

Project 1 :

```
int speedL = 10;
int IN1= 9;
int IN2 = 8;
int IN3= 7;
int IN4 = 6;
int speedR = 5;

void setup() {
    Serial.begin(9600);
    for (int i = 5; i <= 10; i++) {
        pinMode(i, OUTPUT);
    }
}

void forward() {
    digitalWrite(IN1, HIGH);
    digitalWrite(IN2, LOW);
    digitalWrite(IN3, HIGH);
    digitalWrite(IN4, LOW);
    analogWrite(speedL, 150);
    analogWrite(speedR, 150);
}

void backword() {
    digitalWrite(IN1, LOW);
    digitalWrite(IN2, HIGH);
    digitalWrite(IN3, LOW);
    digitalWrite(IN4, HIGH);
    analogWrite(speedL, 150);
    analogWrite(speedR, 150);
}

void left() {
    digitalWrite(IN1, LOW);
    digitalWrite(IN2, LOW);
    digitalWrite(IN3, HIGH);
    digitalWrite(IN4, LOW);
    analogWrite(speedL, 0);
    analogWrite(speedR, 150);
}

void right() {
    digitalWrite(IN1, HIGH);
    digitalWrite(IN2, LOW);
    digitalWrite(IN3, LOW);
    digitalWrite(IN4, LOW);
    analogWrite(speedL, 150);
    analogWrite(speedR, 0);
}

void stopp() {
    digitalWrite(IN1, LOW);
    digitalWrite(IN2, LOW);
    digitalWrite(IN3, LOW);
    digitalWrite(IN4, LOW);
    analogWrite(speedL, 0);
    analogWrite(speedR, 0);
}
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void loop() {
    forward();
    delay(1000); // Move forward for 1 second
    backward();
    delay(1000); // Move backward for 1 second
    right();
    delay(1000); // Turn right for 1 second
    left();
    delay(1000); // Turn left for 1 second
    stopp();
    delay(1000); // Stop for 1 second
}

```

Project 2 :

```

int speedL = 10;
int IN1 = 9;
int IN2 = 8;
int IN3 = 7;
int IN4 = 6;
int speedR = 5;
char Reading;

void setup() {
    Serial.begin(9600);
    for (int i = 5; i <= 10; i++) {
        pinMode(i, OUTPUT);
    }
}

void forward() {
    digitalWrite(IN1, HIGH);
    digitalWrite(IN2, LOW);
    digitalWrite(IN3, HIGH);
    digitalWrite(IN4, LOW);
    analogWrite(speedL, 150);
    analogWrite(speedR, 150);
}

void backward() {
    digitalWrite(IN1, LOW);
    digitalWrite(IN2, HIGH);
    digitalWrite(IN3, LOW);
    digitalWrite(IN4, HIGH);
    analogWrite(speedL, 150);
    analogWrite(speedR, 150);
}

void left() {
    digitalWrite(IN1, LOW);
    digitalWrite(IN2, LOW);
    digitalWrite(IN3, HIGH);
    digitalWrite(IN4, LOW);
    analogWrite(speedL, 0);
    analogWrite(speedR, 150);
}

void right() {
    digitalWrite(IN1, HIGH);
    digitalWrite(IN2, LOW);
    digitalWrite(IN3, LOW);
}

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        digitalWrite(IN4, LOW);
        analogWrite(speedL, 150);
        analogWrite(speedR, 0);
    }

    void stopp() {
        digitalWrite(IN1, LOW);
        digitalWrite(IN2, LOW);
        digitalWrite(IN3, LOW);
        digitalWrite(IN4, LOW);
        analogWrite(speedL, 0);
        analogWrite(speedR, 0);
    }

    void loop() {
        if (Serial.available() > 0) {
            Reading = Serial.read();
            switch (Reading) {
                case 'F': forward(); break;
                case 'B': backward(); break;
                case 'R': right(); break;
                case 'L': left(); break;
                case 'S': stopp(); break;
            }
        }
    }
}

