```
/*
   Code: Final Test
   Author: Yujun Lai (Zane) #11094794 (Electrical and Electronics Sub-team member)
   Date: 2023/6/26
*/

//Libraries
#include <DHT.h>
#include <MsTimer2.h>
#include <SoftwareSerial.h>
#include <stdio.h>
#include "Wire.h"
#include "Adafruit_LiquidCrystal.h"
#include <stdbool.h>
#include <unistd.h>
/*
#include "Talkie.h"
#include "Vocab_US_Large.h"

Talkie voice;
*/

//Constants
#define DHTPIN 2           // what pin we're connected to
#define DHTTYPE DHT22    // DHT 22

#define heater 8    //14&15
#define fan 9         //39&40
#define motor 10    //58&59

//Extra Set Up
DHT dht(DHTPIN, DHTTYPE);      // Initialize DHT sensor for normal 16mhz Arduino
SoftwareSerial BT(12, 13);    //R,T
//SoftwareSerial mySerial(10, 11); // RX, TX
Adafruit_LiquidCrystal lcd(0);

//EE Variables
double hum;    //Stores humidity value
double tem;    //Stores temperature value
int ms200 = 0, seconds = 0;
int heatState = 0;

//UI Variables
int tim = 0;
int temp = 0;
int dry = 0;

int buttonA = 3;
int buttonB = 4;
int buttonReturn = 5;

int btState = 0;
int buttonAState = 0;
int buttonBState = 0;
int buttonReturnState = 0;

/*
  EE Conctrol (51-176):
    Code: Electrical and Electronics Control
    Author: Yujun Lai (Zane) #11094794 (Electrical and Electronics Sub-team member)
    Date: 2023/6/16
*/

void sensor()   //Interrupt Service Routine (ISR)
{
  ms200++;
  if (ms200 > 4) {
    seconds++;
    ms200 = 0;
  }

  //Read temp and humidity values
  hum = dht.readHumidity();
  tem = dht.readTemperature();

  //Print tem and humidity values to serial monitor

  /*
  Serial.print("Humidity: ");
  Serial.print(hum);
  Serial.print(" %, Temp: ");
  Serial.print(tem);
  Serial.println(" Celsius");
  */
}

void heatinital() {
  for (int fadeValue = 0; fadeValue <= 125; fadeValue += 5) {
    analogWrite(fan, fadeValue);
    delay(30);
  }

  for (int fadeValue = 0; fadeValue <= 175; fadeValue += 5) {
    analogWrite(motor, fadeValue);
    delay(30);
  }
}

void heat(int Etime, int Etemperature, int Ehumidity) {
  /*
  BT.println("Hello! I am the Group 5's Dryer AI.");
  BT.println("Manu:");
  delay(5);
  BT.println("1.Check the temperature for now.");
  delay(5);
  BT.println("2.Check the humidity for now.");
  delay(5);
  BT.println("3.Check the elapsed time.");
  delay(5);
  BT.println("0.Check the manu again.");
  */

  if (heatState == 0)
  {
    heatinital();
    heatState++;
  }

  if (tem < Etemperature)
  {
    digitalWrite(heater, HIGH);
    //Serial.println("on");
  } else {
    digitalWrite(heater, LOW);
    //Serial.println("off");
  }
  if (hum < Ehumidity)
  {
    readyScreen();
    welcomeScreen();
  }
  switch (BT.read()) {
```

```
case '1':
    BT.print("The temperature is ");
    BT.print(tem);
    BT.println(" Celsius!");
    break;

case '2':
    BT.print("The humidity is ");
    BT.print(hum);
    BT.println(" %.");
    break;

case '3':
    BT.print("The elapsed time is ");
    BT.print(seconds);
    BT.println("s.");
    break;

case '4':
    BT.println("Enter num.4 to unpause");
    restart();
    while (1) {
        if (BT.read() == '4') {
            break;
        }
    }
    heatinital();
    break;

case '5':
    BT.print("OK!");
    readyScreen();
    welcomeScreen();
    break;

case '0':
    BT.println("Hello! I am the Group 5's Dryer AI.");
    BT.println("Manu:");
    delay(5);
    BT.println("1.Check the temperature for now.");
    delay(5);
    BT.println("2.Check the humidity for now.");
    delay(5);
    BT.println("3.Check the elapsed time.");
```

```
      delay(5);
      BT.println("4.Pause.");
      delay(5);
      BT.println("5.Reset.");
      delay(5);
      BT.println("0.Check the manu again.");
      break;
  }
}

/*
  UI Conctrol (179-463):
    Code: User Interface Control
