**PRACTICE 2: MODERN IOT**

**1 Analog vs Digital**

**A blue circuit board with wires and a black cable

AI-generated content may be incorrect.**

**Code**

void setup(){ pinMode(2, OUTPUT);

pinMode(3, OUTPUT);

digitalWrite(2, HIGH);

}

void loop(){

for(int i = 0; i < 255; i += 5){ analogWrite(3, i);

delay(100);

}

}

**2- Motor Controller**

**A circuit board with wires and wires

AI-generated content may be incorrect.**

**2.1 Left Motor Controller**

void setup() {

pinMode(8, OUTPUT);

pinMode(11,OUTPUT);

pinMode(9, OUTPUT);

}

void loop() {

digitalWrite(11, HIGH);

digitalWrite(8, LOW);

analogWrite(9, 100);

}

void left\_speed(int speed) {

if (speed >= 0) {

digitalWrite(11, HIGH);

digitalWrite(8, LOW);

analogWrite(9, speed);

} else {

speed = 0 - speed;

digitalWrite(8, HIGH);

digitalWrite(11, LOW);

analogWrite(9, speed);

}

}

**2.2 Left Motor Testing**

void setup() {

pinMode (8, OUTPUT);

pinMode (11, OUTPUT);

pinMode (9, OUTPUT);

}

void left\_speed(int speed) {

if (speed >= 0) {

digitalWrite(11, HIGH);

digitalWrite(8, LOW);

analogWrite(9, speed); }

else {

speed = 0 - speed;

digitalWrite(8, HIGH);

digitalWrite(11, LOW);

analogWrite(9, speed); }

}

void loop() {

digitalWrite(11, HIGH);

digitalWrite(8, LOW);

analogWrite(9,100); }

**2.3 Right Motor Testing**

void setup() {

pinMode (8, OUTPUT);

pinMode (11, OUTPUT);

pinMode (9, OUTPUT);

pinMode (12, OUTPUT);

pinMode (13, OUTPUT);

pinMode (10, OUTPUT);

}

void right\_speed (int speed) {

if (speed >= 0) {

digitalWrite(13, HIGH);

digitalWrite(12, LOW);

analogWrite(10, speed); }

else {

speed = 0 - speed;

digitalWrite(13, HIGH);

digitalWrite(12, LOW);

analogWrite(10, speed); }

}

void loop() {

digitalWrite(13, HIGH);

digitalWrite(12, LOW);

analogWrite(10,100); }

**2.4 Full Motor Control Functions**

void forward (int speed) {

left\_speed(speed);

right\_speed(speed);

}

void backward (int speed) {

left\_speed(0 - speed);

right\_speed(0 - speed);

}

void turnleft (int speed) {

left\_speed(0);

right\_speed(speed);

}

void turnright (int speed) {

left\_speed(speed);

right\_speed(0);

}

**2.5 Full Motor Testing**

void setup()

{

pinMode (8, OUTPUT);

pinMode (11, OUTPUT);

pinMode (9, OUTPUT);

pinMode (12, OUTPUT);

pinMode (13, OUTPUT);

pinMode (10, OUTPUT);

}

void left\_speed(int speed) {

if (speed >= 0) {

digitalWrite(11, HIGH);

digitalWrite(8, LOW);

analogWrite(9, speed);

} else {

speed = 0 - speed;

digitalWrite(8, HIGH);

digitalWrite(11, LOW);

analogWrite(9, speed);

}

}

void right\_speed(int speed) {

if (speed >= 0) {

digitalWrite(13, HIGH);

digitalWrite(12, LOW);

analogWrite(10, speed);

} else {

speed = 0 - speed;

digitalWrite(12, HIGH);

digitalWrite(13, LOW);

analogWrite(10, speed);

}

}

void forward (int speed) {

left\_speed(speed);

right\_speed(speed);

}

void backward (int speed) {

left\_speed(0 - speed);

right\_speed(0 - speed);

}

void turnleft (int speed) {

left\_speed(0);

right\_speed(speed);

}

void turnright (int speed) {

left\_speed(speed);

right\_speed(0);

}

void loop() {

forward(100);

delay(2000);

turnleft(100);

delay(2000);

backward(100);

delay(2000);

turnright(100);

delay(2000);

}

**3 Serial Monitor**

void setup(){

Serial.begin(9600);

}

void loop(){

Serial.println("Hello TinkerCad");

delay(1000);

}

A screenshot of a computer monitor

AI-generated content may be incorrect.

void setup() {

Serial.begin(9600); // Khởi động Serial Monitor với tốc độ 9600 baud

}

void loop() {

if (Serial.available()) { // Nếu có dữ liệu từ PC gửi tới

char temp = Serial.read(); // Đọc ký tự từ Serial

Serial.print("I received: "); // Gửi phản hồi đến PC

Serial.println(temp);

}

}

A screenshot of a computer monitor

AI-generated content may be incorrect.

**3.1 LED Controller 1**

**A blue circuit board with black and white buttons

AI-generated content may be incorrect.**

void setup() {

Serial.begin(9600);

pinMode(13, OUTPUT);

}

void loop() {

if (Serial.available()) {

char temp = Serial.read();

Serial.print("I received: ");

Serial.println(temp);

if (temp == 'O') {

digitalWrite(13, HIGH);

}

}

}

**3.2 LED Controller 2**

**A computer screen shot of a circuit board

AI-generated content may be incorrect.**

**A blue circuit board with a green wire

AI-generated content may be incorrect.**

void setup(){

Serial.begin(115200);

pinMode (13, OUTPUT);

}

void loop() {

if(Serial.available()){

char temp = Serial.read();

Serial.print("I received: ");

Serial.println(temp);if(temp == 111){

digitalWrite(13, LOW);

delay(2000);

}

if(temp == 102){

digitalWrite(13, HIGH);

}

}

}