```

Project 3 :

```

int speedL = 10;
int IN1 = 9;
int IN2 = 8;
int IN3 = 7;
int IN4 = 6;
int speedR = 5;
int sensorL = 4;
int sensorR = 3;

void setup() {
    pinMode(speedL, OUTPUT);
    pinMode(speedR, OUTPUT);
    pinMode(IN1, OUTPUT);
    pinMode(IN2, OUTPUT);
    pinMode(IN3, OUTPUT);
    pinMode(IN4, OUTPUT);

    pinMode(sensorL, INPUT);
    pinMode(sensorR, INPUT);
}

void loop() {
    int sl = digitalRead(sensorL);
    int sr = digitalRead(sensorR);

    if (sl == 0 && sr == 0) {
        moveForward();
    }
    else if (sl == 1 && sr == 0) {
        turnRight();
    }
    else if (sl == 0 && sr == 1) {

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        turnLeft();
    }
    else {
        stopMotors();
    }
}

void moveForward() {
    analogWrite(speedL, 90);
    analogWrite(speedR, 90);
    digitalWrite(IN1, HIGH);
    digitalWrite(IN2, LOW);
    digitalWrite(IN3, HIGH);
    digitalWrite(IN4, LOW);
}

void turnRight() {
    analogWrite(speedL, 90);
    analogWrite(speedR, 0);
    digitalWrite(IN1, HIGH);
    digitalWrite(IN2, LOW);
    digitalWrite(IN3, LOW);
    digitalWrite(IN4, LOW);
}

void turnLeft() {
    analogWrite(speedL, 0);
    analogWrite(speedR, 90);
    digitalWrite(IN1, LOW);
    digitalWrite(IN2, LOW);
    digitalWrite(IN3, HIGH);
    digitalWrite(IN4, LOW);
}

void stopMotors() {
    analogWrite(speedL, 0);
    analogWrite(speedR, 0);
    digitalWrite(IN1, LOW);
    digitalWrite(IN2, LOW);
    digitalWrite(IN3, LOW);
    digitalWrite(IN4, LOW);
}

```

Project 4 :

```

int speedL = 10;
int IN1 = 9;
int IN2 = 8;
int IN3 = 7;
int IN4 = 6;
int speedR = 5;
int trig = 3;
int echo = 4;
long duration, distance;

void setup() {
    Serial.begin(9600); // Initialize serial communication
    for (int i = 5; i <= 11; i++) {
        pinMode(i, OUTPUT);
    }
    pinMode(echo, INPUT);
}

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    pinMode(trig , OUTPUT);
}

void Ultrasonic() {
    digitalWrite(trig, LOW);
    delayMicroseconds(2);
    digitalWrite(trig, HIGH);
    delayMicroseconds(10);
    digitalWrite(trig, LOW);
    duration = pulseIn(echo, HIGH);
    distance = (duration / 2) * 0.0343;

    // Print the distance to the Serial Monitor
    Serial.print("Distance: ");
    Serial.print(distance);
    Serial.println(" cm");
}

void forward() {
    digitalWrite(IN1, HIGH);
    digitalWrite(IN2, LOW);
    digitalWrite(IN3, HIGH);
    digitalWrite(IN4, LOW);
    analogWrite(speedL, 120); // Reduced speed
    analogWrite(speedR, 120); // Reduced speed
}

void backward() {
    digitalWrite(IN1, LOW);
    digitalWrite(IN2, HIGH);
    digitalWrite(IN3, LOW);
    digitalWrite(IN4, HIGH);
    analogWrite(speedL, 120); // Reduced speed
    analogWrite(speedR, 120); // Reduced speed
}

void left() {
    digitalWrite(IN1, LOW);
    digitalWrite(IN2, LOW);
    digitalWrite(IN3, HIGH);
    digitalWrite(IN4, LOW);
    analogWrite(speedL, 0);
    analogWrite(speedR, 120); // Reduced speed
}

void right() {
    digitalWrite(IN1, HIGH);
    digitalWrite(IN2, LOW);
    digitalWrite(IN3, LOW);
    digitalWrite(IN4, LOW);
    analogWrite(speedL, 120); // Reduced speed
    analogWrite(speedR, 0);
}

void stopp() {
    digitalWrite(IN1, LOW);
    digitalWrite(IN2, LOW);
    digitalWrite(IN3, LOW);
    digitalWrite(IN4, LOW);
    analogWrite(speedL, 0);
    analogWrite(speedR, 0);
}

```

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}

void loop() {
  Ultrasonic();
  if (distance < 20) {
    Serial.println("Obstacle detected! Stopping...");
    stopp();
    delay(250);
    Serial.println("Moving backward...");
    backward();
    delay(500);
    Serial.println("Turning right...");
    right();
    delay(1000);
  } else {
    Serial.println("Moving forward...");
    forward();
  }
}
```