    Author: Lina (User Interface Sub-team member)
    Auxiliary & Modify: Yujun Lai (Zane) #11094794 (Electrical and Electronics Sub-team member)
    Date: 2023/6/26
*/

int readSelection() {
  while (true) {
    buttonAState = digitalRead(buttonA);
    buttonBState = digitalRead(buttonB);
    buttonReturnState = digitalRead(buttonReturn);

    //Checks if button "A" was pressed
    if (buttonAState == 0) {
      btState = 1;
      delay(1000);
      break;
    }

    //Checks if button "B" was pressed
    else if (buttonBState == 0) {
      btState = 2;
      delay(1000);
      break;
    }

    //Checks if button "Return" was pressed
    else if (buttonReturnState == 0) {
      btState = 3;
      delay(1000);
      break;
    }
  }

  Serial.print("The bottom state is: ");
  Serial.println(btState);
  return btState;
}

void welcomeScreen() {
  lcd.setCursor(0, 0);
  lcd.print("Welcome :)");
  lcd.setCursor(0, 2);
  lcd.print("Close the door");
  lcd.setCursor(0, 3);
  lcd.print("to start");
  /*
  #if defined(TEENSYDUINO)
    pinMode(5, OUTPUT);
    digitalWrite(5, HIGH); //Enable Amplified PROP shield
  #endif
    voice.say(sp4_CLOSE);
    voice.say(sp4_THE);
    voice.say(sp5_DOORS);
    voice.say(sp4_TO);
    voice.say(sp3_START);
  */
  delay(5000);
  lcd.clear();
  modeScreen();
}

void modeScreen() {
  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("Choose the mode:");
  lcd.setCursor(0, 2);
  lcd.print("Automatic");
  lcd.setCursor(14, 2);
  lcd.print("Manual");
  lcd.setCursor(4, 3);
  lcd.print("(A)");
  lcd.setCursor(15, 3);
  lcd.print("(B)");
  /*
```

```
    #if defined(TEENSYDUINO)
        pinMode(5, OUTPUT);
        digitalWrite(5, HIGH); //Enable Amplified PROP shield
    #endif
        voice.say(sp3_FOR);
        voice.say(sp2_AUTOMATIC);
        voice.say(sp2_PRESS);
        voice.say(sp2_A);
        voice.say(sp3_FOR);
        voice.say(sp2_MANUAL);
        voice.say(sp2_PRESS);
        voice.say(sp2_B);
    */
    btState = readSelection();
    //If "Automatic" was pressed
    if (btState == 1) {
        timerScreen(30);
    }
    //If "Manual" was pressed
    else if (btState == 2) {
        tempScreen();
    } else if (btState == 3) {
        welcomeScreen();
    }
}

void tempScreen() {
    lcd.clear();
    lcd.setCursor(0, 0);
    lcd.print("TEMPERATURE>Time>Dry");
    lcd.setCursor(0, 2);
    lcd.print("No heat");
    lcd.setCursor(11, 2);
    lcd.print("With heat");
    lcd.setCursor(2, 3);
    lcd.print("(A)");
    lcd.setCursor(14, 3);
    lcd.print("(B)");
    /*
    #if defined(TEENSYDUINO)
        pinMode(5, OUTPUT);
        digitalWrite(5, HIGH); //Enable Amplified PROP shield
    #endif
        voice.say(sp3_FOR);
```

```
  voice.say(sp3_FIFTY);
  voice.say(sp3_CELCIUS);
  voice.say(sp3_DEGREES);
  voice.say(sp2_PRESS);
  voice.say(sp2_A);
  voice.say(sp3_FOR);
  voice.say(sp3_SEVENTY);
  voice.say(sp2_FIVE);
  voice.say(sp3_CELCIUS);
  voice.say(sp3_DEGREES);
  voice.say(sp2_PRESS);
  voice.say(sp2_B);
*/
btState = readSelection();
//If "No heat" was pressed
if (btState == 1) {
  temp = 0;
  timeScreen();
}
//If "With heat" was pressed
else if (btState == 2) {
  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("TEMPERATURE>Time>Dry");
  lcd.setCursor(4, 2);
  lcd.print("50 C");
  lcd.setCursor(12, 2);
  lcd.print("75 C");
  lcd.setCursor(5, 3);
  lcd.print("(A)");
  lcd.setCursor(13, 3);
  lcd.print("(B)");

  btState = readSelection();
  if (btState == 1) {
    temp = 50;
    timeScreen();
  } else if (btState == 2) {
    temp = 75;
    timeScreen();
  } else if (btState == 3) {
    tempScreen();
  }
}
```

```
    //If "Return" was pressed
    else if (btState == 3) {
        modeScreen();
    }
}

void timeScreen() {
    lcd.clear();
    lcd.setCursor(0, 0);
    lcd.print("Temperature>TIME>Dry");
    lcd.setCursor(2, 2);
