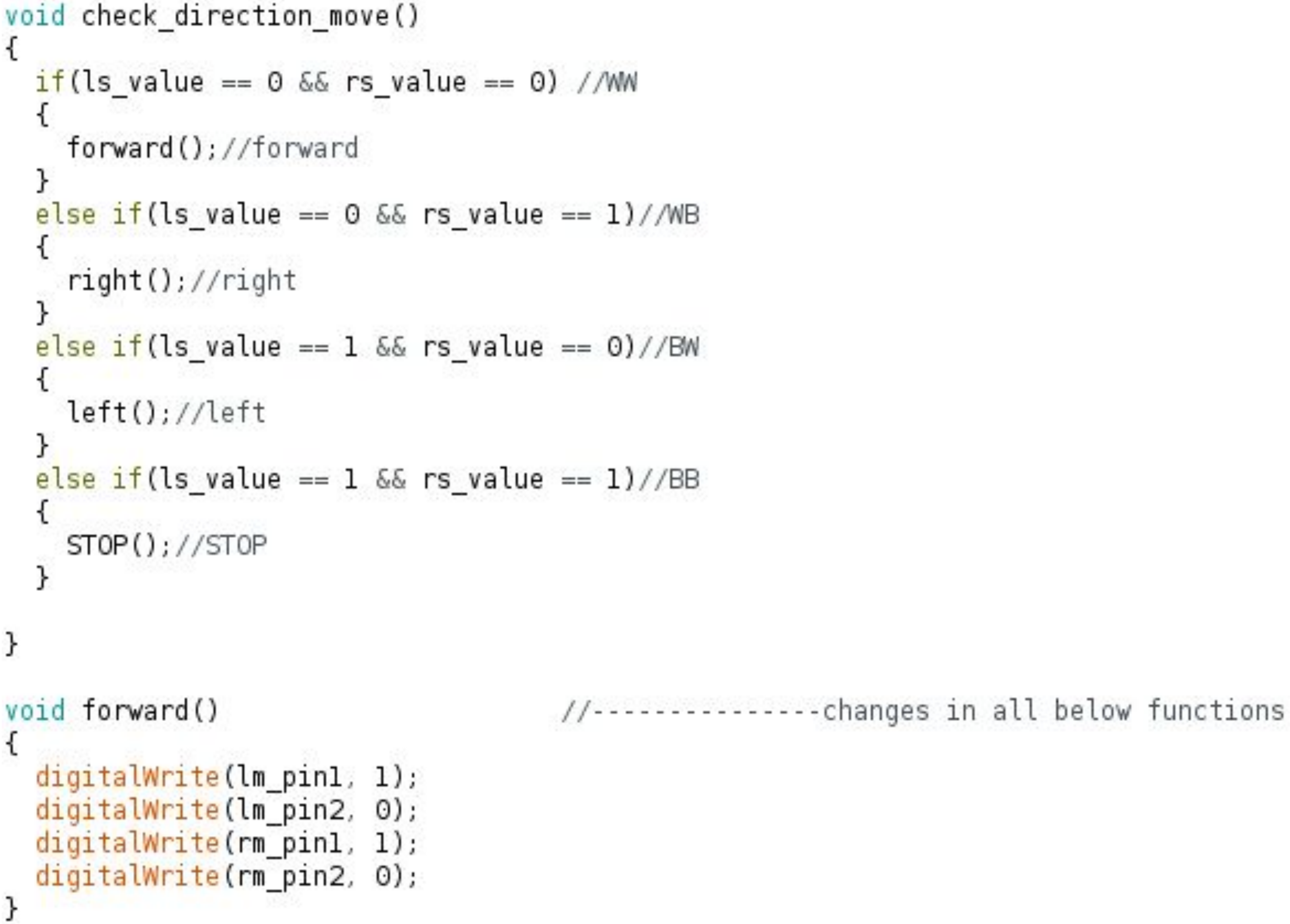
Session 3: Obstacle avoider robot

Robotics Club

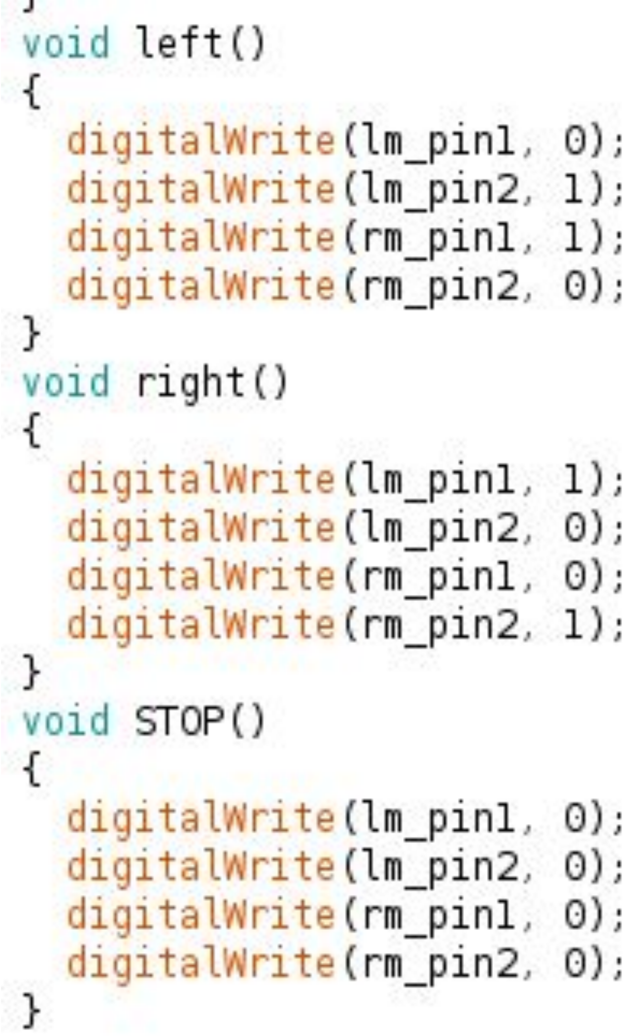
Linefollower using Differential drive



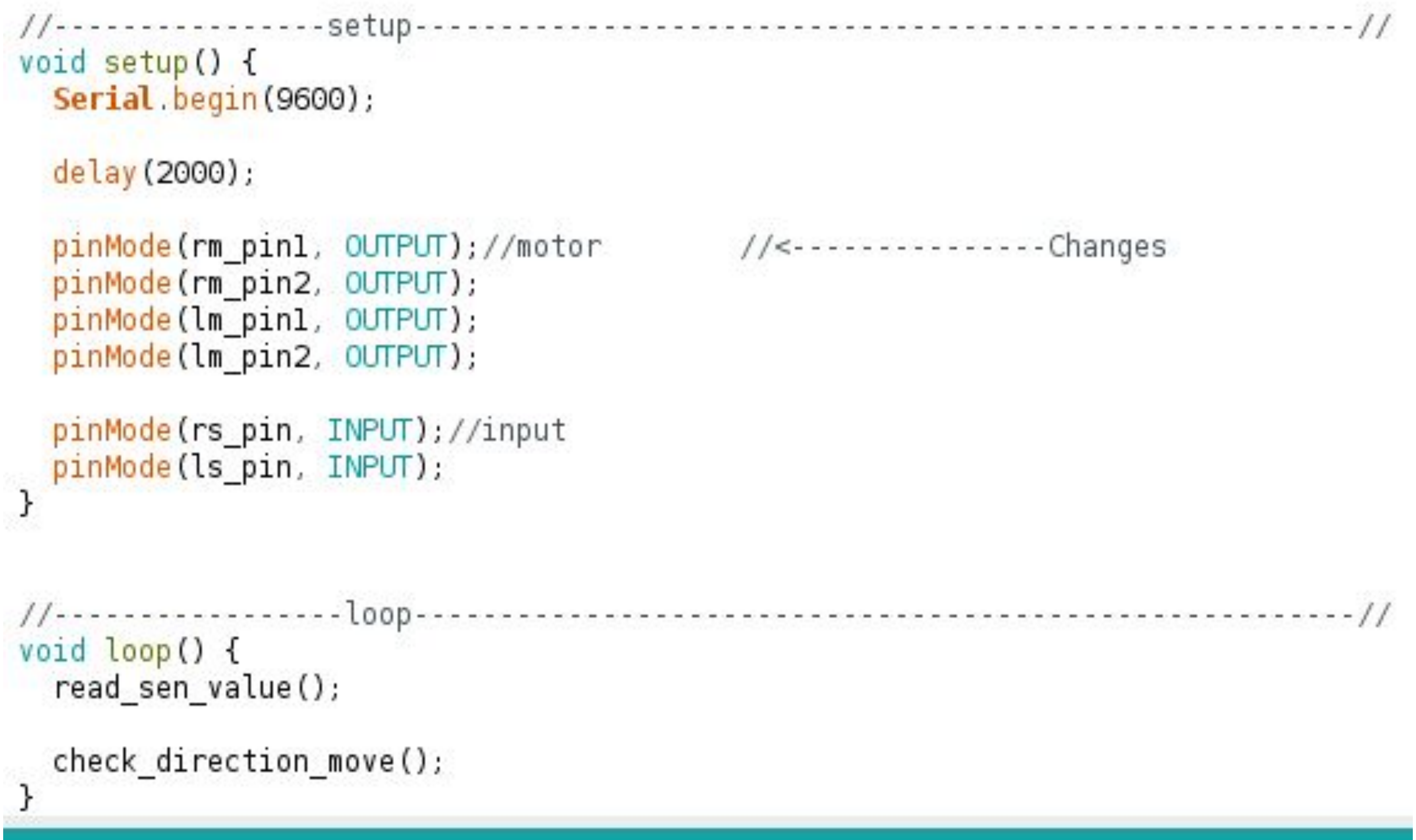
```
//--------------Global declaration---------------------------------//
//motor
int lm_pin1=2;          //<-----------------------Changes
int lm_pin2=3;
int rm_pin1=4;
int rm_pin2=5;

//sensor
int ls_pin=6;
int rs_pin=7;
int rs_value;
int ls_value;




//-------------function defination---------------------------------------//
void read_sen_value()
{
  rs_value = digitalRead(rs_pin);
  ls_value = digitalRead(ls_pin);
}
```



```
void check_direction_move()
{
  if(ls_value == 0 && rs_value == 0) //WW
  {
    forward();//forward
  }
  else if(ls_value == 0 && rs_value == 1)//WB
  {
