#include <LiquidCrystal.h>

#include <SoftwareSerial.h>

#include <DHT.h>

#define DHTPIN 2

DHT dht(DHTPIN, DHT11, 15);// Start DHT sensor

int msec\_cnt=0,CLR\_CNT=0;

LiquidCrystal lcd(8,7,6,5,4,3);

const int NODE\_D0\_PIN=A0;

const int NODE\_D1\_PIN=A1;

const int NODE\_D2\_PIN=A2;

const int NODE\_D3\_PIN=A3;

const int NODE\_D4\_PIN=A4;

const int N\_SV\_PIN=9;

const int P\_SV\_PIN=10;

const int K\_SV\_PIN=11;

const int PUMP\_PIN=12;

boolean MODE\_FLAG=0;

int MOTOR\_ON\_CNT=0,STAGE=0;

boolean BEEP\_FLG=0,TOGGLE\_FLG=0,MODE\_FLG=0;

int BEEP\_CNT=0,LCD\_CLR\_CNT=0,TEN\_MCNT=0;

char RX\_DATA[10];

int K=0;

boolean N\_SV\_ON\_FLG=0,P\_SV\_ON\_FLG=0,K\_SV\_ON\_FLG=0,PUMP\_ON\_FLG=0,PUMP1\_ON\_FLG=0;

boolean RX\_FLG=0,C1\_FLG=0;

int RX\_COUNT=0;

int D=0,I=0;

int TEMP=0,HUMIDITY=0;

boolean Tenmec\_Flg=0,DISP\_TOGGGLE;

boolean LCD\_CLR\_FLG=0,NORMAL\_FLG=0;

int NUM=0;int STAGE\_CNT=0;

boolean IP\_PIN1\_FLAG=0,IP\_PIN2\_FLAG=0,IP\_PIN3\_FLAG=0,IP\_PIN4\_FLAG=0,IP\_PIN5\_FLAG=0;

void setup(){

Serial.begin(9600);

dht.begin();

pinMode(13, OUTPUT);

pinMode(N\_SV\_PIN,OUTPUT);

pinMode(P\_SV\_PIN,OUTPUT);

pinMode(K\_SV\_PIN,OUTPUT);

pinMode(PUMP\_PIN,OUTPUT);

pinMode(NODE\_D0\_PIN,INPUT);

pinMode(NODE\_D1\_PIN,INPUT);

pinMode(NODE\_D2\_PIN,INPUT);

pinMode(NODE\_D3\_PIN,INPUT);

pinMode(NODE\_D4\_PIN,INPUT);

lcd.begin(16, 2);

lcd.setCursor(0,0);

lcd.print(" PLANT DISEASE ");

lcd.setCursor(0,1);

lcd.print("DETECTION SYSTEM "); delay(2000); lcd.clear();

}

void loop(){

RecieveData();

TEMP\_SENSOR();timerIsr();

LCD\_INDICATION();

}

void LCD\_INDICATION(void){

if(LCD\_CLR\_FLG){ lcd.clear(); LCD\_CLR\_FLG=0; }

if(DISP\_TOGGGLE){

lcd.setCursor(0,0);

lcd.print(TEMP);

lcd.print("\xDF\C ");

}else{

lcd.setCursor(0,0);

lcd.print(HUMIDITY);

lcd.print("\x25\RH");

}

if(MODE\_FLAG==0){

lcd.setCursor(6,0);

lcd.print("M:AI ");

if(NORMAL\_FLG){

lcd.setCursor(0,1);

lcd.print("LEAF IS HEALTHY ");

}else if(STAGE==1){

lcd.setCursor(0,1);

lcd.print("NPK DISPENSING ");

}else if(STAGE==2){

lcd.setCursor(0,1);

lcd.print("WATER DISPENSING ");

}else{

lcd.setCursor(0,1);

lcd.print("WAIT.FR AI INPUT");

}

if(PUMP1\_ON\_FLG){

lcd.setCursor(11,0);

lcd.print("W:ON ");

}else{

lcd.setCursor(11,0);

lcd.print("W:OFF");

}

}else{

lcd.setCursor(6,0);

lcd.print("M:BL");

if(N\_SV\_ON\_FLG){

lcd.setCursor(0,1);

lcd.print("N:OFF");

}else{ lcd.setCursor(0,1);

lcd.print("N:ON ");

}

if(P\_SV\_ON\_FLG){

lcd.setCursor(6,1);

lcd.print("P:OFF");

}else{

lcd.setCursor(6,1);

lcd.print("P:ON ");

}

if(K\_SV\_ON\_FLG){

lcd.setCursor(12,1);

lcd.print("K:OFF");

}else{lcd.setCursor(12,1);

lcd.print("K:ON ");

}

if(PUMP\_ON\_FLG){

lcd.setCursor(11,0);

lcd.print("W:OFF");

}else{

lcd.setCursor(11,0);

lcd.print("W:ON ");

}

}

}

void TEMP\_SENSOR(void){

if(Tenmec\_Flg){

TEMP = dht.readTemperature();

HUMIDITY = dht.readHumidity();

Tenmec\_Flg=0;

}

}

int N\_COUNT=0;

void timerIsr()

{

msec\_cnt++;if(msec\_cnt>=500){

LCD\_CLR\_CNT++;if(LCD\_CLR\_CNT>=4){ LCD\_CLR\_FLG=1; LCD\_CLR\_CNT=0; DISP\_TOGGGLE=!DISP\_TOGGGLE; }

TOGGLE\_FLG=!TOGGLE\_FLG;