    lcd.print("30 min");
    lcd.setCursor(12, 2);
    lcd.print("1 hour");
    lcd.setCursor(4, 3);
    lcd.print("(A)");
    lcd.setCursor(13, 3);
    lcd.print("(B)");
    /*
    #if defined(TEENSYDUINO)
        pinMode(5, OUTPUT);
        digitalWrite(5, HIGH); //Enable Amplified PROP shield
    #endif
        voice.say(sp3_FOR);
        voice.say(sp3_THIRTY);
        voice.say(sp2_MINUTES);
        voice.say(sp2_PRESS);
        voice.say(sp2_A);
        voice.say(sp3_FOR);
        voice.say(sp2_ONE);
        voice.say(sp3_HOUR);
        voice.say(sp2_PRESS);
        voice.say(sp2_B);
    */

    btState = readSelection();
    //If "30 min" was pressed
    if (btState == 1) {
        tim = 30;
        drynessScreen(dry, btState);
    }
    //If "1 hour" was pressed
    else if (btState == 2) {
        tim = 60;
        drynessScreen(dry, btState);
    }
    //If "Return" was pressed
    else if (btState == 3) {
        tempScreen();
    }
}

void drynessScreen(int dry, int btState) {
    lcd.clear();
    lcd.setCursor(0, 0);
    lcd.print("Temperature>Time>DRY");
    lcd.setCursor(0, 1);
    lcd.print("I want my clothes:");
    lcd.setCursor(4, 2);
    lcd.setCursor(0, 2);
    lcd.print("90% dry");
    lcd.setCursor(9, 2);
    lcd.print("100% dry");
    lcd.setCursor(2, 3);
    lcd.print("(A)");
    lcd.setCursor(14, 3);
    lcd.print("(B)");
    //voice.say("To partially dry your clothes, press A. To completely dry, press B.");

    btState = readSelection();
    //If "Dry" was pressed
    if (btState == 1) {
        dry = 10;
        timerScreen(tim);
    }
    //If "Very dry" was pressed
    else if (btState == 2) {
        dry = 0;
        timerScreen(tim);
    } else if (btState == 3) {
        timeScreen();
    }
}

void timerScreen(int Utime) {
    int minutes = Utime;
    int seconds = 0;
```

```
  lcd.clear();

  Serial.println(temp);
  Serial.println(dry);
  Serial.println(tim);

  while (minutes >= 0 && seconds >= 0) {
    lcd.setCursor(7, 2);
    lcd.print(minutes);
    lcd.print(":");
    if (seconds < 10) {
      lcd.print("0");
    }
    lcd.print(seconds);

    delay(1000);

    if (seconds == 0) {
      minutes--;
      seconds = 59;
    } else {
      seconds--;
    }

    if (minutes == -1) {
      readyScreen();
    }

    heat(10, temp, dry);
  }

  readyScreen();
}

void readyScreen() {
  tim = 0;
  temp = 0;
  dry = 0;

  btState = 0;
  buttonAState = 0;
  buttonBState = 0;
  buttonReturnState = 0;
  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("Your clothes are");
  lcd.setCursor(0, 1);
  lcd.print("ready! :)");
  lcd.setCursor(0, 3);
  lcd.print("Open the door");
  /*
  #if defined(TEENSYDUINO)
    pinMode(5, OUTPUT);
    digitalWrite(5, HIGH); //Enable Amplified PROP shield
  #endif
    voice.say(sp4_READY);
    voice.say(sp2_OPEN);
    voice.say(sp4_THE);
    voice.say(sp5_DOORS);
  */
  restart();
  delay(4000);
  lcd.clear();
}

void restart() {
  heatState = 0;
  ms200 = 0;
  seconds = 0;

  for (int fadeValue = 175; fadeValue >= 0; fadeValue -= 5) {
    analogWrite(motor, fadeValue);
    delay(30);
  }
  for (int fadeValue = 125; fadeValue >= 0; fadeValue -= 5) {
    analogWrite(fan, fadeValue);
    delay(30);
  }

  digitalWrite(heater, LOW);
}

//Main functions (465)

void setup() {
  //UI Setup
  pinMode(buttonA, INPUT_PULLUP);
  pinMode(buttonB, INPUT_PULLUP);
  pinMode(buttonReturn, INPUT_PULLUP);

  //mySerial.begin(9600); //speaker
  lcd.begin(20, 4);

  //EE Setup
  BT.begin(9600);
  dht.begin();    //Set the DHT22 sensor

  MsTimer2::set(200, sensor);    //Set the ISR
  MsTimer2::start();                      //Start the ISR

  pinMode(heater, OUTPUT);
  pinMode(fan, OUTPUT);
  pinMode(motor, OUTPUT);

  //Main Setup
  Serial.begin(9600);
}

void loop() {
  welcomeScreen();
}
```