    right();//right
  }
  else if(ls_value == 1 && rs_value == 0)//BW
  {
    left();//left
  }
  else if(ls_value == 1 && rs_value == 1)//BB
  {
    STOP();//STOP
  }

}

void forward()                      //---------------changes in all below functions
{
  digitalWrite(lm_pin1, 1);
  digitalWrite(lm_pin2, 0);
  digitalWrite(rm_pin1, 1);
  digitalWrite(rm_pin2, 0);
}
```

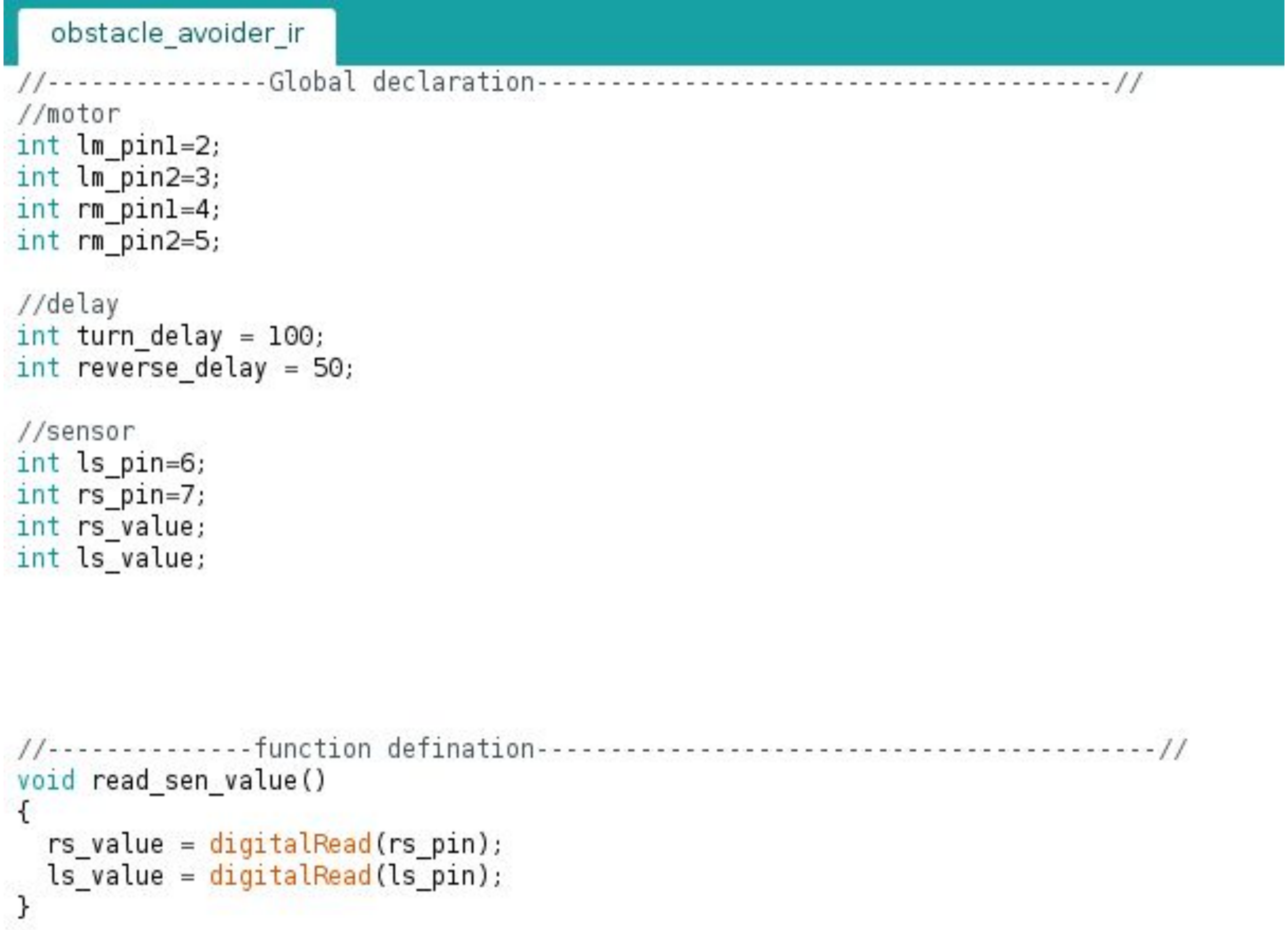


```
}
void left()
{
  digitalWrite(lm_pin1, 0);
  digitalWrite(lm_pin2, 1);
  digitalWrite(rm_pin1, 1);
  digitalWrite(rm_pin2, 0);
}
void right()
{
  digitalWrite(lm_pin1, 1);
  digitalWrite(lm_pin2, 0);
  digitalWrite(rm_pin1, 0);
  digitalWrite(rm_pin2, 1);
}
void STOP()
{
  digitalWrite(lm_pin1, 0);
  digitalWrite(lm_pin2, 0);
  digitalWrite(rm_pin1, 0);
  digitalWrite(rm_pin2, 0);
}
```

