LAMPIRAN

Koding Utama Arduino IDE :

```
//==============Loadcel
#include "HX711.h"
#define DOUT  A13
#define CLK  A12
#define Tombol 10
int tombol = 0;
HX711 scale(DOUT, CLK);
float calibration_factor = 885.50;
int GRAM;
int kunciGRAM = 0;
int logicGRAM = 0;
int hitungBerat = 0;
int logicSTOP = 0;
//================Motor
#define arah1a 3
#define arah2a 4
#define pwm1 2
#define arah1b 5
#define arah2b 6
#define pwm2 7
//=============Pompa
#define pompa1 8
```

```
#define pompa2 9


//==========Mode
#define potensio A9
#define led1 A8
#define led2 A7
#define led3 A6
int adc;
int mode = 0;


//========Servo
ServoGo dof1 = ServoGo(9, 10, 7); // channel, interval, step
ServoGo dof2 = ServoGo(8, 10, 7);
ServoGo dof3 = ServoGo(7, 10, 7);
ServoGo dof4 = ServoGo(12, 10, 7);
ServoGo dof5 = ServoGo(13, 10, 7);
ServoGo dof6 = ServoGo(11, 10, 7);
ServoGo dof7 = ServoGo(14, 10, 7);


int step_step = 0;
int i = 0;


void setup() {
  Serial.begin(9600);
  pwm.begin();
```

```cpp
pwm.setOscillatorFrequency(27000000);

pwm.setPWMFreq(SERVO_FREQ);  // Analog servos run at ~50 Hz updates

pwm.writeMicroseconds(9, 722); //pin servo 1 20

pwm.writeMicroseconds(7, 1388); //pin servo 3 80

pwm.writeMicroseconds(8, 2100); //pin servo 2 dari endefector 180

pwm.writeMicroseconds(11, 1500); //pin servo 6 90

pwm.writeMicroseconds(12, 1222); //pin servo 4 dari end efector 65

pwm.writeMicroseconds(13, 1722); //pin servo 5 110

pwm.writeMicroseconds(14, 1388); //pin servo 7 80

lcd.begin();

lcd.backlight();

lcd.print("Ready");

sensors.begin();

scale.set_scale();

scale.tare();

pinMode(potensio, INPUT);

pinMode (led1, OUTPUT);

pinMode (led2, OUTPUT);

pinMode (led3, OUTPUT);

pinMode(arah1a, OUTPUT);

pinMode(arah2a, OUTPUT);

pinMode(pwm1, OUTPUT);

pinMode(arah1b, OUTPUT);

pinMode(arah2b, OUTPUT);

pinMode(pwm2, OUTPUT);
```

```arduino
  pinMode(pompa1, OUTPUT);

  pinMode(pompa2, OUTPUT);

  pinMode(trigPin, OUTPUT);

  pinMode(echoPin, INPUT);

  pinMode(Tombol, INPUT_PULLUP);

  Serial.println("tes");

  digitalWrite(led1, HIGH);

  digitalWrite(led2, HIGH);

  digitalWrite(led3, HIGH);

  delay(2000);

}


void loop() {

  //=======mode

  adc = analogRead(potensio);

  tombol = digitalRead(Tombol);

  Serial.println(tombol);

  if (adc < 10) {

   lcd.setCursor(0, 0); lcd.print("Ready      ");

   step_step = 0;

   digitalWrite(led1, HIGH);

   digitalWrite(led2, HIGH);

   digitalWrite(led3, HIGH);

   motor(0, 0);

   pompa(0, 0);
```

```arduino
    mode = 0;
  }
  if (adc >= 10 && adc < 340) {
    lcd.setCursor(0, 0); lcd.print("Mode 1        ");
    step_step = 0;
    digitalWrite(led1, HIGH);
    digitalWrite(led2, HIGH);
    digitalWrite(led3, LOW);
    pompa(0, 0);
    if (tombol == 0) {
      motor(160, 160);
      delay(700);
      mode = 1;
    }
  }
  if (adc >= 340 && adc < 720) {
    lcd.setCursor(0, 0); lcd.print("Mode 2        ");
    step_step = 0;
    digitalWrite(led1, HIGH);
    digitalWrite(led2, LOW);
    digitalWrite(led3, HIGH);
    motor(0, 0);
    pompa(0, 0);
    if (tombol == 0) {
      //    motor(160, 160);
```

```arduino
  //    delay(700);

  mode = 2;
 }
}
if (adc >= 720) {
