```
/*
  WRITTEN BY RUPJIT CHOWDHURY
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  TESTED OK

  KEYPAD DATA
  1=MENU
  2=UP
  3=DN
  4=QUIT
  AFTER POWER UP CLOCK WILL NOT START DIRECTLY
  PRESSING UP+DN KEYS TOGETHER  TO START CLOCK (UP=2,DN=3)
  PRESSING MENU KEY TAKES TO TIME ADJUST MENU (1= MENU)
  PRESSING QUIT LEAVES FROM RUNNING CLOCK AND POINTS TO TIME ADJUST MENU (4 = QUIT)




*/
#include <LCD_I2C.h>
#include <Wire.h>
#include <I2C_RTC.h>
static DS3231 RTC;

int menu=0;
int updn=0;
//int dn=0;
int quit=0;
//
LCD_I2C lcd(0x27, 16, 2); // Default address of most PCF8574 modules, change
according


void setup() {
  //start serial connection
  Serial.begin(9600);
  //configure pin 2 as an input and enable the internal pull-up resistor
  pinMode(2, INPUT_PULLUP);
  pinMode(3, INPUT_PULLUP);
  pinMode(4, INPUT_PULLUP);
  pinMode(5, INPUT_PULLUP);
  pinMode(13, OUTPUT);
  lcd.begin(); // If you are using more I2C devices using the Wire library use
lcd.begin(false)
  lcd.backlight();
  //
  RTC.begin();
  //RTC.setHourMode(CLOCK_H12);
  RTC.setHourMode(CLOCK_H24);
  if (RTC.getHourMode() == CLOCK_H12)
```

```arduino
  {
    //RTC.setMeridiem(HOUR_PM);
  }
  RTC.setDay(22);
  RTC.setMonth(5);
  RTC.setYear(2020);
  RTC.setHours(23);
  RTC.setMinutes(47);
  RTC.setSeconds(56);
  RTC.setWeek(1);

  //RTC.setDate(22,07,29);
  //RTC.setTime(22,10,20);
lcd.setCursor(3, 0);
      lcd.print("UP+DN CLOCK"); // You can make spaces using well... spaces
      lcd.setCursor(3, 1); // Or setting the cursor in the desired position.
      lcd.print("MENU TO ADJ");
      delay(1000);

}

void loop() {
  //read the pushbutton value into a variable
  int sensorVal1 = digitalRead(2);
  int sensorVal2 = digitalRead(3);
  int sensorVal3 = digitalRead(4);
  int sensorVal4 = digitalRead(5);

  //print out the value of the pushbutton
  //Serial.println(sensorVal);

  // Keep in mind the pull-up means the pushbutton's logic is inverted. It goes
  // HIGH when it's open, and LOW when it's pressed. Turn on pin 13 when the
  // button's pressed, and off when it's not:

  while ((sensorVal2) == LOW  && (sensorVal3) == LOW)
      {
        lcd.clear();
        mainclockdisplay();
      }

  if (sensorVal1 == HIGH) {
    digitalWrite(13, LOW);
  } else {
    digitalWrite(13, HIGH);
    if(menu<10){
    menu=menu+1;
    Serial.println("MENU");
    Serial.println(menu);
    delay(1000);
```

```
    }else{menu=1;}
}


//lcd.clear();
switch (menu) {
  case 1:
  lcd.clear();
  lcd.setCursor(0, 0);
    lcd.print("SET 12=1/24=0 HR"); // You can make spaces using well... spaces
    lcd.setCursor(5, 1); // Or setting the cursor in the desired position.
    lcd.print(RTC.getHourMode());
    updn=RTC.getHourMode();
    //dn=RTC.getHours();
    if (sensorVal2 == HIGH) {
        digitalWrite(13, LOW);
          } else {
        digitalWrite(13, HIGH);
        if(updn<5){
           updn=updn+1;
           Serial.println("UP");
           Serial.println(updn);
           delay(1000);
          }else{updn=0;}
    }
    if (sensorVal3 == HIGH) {
          digitalWrite(13, LOW);
          } else {
          digitalWrite(13, HIGH);
          if(updn<5){
          updn=updn-1;
          Serial.println("DN");
          Serial.println(updn);
          delay(1000);
          }else{updn=0;}
    }
    lcd.setCursor(0, 0);
    lcd.print("SET 12=1/24=0 HR"); // You can make spaces using well... spaces
    lcd.setCursor(5, 1); // Or setting the cursor in the desired position.