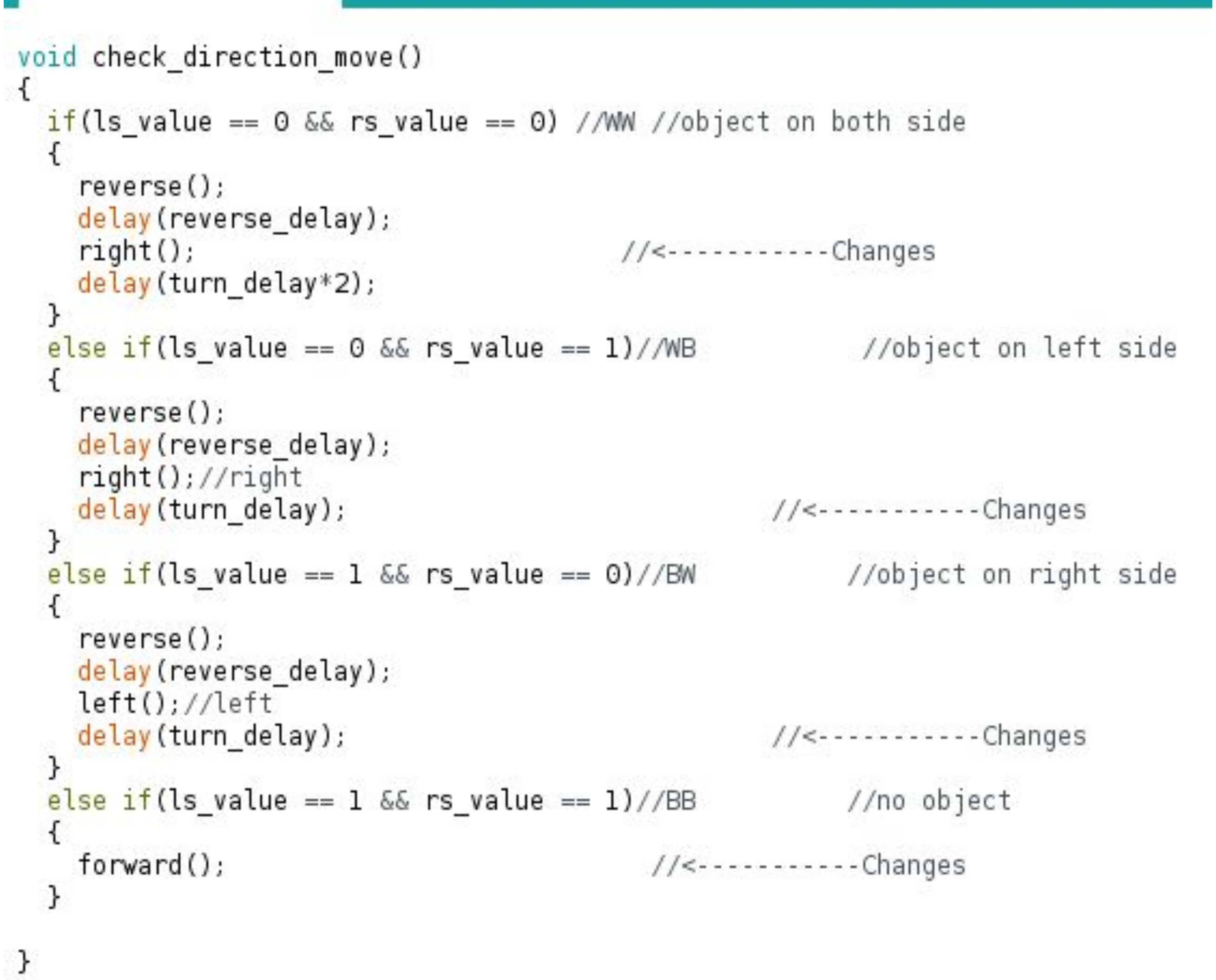


```
//----------------setup--------------------------------------------------------//
void setup() {
  Serial.begin(9600);

  delay(2000);

  pinMode(rm_pin1, OUTPUT);//motor        //<---------------Changes
  pinMode(rm_pin2, OUTPUT);
  pinMode(lm_pin1, OUTPUT);
  pinMode(lm_pin2, OUTPUT);

  pinMode(rs_pin, INPUT);//input
  pinMode(ls_pin, INPUT);
}


//-----------------loop--------------------------------------------------------//
void loop() {
  read_sen_value();

  check_direction_move();
}
```

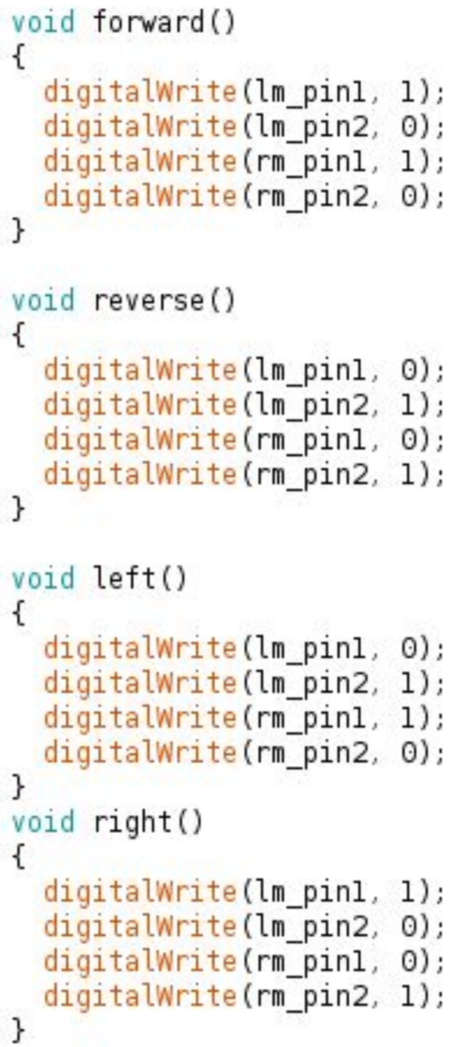
Obstacle Avoider using IR Sensor



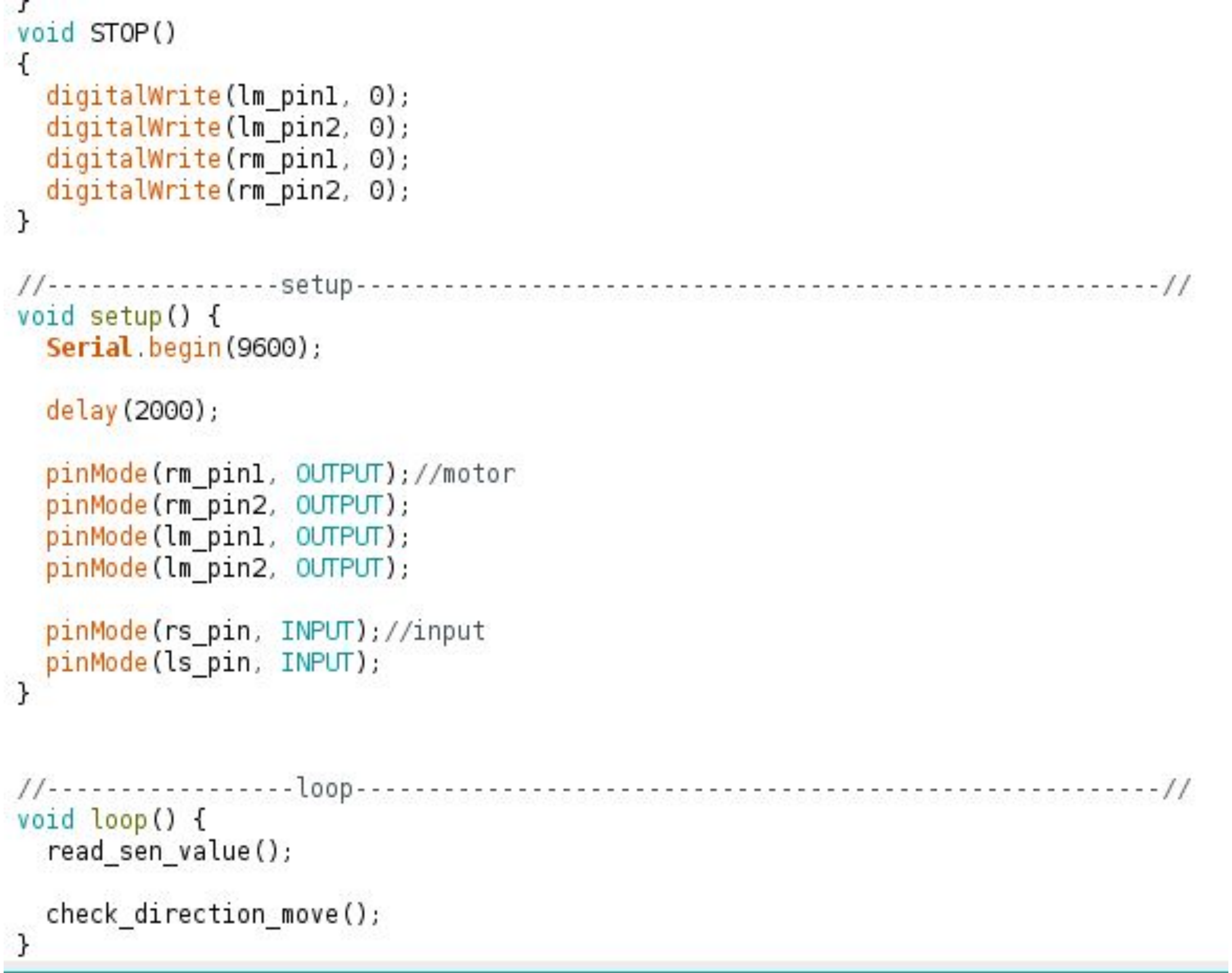
```
//--------------Global declaration----------------------------------------//
//motor
int lm_pin1=2;
int lm_pin2=3;
int rm_pin1=4;
int rm_pin2=5;

//delay
int turn_delay = 100;
int reverse_delay = 50;

//sensor
int ls_pin=6;
int rs_pin=7;
int rs_value;
int ls_value;




//-------------function defination-----------------------------------------//
void read_sen_value()
{
  rs_value = digitalRead(rs_pin);
  ls_value = digitalRead(ls_pin);
}
```



```
void check_direction_move()
{
  if(ls_value == 0 && rs_value == 0) //WW //object on both side
  {
    reverse();
    delay(reverse_delay);
    right();                            //<-----------Changes
    delay(turn_delay*2);
  }
  else if(ls_value == 0 && rs_value == 1)//WB           //object on left side
  {
    reverse();
    delay(reverse_delay);
    right();//right
    delay(turn_delay);                            //<-----------Changes
  }
  else if(ls_value == 1 && rs_value == 0)//BW          //object on right side
  {
    reverse();
    delay(reverse_delay);
    left();//left
    delay(turn_delay);                            //<-----------Changes
  }
  else if(ls_value == 1 && rs_value == 1)//BB          //no object
  {
    forward();                            //<-----------Changes
  }

}
```

