

```
#include <Servo.h>

Servo myservo;

// initial Serial MSG Process

const int MSG_LENGTH = 4;

const char HEADER_R = 'R';

const char HEADER_L = 'L';

const char HEADER_P = 'P';

const char HEADER_Y = 'Y';

const char HEADER_C = 'C';

int READ_R,READ_L,READ_P,READ_Y,READ_C = 0;

int speed_min = 0; // set speed minimum value

boolean start = false;

// timer

int time_delay = 3000;

long time_m = 0;

long time_p = 0;

// initial Left Wheels H-Bridge Control Pin

int LH1 =22;

int LH2 =23;

int LH3 =24;

int LH4 =25;

int PWML =8;
```

```
// initial Right Wheels H-Bridge Control Pin

int RH1 =26;

int RH2 =27;

int RH3 =28;

int RH4 =29;

int PWMR =9;

// initial Digital Output Pin

int LASER = 31;

int FLASHLIGHT = 30;

int VIDEO = 33;

void setup(){

  Serial.begin(9600);

  Serial1.begin(9600);

  Serial2.begin(9600);

  myservo.attach(11);

  myservo.write(50);

  //TCCR4B = TCCR4B & 0b11111000 | 0x02; // PWM Frequency for pin 8

  //TCCR2B = TCCR2B & 0b11111000 | 0x02; // PWM Frequency for pin 9

  pinMode(LH1, OUTPUT);

  pinMode(LH2, OUTPUT);

  pinMode(LH3, OUTPUT);

  pinMode(LH4, OUTPUT);
```

```
pinMode(PWML, OUTPUT);
```

```
pinMode(RH1, OUTPUT);
```

```
pinMode(RH2, OUTPUT);
```

```
pinMode(RH3, OUTPUT);
```

```
pinMode(RH4, OUTPUT);
```

```
pinMode(PWMR, OUTPUT);
```

```
pinMode(LASER, OUTPUT);
```

```
pinMode(FLASHLIGHT, OUTPUT);
```

```
pinMode(VIDEO, OUTPUT);
```

```
Serial.println("Welcome Back, Ready to Recieve Command");
```

```
}
```

```
void loop(){
```

```
int command_valid = processSerial(); // try to an get a message
```

```
time_m = millis();
```

```
if(time_m - time_p > time_delay || start == false)
```

```
{
```

```
  m_stop();
```

```
}
```

```
if(start == true){
```

```
  digitalout();
```

```

}else{

  digitalWrite();

}

// Start Control When Command > 0 //
if(command_valid > 0 && start == true){

  time_p = time_m;

  // Control Left Wheel

  if( READ_L >= 400 && READ_L <= 500 ) // is 200 - 300 range ? // FW
  {

    int ispeed = READ_L - 400;

    ispeed = map(ispeed, 0, 100, speed_min, 255);

    analogWrite(PWML, 0);

    digitalWrite(LH2, LOW);

    digitalWrite(LH3, LOW);

    digitalWrite(LH1, HIGH);

    digitalWrite(LH4, HIGH);

    analogWrite(PWML, ispeed);

    //Serial.print("Left PWM Duty ");

    //Serial.println(ispeed);

  }

  else if( READ_L >= 200 && READ_L <= 300 ) // is 400 - 500 range ? // RW
  {

    int ispeed = READ_L - 200;

    ispeed = map(ispeed, 0, 100, speed_min, 255);

```

```
    analogWrite(PWML, 0);
    digitalWrite(LH1, LOW);
    digitalWrite(LH4, LOW);
    digitalWrite(LH2, HIGH);
    digitalWrite(LH3, HIGH);
    analogWrite(PWML, ispeed);
    //Serial.print("Left PWM Duty ");
    //Serial.println(ispeed);
}
else{
    digitalWrite(LH1, LOW);
    digitalWrite(LH2, LOW);
    digitalWrite(LH3, LOW);
    digitalWrite(LH4, LOW);
    analogWrite(PWML, 0);
}

// Control Right Wheel
if( READ_R >= 400 && READ_R <= 500 ) // is 200 - 300 range ? // FW
{
    int ispeed = READ_R - 400;