 lcd.setCursor(0, 0); lcd.print("Mode 3     ");
 digitalWrite(led1, LOW);
 digitalWrite(led2, HIGH);
 digitalWrite(led3, HIGH);
 step_step = 0;
 motor(0, 0);
 pompa(0, 0);
 if (tombol == 0) {
  motor(160, 160);
  delay(1300);
  mode = 3;
 }
}
Serial.print("tombol = ");
Serial.print(tombol);
Serial.print("mode = ");
Serial.println(mode);
//============Raffly
if (mode == 2) {
 berat();
```

```
lcd.setCursor(0, 0); lcd.print("Mode 2     ");

lcd.setCursor(0, 1); lcd.print("Berat = ");

lcd.setCursor(8, 1); lcd.print(GRAM); lcd.print("     ");

lcd.setCursor(14, 1); lcd.print("Gr");

digitalWrite(led2, HIGH);

if (GRAM < 150 && GRAM > 40 && kunciGRAM == 0 && hitungBerat ==
10) {

  kunciGRAM = 1;

  }

if (GRAM >= 150 && GRAM <= 300 && kunciGRAM == 0 && hitungBerat
== 10) {

  kunciGRAM = 2;

  }

if (GRAM > 300 && GRAM <= 450 && kunciGRAM == 0 && hitungBerat ==
10) {

  kunciGRAM = 3;

  }

if (GRAM > 450 && kunciGRAM == 0 && hitungBerat == 10) {

  kunciGRAM = 0;

  hitungBerat == 0;

  lcd.setCursor(0, 0); lcd.print(" OVERLOAD  ");

  delay(3000);


  }

Serial.println(kunciGRAM);

Serial.println(" || ");
```

```
Serial.println(logicGRAM);

if (kunciGRAM == 1 && logicGRAM == 1) {

  Serial.println("Gerak1");

  Servo_Gerak1();

}

if (kunciGRAM == 2 && logicGRAM == 1) {

  Serial.println("Gerak2");

  Servo_Gerak2();

}

if (kunciGRAM == 3 && logicGRAM == 1) {

  Serial.println("Gerak3");

  Servo_Gerak3();

}

if (kunciGRAM == 4 && step_step == 4) {

  kunciGRAM = 0;

  step_step = 0;

  logicGRAM = 0;

  hitungBerat = 0;

}

if (GRAM > 60 && logicGRAM == 0 && hitungBerat == 10) {

  delay(1000);

  Serial.println("masuk");

  Servo_Gerak0();

  if (step_step == 4) {
```

```
      logicGRAM = 1;

      step_step = 0;

    }

  }

}
//===============================2====================
=

void Servo_Gerak0() {//berat kotak loadcel

  int i = 0;

  motor(0, 0);

  while (1) {

    switch (step_step) {

      case 0:

        for (i; i < step_step + 1; i++) {

          dof7.setLogic(true);

        }

        dof7.goTo(80, 165);

        Serial.println("Satu");

        if (dof7.getLangkah() == true) step_step += 1;

        break;


      case 1:

        for (i; i < step_step + 1; i++) {

          dof4.setLogic(true);

          dof5.setLogic(true);
```

```
        }

        dof4.goTo(65, 110);

        dof5.goTo(110, 85);

        Serial.println("Dua");

        if (dof4.getLangkah() == true && dof5.getLangkah() == true) step_step += 1;

        break;


    case 2:

        pompa(0, 200);

        delay(2000);

        for (i; i < step_step + 1; i++) {

            dof4.setLogic(true);

        }

        dof4.goTo(110, 65);

        Serial.println("Tiga");

        if (dof4.getLangkah() == true) step_step += 1;

        break;


    case 3:

        for (i; i < step_step + 1; i++) {

            dof5.setLogic(true);

            dof7.setLogic(true);

        }

        dof5.goTo(85, 110);
```

```
        dof7.goTo(165, 80);

        Serial.println("Empat");

        if (dof5.getLangkah() == true && dof7.getLangkah() == true) {

          step_step += 1;

        }

        break;

      }