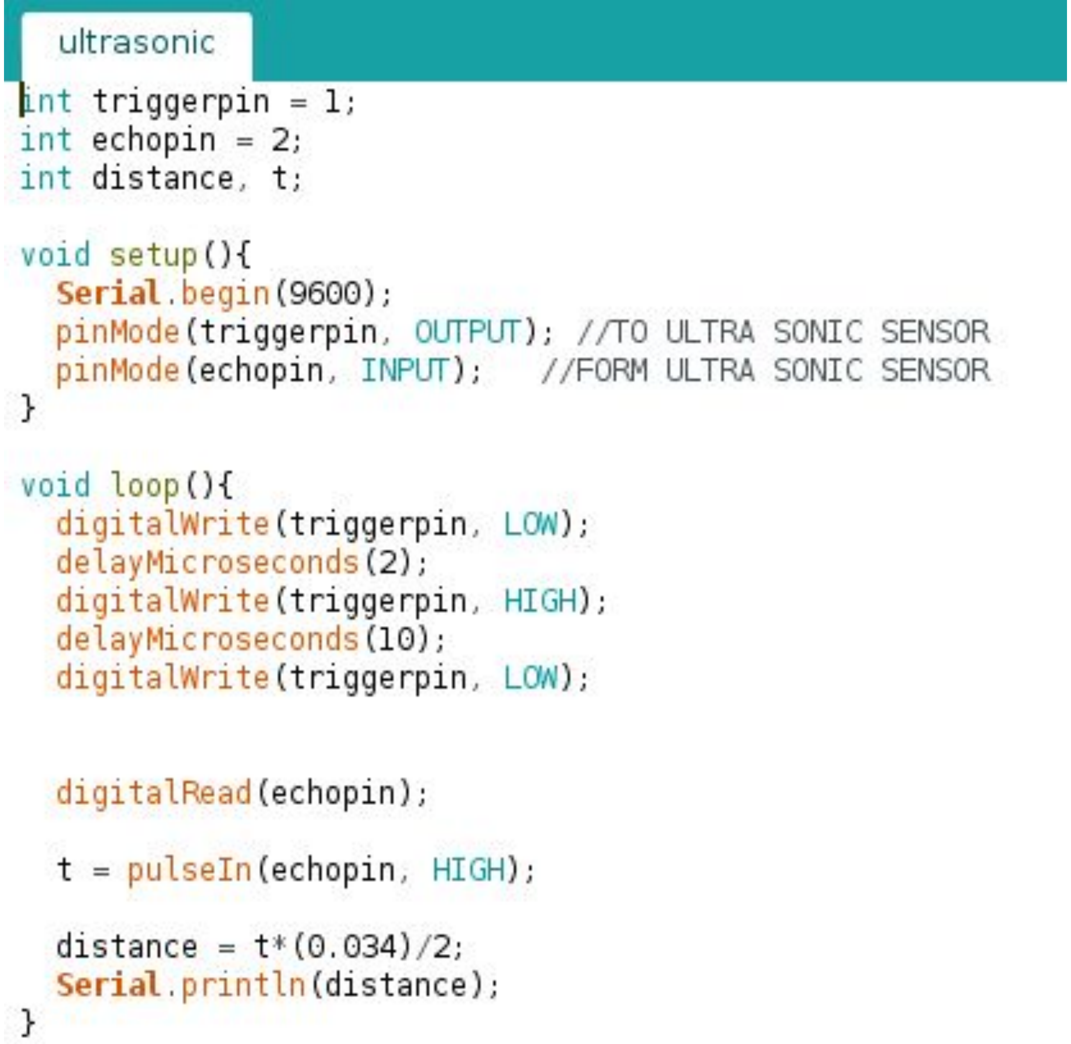


```
void forward()
{
  digitalWrite(lm_pin1, 1);
  digitalWrite(lm_pin2, 0);
  digitalWrite(rm_pin1, 1);
  digitalWrite(rm_pin2, 0);
}

void reverse()
{
  digitalWrite(lm_pin1, 0);
  digitalWrite(lm_pin2, 1);
  digitalWrite(rm_pin1, 0);
  digitalWrite(rm_pin2, 1);
}

void left()
{
  digitalWrite(lm_pin1, 0);
  digitalWrite(lm_pin2, 1);
  digitalWrite(rm_pin1, 1);
  digitalWrite(rm_pin2, 0);
}
void right()
{
  digitalWrite(lm_pin1, 1);
  digitalWrite(lm_pin2, 0);
  digitalWrite(rm_pin1, 0);
  digitalWrite(rm_pin2, 1);
}
```