    ispeed = map(ispeed, 0, 100, speed_min, 255);
    analogWrite(PWML, 0);
    digitalWrite(RH2, LOW);
    digitalWrite(RH3, LOW);
```

```
digitalWrite(RH1, HIGH);

digitalWrite(RH4, HIGH);

analogWrite(PWMR, ispeed);

//Serial.print("Right PWM Duty ");

//Serial.println(ispeed);

}

else if( READ_R >= 200 && READ_R <= 300 ) // is 400 - 500 range ? // RW

{

    int ispeed = READ_R - 200;

    ispeed = map(ispeed, 0, 100, speed_min, 255);

    analogWrite(PWMR, 0);

    digitalWrite(RH1, LOW);

    digitalWrite(RH4, LOW);

    digitalWrite(RH2, HIGH);

    digitalWrite(RH3, HIGH);

    analogWrite(PWMR, ispeed);

    //Serial.print("Right PWM Duty ");

    //Serial.println(ispeed);

}

else{

    digitalWrite(RH1, LOW);

    digitalWrite(RH2, LOW);

    digitalWrite(RH3, LOW);

    digitalWrite(RH4, LOW);

    analogWrite(PWMR, 0);
```

```

    }
    } // end if Command > 0 //

} // end void loop

int processSerial()
{
    while(Serial.available() >= MSG_LENGTH ) // process messages when all characters are received
    {
        char check = Serial.read();

        if( check == 'S'){start = true;}

        if( check == 'T'){start = false;}

        if( check == HEADER_L || check == HEADER_R || check == HEADER_P || check == HEADER_Y || check
        == HEADER_C)
        {
            int val = 0;

            for(int i =0; i < MSG_LENGTH-1; i++)
            {
                char ch = Serial.read();

                if(ch >= '0' && ch <= '9'){                // is ch a number?

                    val = val * 10 + ch - '0';                // yes, accumulate the value

                }

            }

            if( check == HEADER_R ) { READ_R = val; return 1;}

```

```
if( check == HEADER_L ) { READ_L = val; return 1;}

if( check == HEADER_C ) { READ_C = val;}

if( check == HEADER_P && start == true ){

READ_P = val;

Serial1.print("P");

Serial1.print(READ_P);

return -1;

}

if( check == HEADER_Y && start == true ){

READ_Y = val;

Serial2.print("Y");

Serial2.print(READ_Y);

return -1;

}

}

}

return -1; // return -1 if nothing recieve

}
```

```
void m_stop()

{

digitalWrite(LH1, LOW);

digitalWrite(LH2, LOW);
```



```
digitalWrite(LH3, LOW);  
digitalWrite(LH4, LOW);  
analogWrite(PWML, 0);  
digitalWrite(RH1, LOW);  
digitalWrite(RH2, LOW);  
digitalWrite(RH3, LOW);  
digitalWrite(RH4, LOW);  
analogWrite(PWMR, 0);  
  
READ_R =0;  
READ_L =0;  
}
```

```
void digitalout(){  
  
  if(READ_C == 131){digitalWrite(LASER, HIGH);}  
  if(READ_C == 231){digitalWrite(LASER, LOW);}  
  if(READ_C == 130){digitalWrite(FLASHLIGHT, HIGH);}  
  if(READ_C == 230){digitalWrite(FLASHLIGHT, LOW);}  
  if(READ_C == 133){digitalWrite(VIDEO, HIGH);}  
  if(READ_C == 233){digitalWrite(VIDEO, LOW);}  
  if(READ_C == 555){myservo.write(50);}  
  if(READ_C == 999){myservo.write(125);}  
}
```

```
void digitaloff(){  
  
  digitalWrite(LASER, LOW);
```

```
digitalWrite(FLASHLIGHT, LOW);
```

```
digitalWrite(VIDEO, LOW);
```

```
myservo.write(50);
```

```
}
```