      if (step_step == 4 || tombol == 0) {

        break;

      }

    }

  }


void Servo_Gerak1() {//berat kotak loadcel

  int i = 0;

  motor(0, 0);

  while (1) {

    switch (step_step) {

      case 0:

        pompa(0, 200);

        for (i; i < step_step + 1; i++) {

          dof7.setLogic(true);

        }

        dof7.goTo(80, 120);

        Serial.println("Satu");
```

```
      if (dof7.getLangkah() == true) step_step += 1;
      break;


case 1:
  for (i; i < step_step + 1; i++) {
    dof4.setLogic(true);
    dof5.setLogic(true);
  }


  dof5.goTo(110, 90);
  dof4.goTo(65, 100);
  Serial.println("Dua");
  if (dof4.getLangkah() == true && dof5.getLangkah() == true) step_step += 1;
    break;


case 2:
  pompa(0, 0);
  delay(2000);
  for (i; i < step_step + 1; i++) {
    dof4.setLogic(true);
  }
  dof4.goTo(100, 65);
  Serial.println("pompa");
  if (dof4.getLangkah() == true) step_step += 1;
    break;
```

```
      case 3:
        for (i; i < step_step + 1; i++) {
          dof5.setLogic(true);
          dof7.setLogic(true);
        }
        dof5.goTo(90, 110);
        dof7.goTo(120, 80);
        Serial.println("Empat");
        if (dof5.getLangkah() == true && dof7.getLangkah() == true) {
          kunciGRAM = 4;
          step_step += 1;
        }
        break;
    }
    if (step_step == 4 || tombol == 0) {
      break;
    }
  }
}


void Servo_Gerak2() {//berat kotak loadcel
  int i = 0;
  motor(0, 0);
  while (1) {
```

```
switch (step_step) {
  case 0:
    pompa(0, 200);
    for (i; i < step_step + 1; i++) {
      dof7.setLogic(true);
    }
    dof7.goTo(80, 65);
    Serial.println("Satu");
    if (dof7.getLangkah() == true) step_step += 1;
    break;

  case 1:
    for (i; i < step_step + 1; i++) {
      dof4.setLogic(true);
      dof5.setLogic(true);
    }

    dof5.goTo(110, 90);
    dof4.goTo(65, 100);
    Serial.println("Dua");
    if (dof4.getLangkah() == true && dof5.getLangkah() == true) step_step += 1;
    break;

  case 2:
    pompa(0, 0);
```

```
      delay(2000);

      for (i; i < step_step + 1; i++) {

        dof4.setLogic(true);

      }

      dof4.goTo(100, 65);

      Serial.println("pompa");

      if (dof4.getLangkah() == true) step_step += 1;

      break;


    case 3:

      for (i; i < step_step + 1; i++) {

        dof5.setLogic(true);

        dof7.setLogic(true);

      }

      dof5.goTo(90, 110);

      dof7.goTo(65, 80);

      Serial.println("Empat");

      if (dof5.getLangkah() == true && dof7.getLangkah() == true) {

        kunciGRAM = 4;

        step_step += 1;

      }

      break;

  }

  if (step_step == 4 || tombol == 0) {

    break;
```

```
    }
  }
}


void Servo_Gerak3() {//berat kotak loadcel
  int i = 0;
  motor(0, 0);
  while (1) {
    switch (step_step) {
      case 0:
        pompa(0, 200);
        for (i; i < step_step + 1; i++) {
          dof7.setLogic(true);
        }
        dof7.goTo(80, 10);
        Serial.println("Satu");
        if (dof7.getLangkah() == true) step_step += 1;
        break;

      case 1:
        for (i; i < step_step + 1; i++) {
          dof4.setLogic(true);
          dof5.setLogic(true);
        }