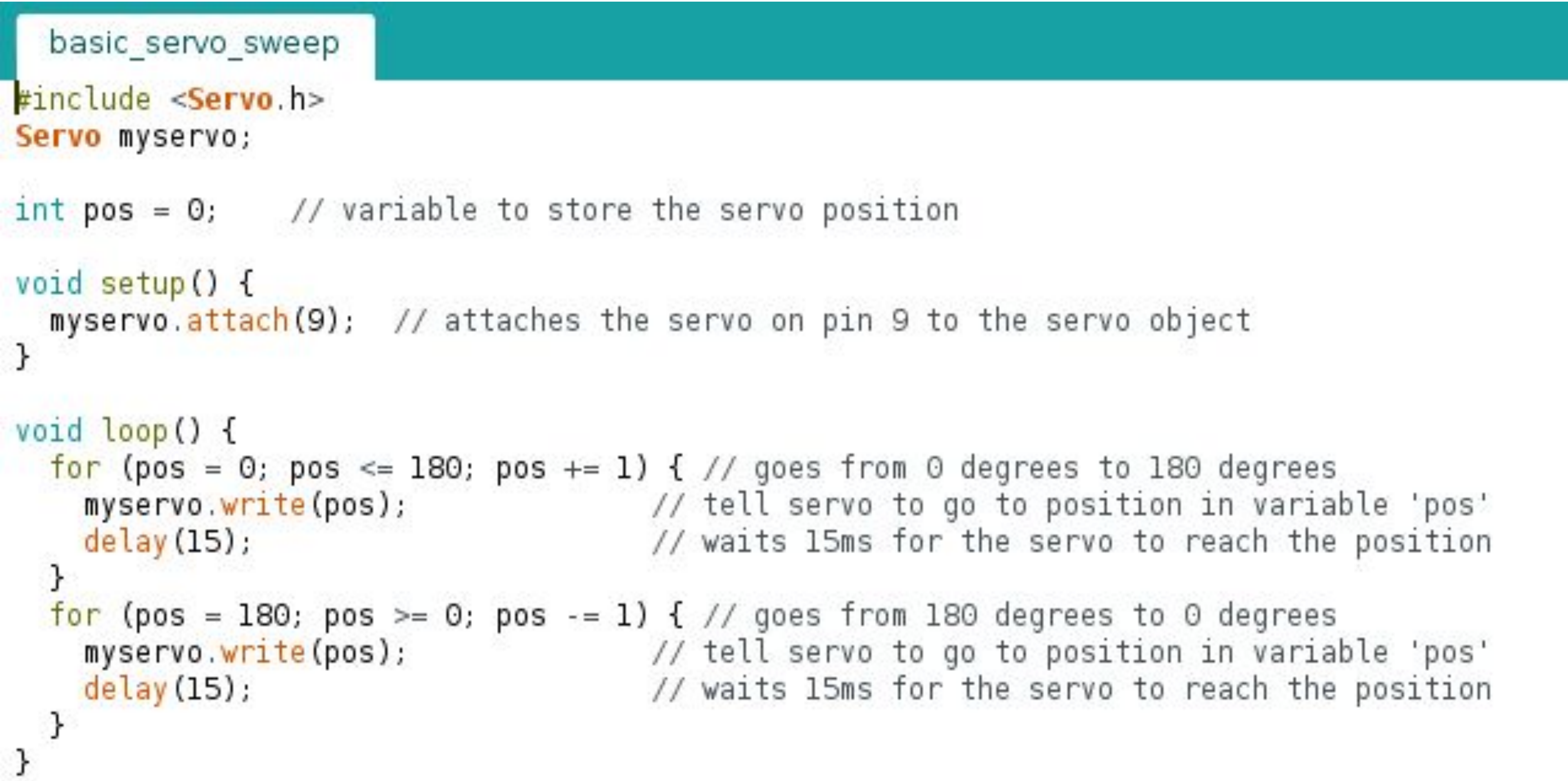
```
}
void STOP()
{
  digitalWrite(lm_pin1, 0);
  digitalWrite(lm_pin2, 0);
  digitalWrite(rm_pin1, 0);
  digitalWrite(rm_pin2, 0);
}

//---------------setup------------------------------------------------------//
void setup() {
  Serial.begin(9600);

  delay(2000);

  pinMode(rm_pin1, OUTPUT);//motor
  pinMode(rm_pin2, OUTPUT);
  pinMode(lm_pin1, OUTPUT);
  pinMode(lm_pin2, OUTPUT);

  pinMode(rs_pin, INPUT);//input
  pinMode(ls_pin, INPUT);
}


//----------------loop------------------------------------------------------//
void loop() {
  read_sen_value();

  check_direction_move();
}
```

BASIC OF ULTRASONIC SENSOR

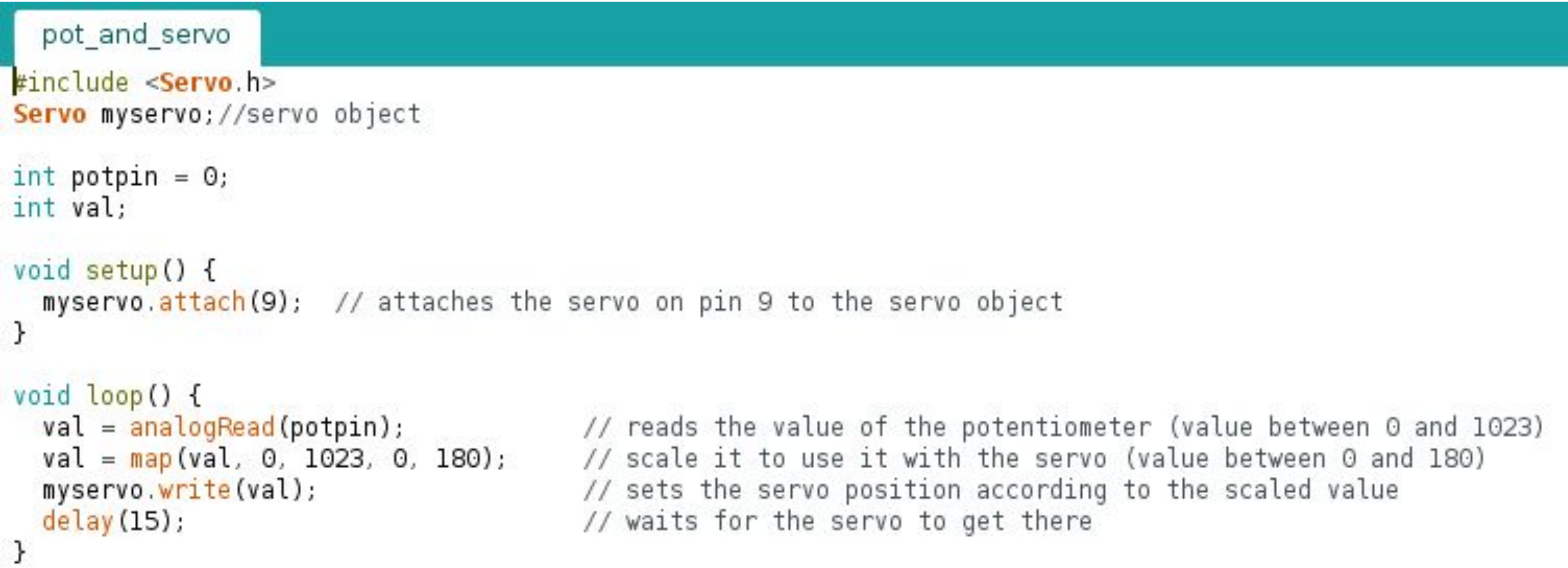


```
int triggerpin = 1;
int echopin = 2;
int distance, t;

void setup(){
  Serial.begin(9600);
  pinMode(triggerpin, OUTPUT); //TO ULTRA SONIC SENSOR
  pinMode(echopin, INPUT);   //FORM ULTRA SONIC SENSOR
}

void loop(){
  digitalWrite(triggerpin, LOW);
  delayMicroseconds(2);
  digitalWrite(triggerpin, HIGH);
  delayMicroseconds(10);
  digitalWrite(triggerpin, LOW);


  digitalRead(echopin);

  t = pulseIn(echopin, HIGH);

  distance = t*(0.034)/2;
  Serial.println(distance);
}
```