CLR\_CNT++;if(CLR\_CNT>=6){ CLR\_CNT=0; LCD\_CLR\_FLG=1;}

digitalWrite(13, digitalRead( 13 ) ^ 1 );

if(STAGE==1){

STAGE\_CNT++; if(STAGE\_CNT>=120){ STAGE=2; STAGE\_CNT=0; }

}else if(STAGE==2){

STAGE\_CNT++; if(STAGE\_CNT>=60){ STAGE=0; STAGE\_CNT=0; }

}

if(NORMAL\_FLG){ N\_COUNT++; if(N\_COUNT>10){ NORMAL\_FLG=0; N\_COUNT=0; } } else{ N\_COUNT=0; }

msec\_cnt=0;

}

MOTOR\_CONTROL();

TEN\_MCNT++;if(TEN\_MCNT>=10){

Tenmec\_Flg=1; TEN\_MCNT=0;

IP\_PIN\_D0\_SENSE(); IP\_PIN\_D1\_SENSE(); IP\_PIN\_D2\_SENSE(); IP\_PIN\_D3\_SENSE(); IP\_PIN\_D4\_SENSE();

}

}

void MOTOR\_CONTROL(void){

if(MODE\_FLAG==0){

if(STAGE==1){

digitalWrite(N\_SV\_PIN,LOW); digitalWrite(P\_SV\_PIN,LOW); digitalWrite(K\_SV\_PIN,LOW);

}else if(STAGE==2){

digitalWrite(N\_SV\_PIN,HIGH); digitalWrite(P\_SV\_PIN,HIGH); digitalWrite(K\_SV\_PIN,HIGH);

digitalWrite(PUMP\_PIN,LOW); PUMP1\_ON\_FLG=1;

}else{

PUMP1\_ON\_FLG=0;digitalWrite(PUMP\_PIN,HIGH);digitalWrite(N\_SV\_PIN,HIGH); digitalWrite(P\_SV\_PIN,HIGH);

digitalWrite(K\_SV\_PIN,HIGH);

}

}else{

if(N\_SV\_ON\_FLG){

digitalWrite(N\_SV\_PIN,HIGH);

}else{ digitalWrite(N\_SV\_PIN,LOW); }

if(P\_SV\_ON\_FLG){

digitalWrite(P\_SV\_PIN,HIGH); digitalWrite(K\_SV\_PIN,HIGH);

}else{ digitalWrite(P\_SV\_PIN,LOW); }

if(K\_SV\_ON\_FLG){

digitalWrite(P\_SV\_PIN,HIGH); digitalWrite(K\_SV\_PIN,HIGH);

}else{ digitalWrite(K\_SV\_PIN,LOW); }

if(PUMP\_ON\_FLG){

digitalWrite(PUMP\_PIN,HIGH);

}else{ digitalWrite(PUMP\_PIN,LOW); }

}

}

void RecieveData(void)

{

if(Serial.available()>0)

{

RX\_DATA[0] = Serial.read();

if((RX\_DATA[0]=='D')){ STAGE=1; NORMAL\_FLG=0; }

if((RX\_DATA[0]=='N')){ NORMAL\_FLG=1; }

}

}

void IP\_PIN\_D0\_SENSE(void)//CALLING IN TIMER INT

{

if(digitalRead(NODE\_D0\_PIN))

{

if(IP\_PIN1\_FLAG==0)

{

MODE\_FLAG=1;

IP\_PIN1\_FLAG=1;

}

}else{ IP\_PIN1\_FLAG=0; MODE\_FLAG=0;

}

}

void IP\_PIN\_D1\_SENSE(void)//CALLING IN TIMER INT

{

if(!digitalRead(NODE\_D1\_PIN))

{

if(IP\_PIN2\_FLAG==0)

{

N\_SV\_ON\_FLG=1;

IP\_PIN2\_FLAG=1;

}

}else{ IP\_PIN2\_FLAG=0; N\_SV\_ON\_FLG=0;

}

}

void IP\_PIN\_D2\_SENSE(void)//CALLING IN TIMER INT

{

if(!digitalRead(NODE\_D2\_PIN))

{

if(IP\_PIN3\_FLAG==0)

{

P\_SV\_ON\_FLG=1;

IP\_PIN3\_FLAG=1;

}

}else{ IP\_PIN3\_FLAG=0; P\_SV\_ON\_FLG=0;

}

}

void IP\_PIN\_D3\_SENSE(void)//CALLING IN TIMER INT

{

if(!digitalRead(NODE\_D3\_PIN))

{

if(IP\_PIN4\_FLAG==0)

{

IP\_PIN4\_FLAG=1; K\_SV\_ON\_FLG=1;

}

}else{ IP\_PIN4\_FLAG=0; K\_SV\_ON\_FLG=0;

}

}

void IP\_PIN\_D4\_SENSE(void)//CALLING IN TIMER INT

{

if(!digitalRead(NODE\_D4\_PIN))

{

if(IP\_PIN5\_FLAG==0)

{

IP\_PIN5\_FLAG=1; PUMP\_ON\_FLG=1;

}

}else{ IP\_PIN5\_FLAG=0; PUMP\_ON\_FLG=0;

}

}