```

```
      dof5.goTo(110, 90);

      dof4.goTo(65, 100);

      Serial.println("Dua");

      if (dof4.getLangkah() == true && dof5.getLangkah() == true) step_step += 1;

      break;


    case 2:

      pompa(0, 0);

      delay(2000);

      for (i; i < step_step + 1; i++) {

        dof4.setLogic(true);

      }

      dof4.goTo(100, 65);

      Serial.println("pompa");

      if (dof4.getLangkah() == true) step_step += 1;

      break;


    case 3:

      for (i; i < step_step + 1; i++) {

        dof5.setLogic(true);

        dof7.setLogic(true);

      }

      dof5.goTo(90, 110);

      dof7.goTo(10, 80);

      Serial.println("Empat");
```

```
      if (dof5.getLangkah() == true && dof7.getLangkah() == true) {

        kunciGRAM = 4;

        step_step += 1;

      }

      break;

    }

    if (step_step == 4 || tombol == 0) {

      break;

    }

  }

}


void motor(int L, int R) {

  if (L > 0) {

    digitalWrite(arah1a, HIGH);

    digitalWrite(arah2a, LOW);

    analogWrite(pwm1, L);

  }

  if (L <= 0) {

    digitalWrite(arah1a, LOW);

    digitalWrite(arah2a, HIGH);

    analogWrite(pwm1, -L);

  }

  if (R > 0) {

    digitalWrite(arah1b, HIGH);
```

```arduino
    digitalWrite(arah2b, LOW);

    analogWrite(pwm2, R);

  }

  if (R <= 0) {

    digitalWrite(arah1b, LOW);

    digitalWrite(arah2b, HIGH);

    analogWrite(pwm2, -R);

  }

}


void pompa(int mm, int pp) {

  analogWrite(pompa1, mm);

  analogWrite(pompa2, pp);

}

void berat() {

  scale.set_scale(calibration_factor);

  GRAM = scale.get_units(), 4;

  Serial.println(GRAM);

  Serial.println(hitungBerat);

  if (GRAM > 30) {

    hitungBerat = hitungBerat + 1;

  }

  delay(100);

}
```

Koding Pengaturan Sudut Servo :

```cpp
class ServoGo {

    int updateInterval;

    unsigned long lastUpdate;

    int pos;

    int increment;

    int servo;

    bool langkah;

    bool logici;

    int fromOri;

    int toOri;


  public:

    ServoGo(int channel, int interval, int setep) // channel dan speed

    {

      updateInterval = interval;

      increment = setep;

      servo = channel;

    }


    bool getLangkah () {

      return langkah;

    }


    void setLogic (bool nilai) {
```

```cpp
    logici = nilai;

  }


  bool getLogic() {
   return logici;

  }


  void goTo(int from, int to) {
   if (logici == true) {
     fromOri = map(from, 0, 180, 500, 2500);
     toOri = map(to, 0, 180, 500, 2500);
     pos = fromOri;
     Serial.println("its supposed to be once");
     logici = false;
   }
   while (logici == false) {
    int stepL = toOri - pos;
    if (!(stepL <= 5 && stepL >= -5)) {
      langkah = false;
      if ((millis() - lastUpdate) > updateInterval) {
       lastUpdate = millis();
       if (fromOri < toOri) {
         pwm.writeMicroseconds(servo, pos);
         pos += increment;
//         Serial.println(pos);
```

```
        }
        if (fromOri > toOri) {

          pwm.writeMicroseconds(servo, pos);

          pos -= increment;
//          Serial.println(pos);

        }

      }

    }
    else {

      langkah = true;

      Serial.println("Lanjut");

      break;

    }

  }

};
```