BASIC OF SERVO MOTOR

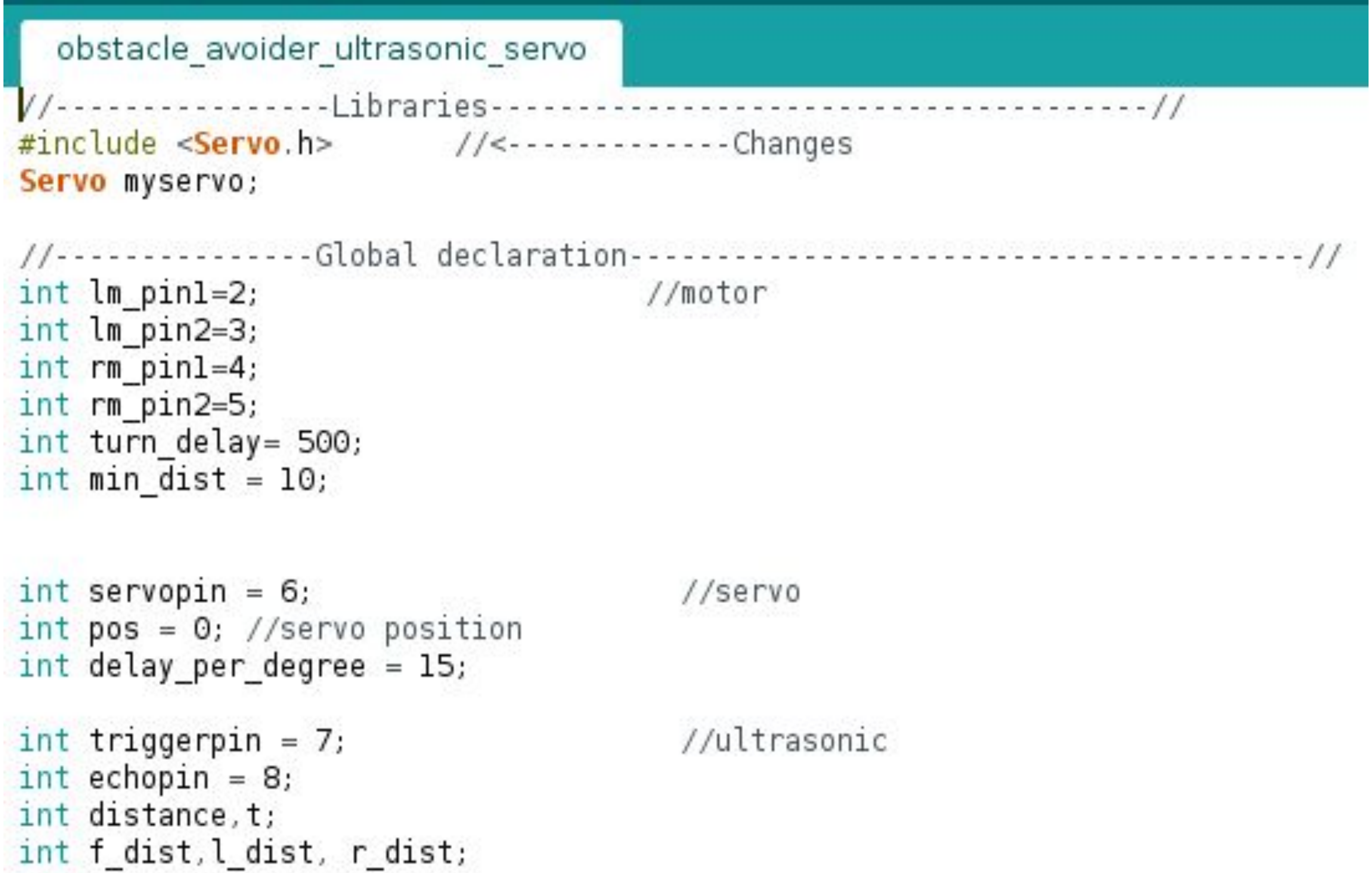


```
#include <Servo.h>
Servo myservo;

int pos = 0;    // variable to store the servo position

void setup() {
  myservo.attach(9);  // attaches the servo on pin 9 to the servo object
}

void loop() {
  for (pos = 0; pos <= 180; pos += 1) { // goes from 0 degrees to 180 degrees
    myservo.write(pos);              // tell servo to go to position in variable 'pos'
    delay(15);                       // waits 15ms for the servo to reach the position
  }
  for (pos = 180; pos >= 0; pos -= 1) { // goes from 180 degrees to 0 degrees
    myservo.write(pos);              // tell servo to go to position in variable 'pos'
    delay(15);                       // waits 15ms for the servo to reach the position
  }
}
```

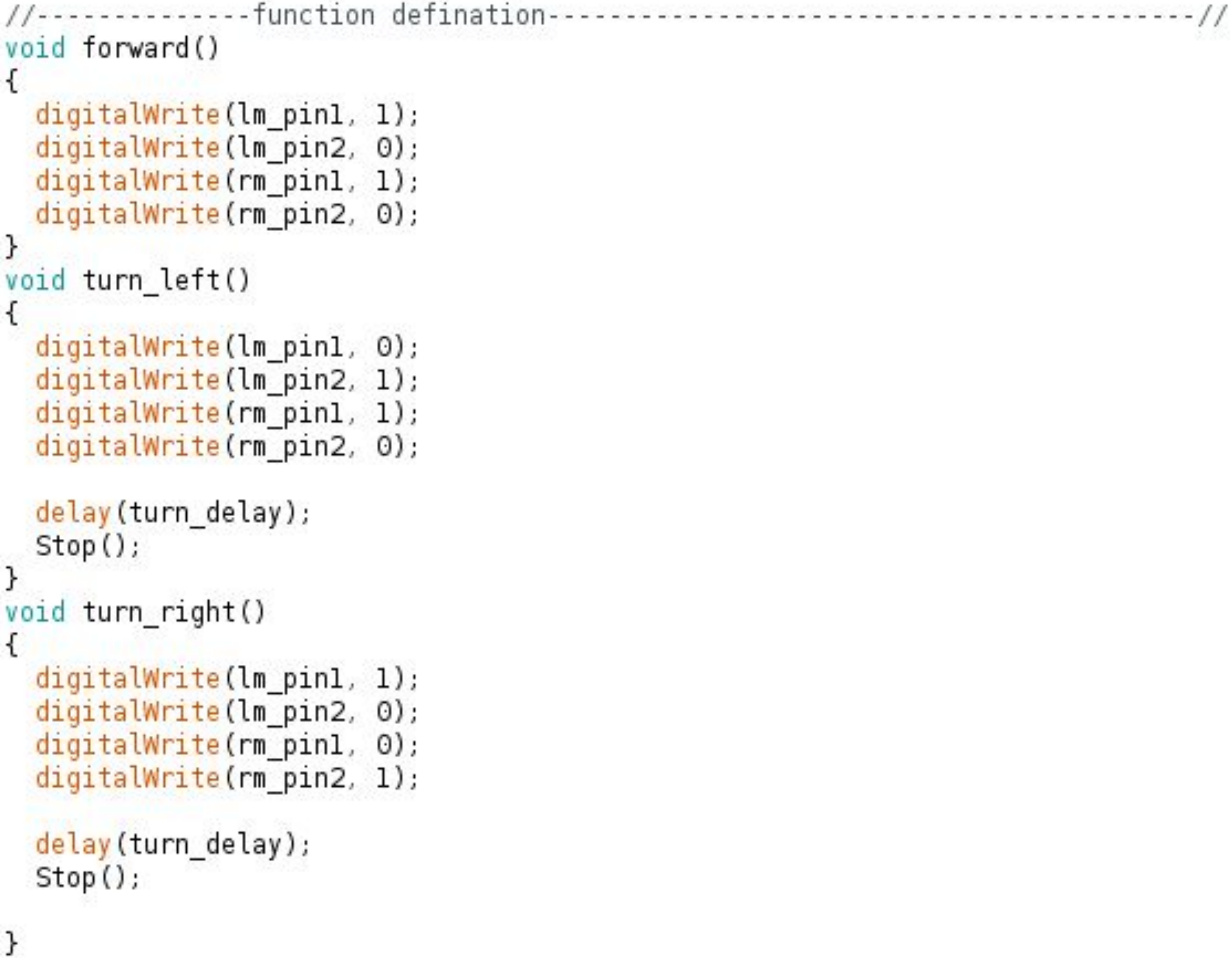


```
#include <Servo.h>
Servo myservo;//servo object

int potpin = 0;
int val;

void setup() {
  myservo.attach(9);  // attaches the servo on pin 9 to the servo object
}

void loop() {
  val = analogRead(potpin);            // reads the value of the potentiometer (value between 0 and 1023)
  val = map(val, 0, 1023, 0, 180);     // scale it to use it with the servo (value between 0 and 180)
  myservo.write(val);                  // sets the servo position according to the scaled value
  delay(15);                           // waits for the servo to get there
}
```

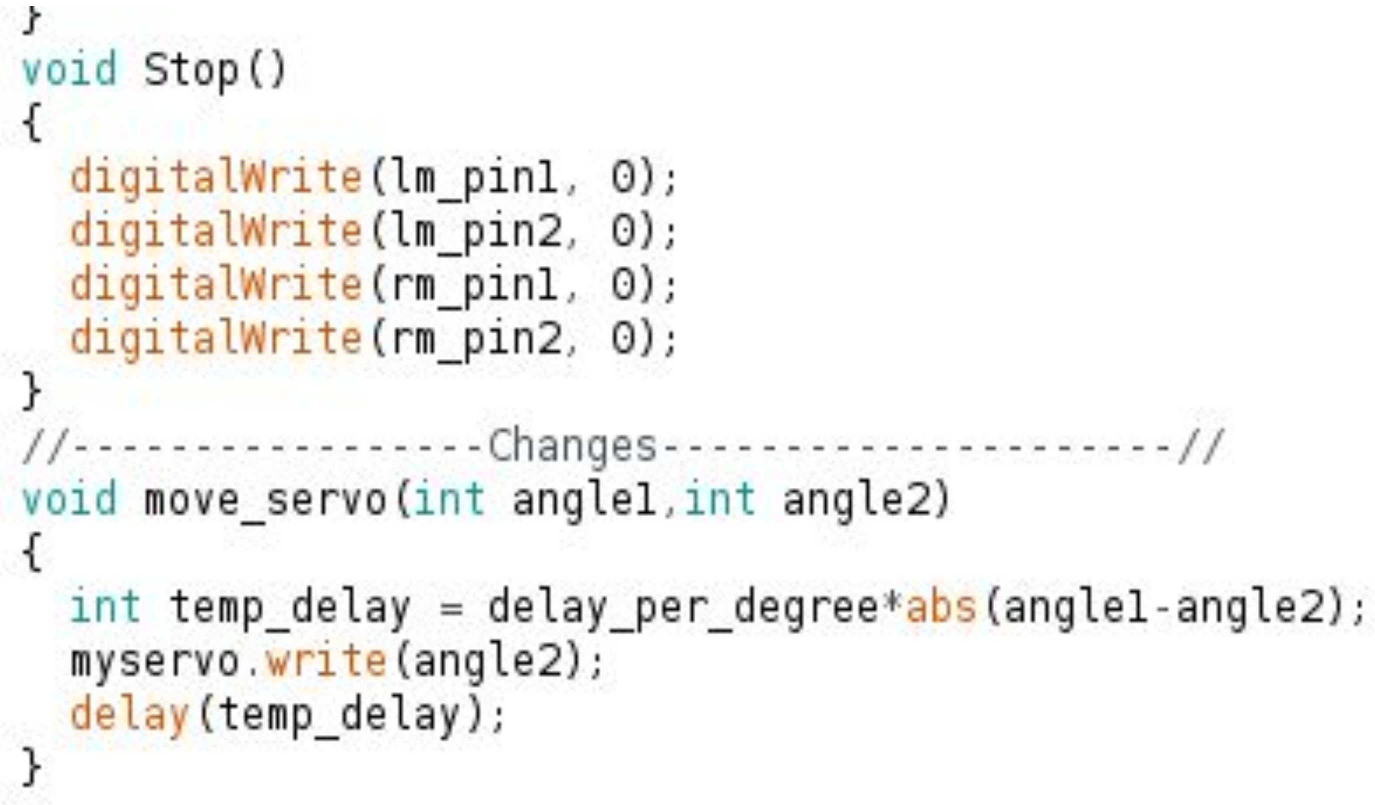
Obstacle Avoider using ultrasonic sensor and servo motor



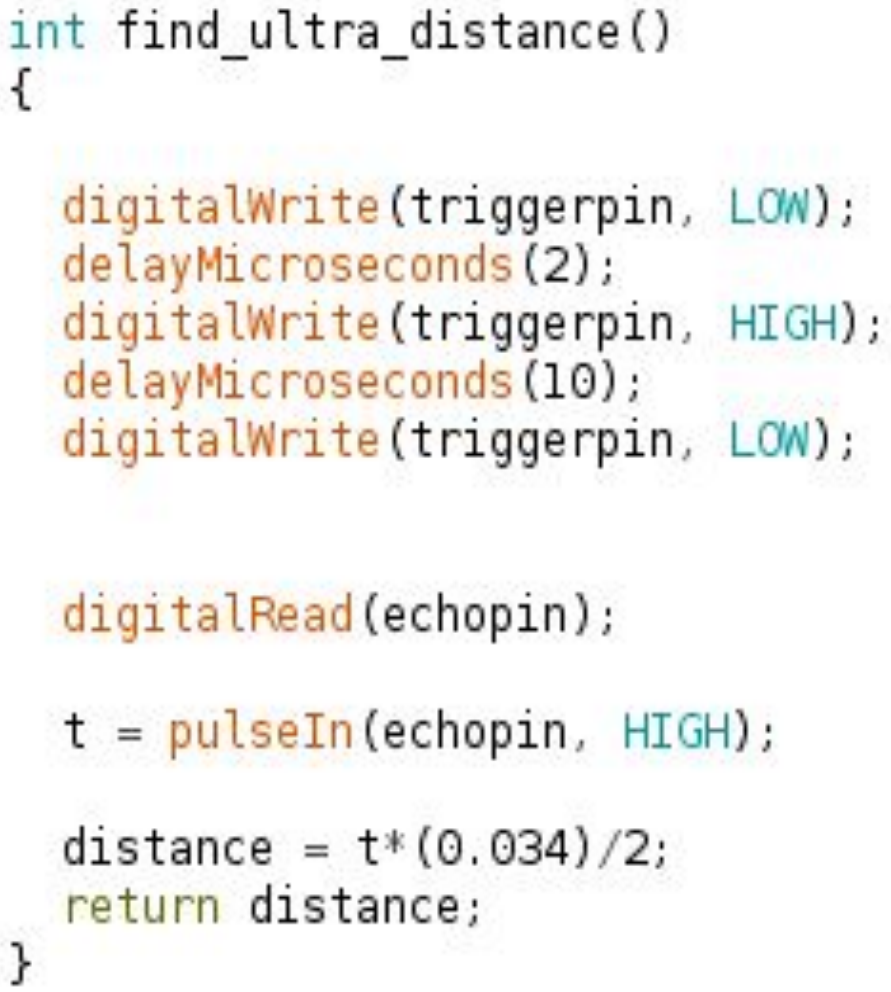
```
//----------------Libraries--------------------------------------//
#include <Servo.h>       //<-------------Changes
Servo myservo;

//---------------Global declaration---------------------------------------//
int lm_pin1=2;                      //motor
int lm_pin2=3;
int rm_pin1=4;
int rm_pin2=5;
int turn_delay= 500;
int min_dist = 10;


int servopin = 6;                     //servo
int pos = 0; //servo position
int delay_per_degree = 15;

int triggerpin = 7;                   //ultrasonic
int echopin = 8;
int distance,t;
int f_dist,l_dist, r_dist;
```



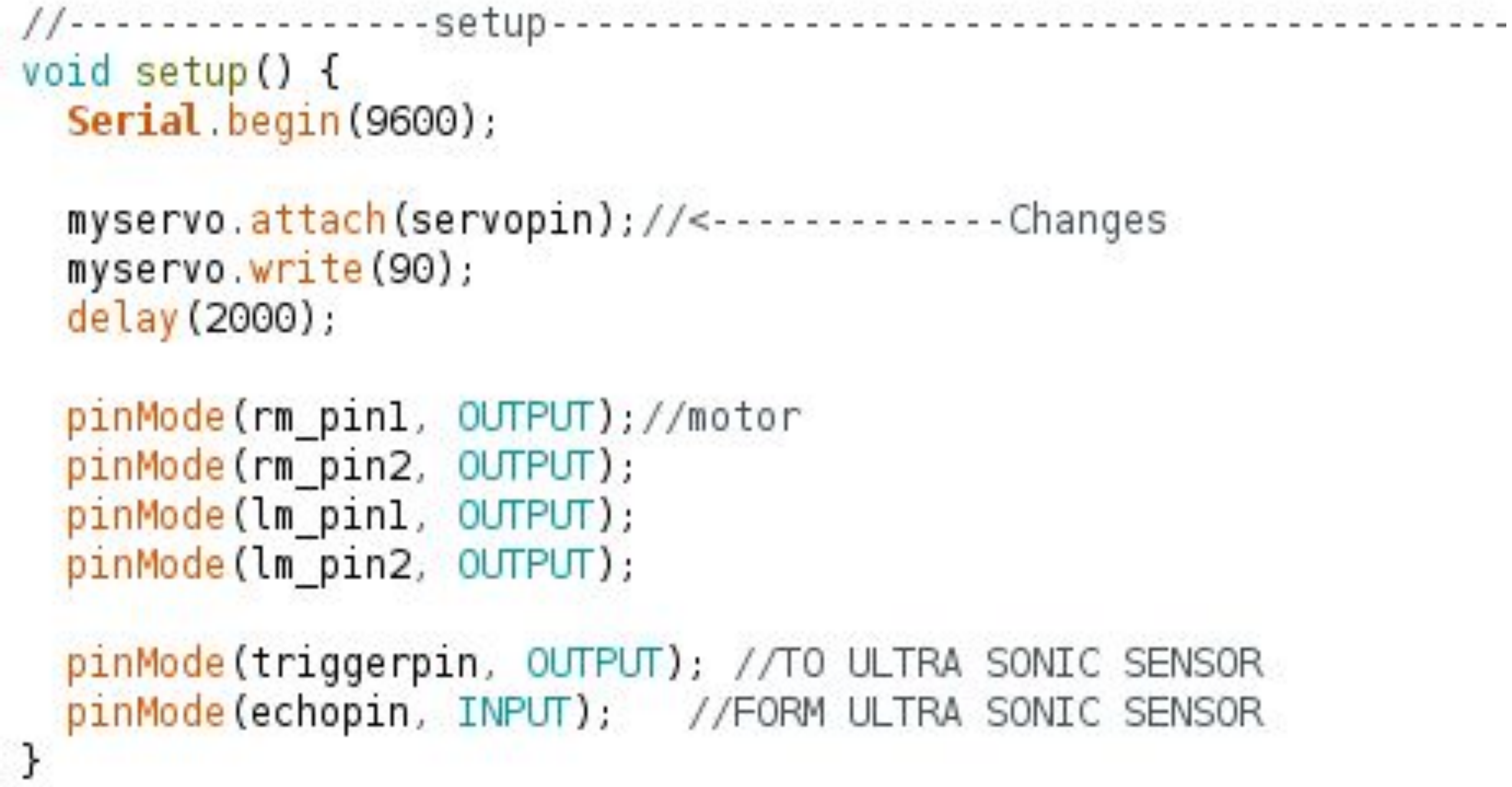
```
//--------------function defination---------------------------------------//
void forward()
{
  digitalWrite(lm_pin1, 1);
  digitalWrite(lm_pin2, 0);
  digitalWrite(rm_pin1, 1);
  digitalWrite(rm_pin2, 0);
}
void turn_left()
{
  digitalWrite(lm_pin1, 0);
  digitalWrite(lm_pin2, 1);
  digitalWrite(rm_pin1, 1);
  digitalWrite(rm_pin2, 0);

  delay(turn_delay);
  Stop();
}
void turn_right()
{
  digitalWrite(lm_pin1, 1);
  digitalWrite(lm_pin2, 0);
  digitalWrite(rm_pin1, 0);
  digitalWrite(rm_pin2, 1);

  delay(turn_delay);
  Stop();

}
```



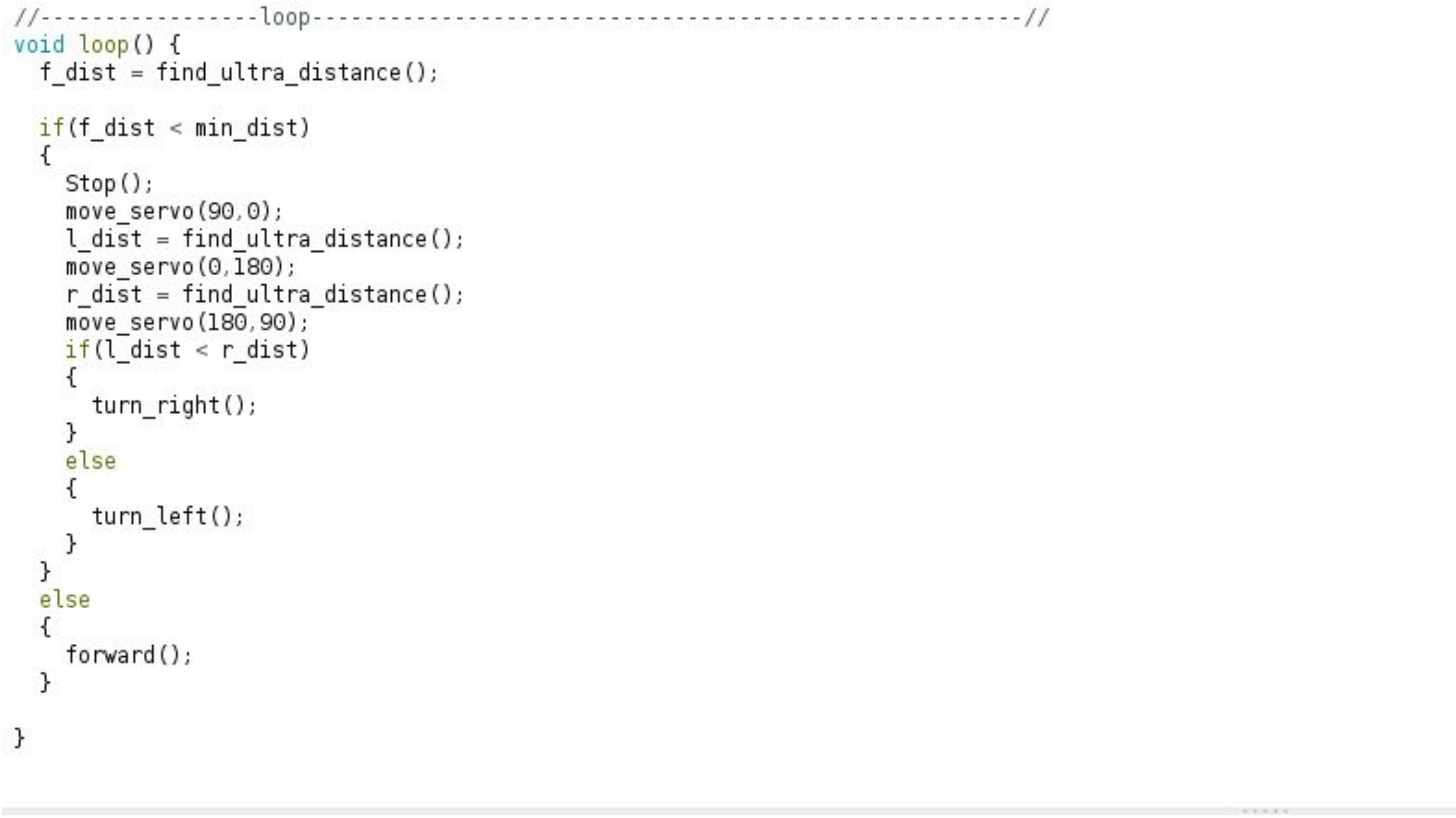
```
}
void Stop()
{
  digitalWrite(lm_pin1, 0);
  digitalWrite(lm_pin2, 0);
  digitalWrite(rm_pin1, 0);
  digitalWrite(rm_pin2, 0);
}
//-----------------Changes----------------------//
void move_servo(int angle1,int angle2)
{
  int temp_delay = delay_per_degree*abs(angle1-angle2);
  myservo.write(angle2);
  delay(temp_delay);
}
```



```
int find_ultra_distance()
{

  digitalWrite(triggerpin, LOW);
  delayMicroseconds(2);
  digitalWrite(triggerpin, HIGH);
  delayMicroseconds(10);
  digitalWrite(triggerpin, LOW);


  digitalRead(echopin);

  t = pulseIn(echopin, HIGH);

  distance = t*(0.034)/2;
  return distance;
}
```



```
//----------------setup------------------------------------------
void setup() {
  Serial.begin(9600);

  myservo.attach(servopin);//<-------------Changes
  myservo.write(90);
  delay(2000);

  pinMode(rm_pin1, OUTPUT);//motor
  pinMode(rm_pin2, OUTPUT);
  pinMode(lm_pin1, OUTPUT);
  pinMode(lm_pin2, OUTPUT);

  pinMode(triggerpin, OUTPUT); //TO ULTRA SONIC SENSOR
  pinMode(echopin, INPUT);   //FORM ULTRA SONIC SENSOR
}
```



```
//----------------loop-----------------------------------------------------//
void loop() {
  f_dist = find_ultra_distance();

  if(f_dist < min_dist)
  {
    Stop();
    move_servo(90,0);
    l_dist = find_ultra_distance();
    move_servo(0,180);
    r_dist = find_ultra_distance();
    move_servo(180,90);
    if(l_dist < r_dist)
    {
      turn_right();
    }
    else
    {
      turn_left();
    }
  }
  else
  {
    forward();
  }

}
```