    RTC.setHourMode(updn);
    lcd.print(RTC.getHourMode());
   // updn=RTC.getHours();
    delay(500);
    break;
    case 2:
    lcd.clear();
    lcd.setCursor(5, 0);
    lcd.print("SET AM/PM"); // You can make spaces using well... spaces
    lcd.setCursor(5, 1); // Or setting the cursor in the desired position.
    lcd.print(RTC.getMeridiem());
```

```
updn=RTC.getMeridiem();
//dn=RTC.getHours();
if (sensorVal2 == HIGH) {
    digitalWrite(13, LOW);
      } else {
    digitalWrite(13, HIGH);
    if(updn<5){
       updn=updn+1;
       Serial.println("UP");
       Serial.println(updn);
       delay(1000);
      }else{updn=0;}
}
if (sensorVal3 == HIGH) {
      digitalWrite(13, LOW);
      } else {
      digitalWrite(13, HIGH);
      if(updn<5){
      updn=updn-1;
      Serial.println("DN");
      Serial.println(updn);
      delay(1000);
      }else{updn=0;}
}
lcd.setCursor(5, 0);
lcd.print("SET AM/PM"); // You can make spaces using well... spaces
lcd.setCursor(5, 1); // Or setting the cursor in the desired position.
RTC.setMeridiem(updn);
lcd.print(RTC.getMeridiem());
// updn=RTC.getHours();
delay(500);
break;
case 3:  // your hand is on the sensor
lcd.clear();
lcd.setCursor(5, 0);
lcd.print("SET HOUR"); // You can make spaces using well... spaces
lcd.setCursor(5, 1); // Or setting the cursor in the desired position.
lcd.print(RTC.getHours());
updn=RTC.getHours();
//dn=RTC.getHours();
if (sensorVal2 == HIGH) {
    digitalWrite(13, LOW);
      } else {
    digitalWrite(13, HIGH);
    if(updn<59){
       updn=updn+1;
       Serial.println("UP");
       Serial.println(updn);
       delay(1000);
      }else{updn=0;}
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```
      }
    if (sensorVal3 == HIGH) {
          digitalWrite(13, LOW);
          } else {
          digitalWrite(13, HIGH);
          if(updn<59){
          updn=updn-1;
          Serial.println("DN");
          Serial.println(updn);
          delay(1000);
          }else{updn=0;}
      }
    lcd.setCursor(5, 0);
    lcd.print("SET HOUR"); // You can make spaces using well... spaces
    lcd.setCursor(5, 1); // Or setting the cursor in the desired position.
    RTC.setHours(updn);
    lcd.print(RTC.getHours());
  // updn=RTC.getHours();
    delay(500);
    break;
  case 4:  // your hand is close to the sensor
    lcd.clear();
    lcd.setCursor(5, 0);
    lcd.print("SET MINUITE"); // You can make spaces using well... spaces
    lcd.setCursor(5, 1); // Or setting the cursor in the desired position.
    lcd.print(RTC.getMinutes());
    updn=RTC.getMinutes();
    //dn=RTC.getHours();
    if (sensorVal2 == HIGH) {
        digitalWrite(13, LOW);
          } else {
        digitalWrite(13, HIGH);
        if(updn<59){
           updn=updn+1;
           Serial.println("UP");
           Serial.println(updn);
           delay(1000);
          }else{updn=0;}
      }
    if (sensorVal3 == HIGH) {
          digitalWrite(13, LOW);
          } else {
          digitalWrite(13, HIGH);
          if(updn<59){
          updn=updn-1;
          Serial.println("DN");
          Serial.println(updn);
          delay(1000);
          }else{updn=0;}
      }
```

```
   lcd.setCursor(5, 0);
   lcd.print("SET MINUITE"); // You can make spaces using well... spaces
   lcd.setCursor(5, 1); // Or setting the cursor in the desired position.
   RTC.setMinutes(updn);
   lcd.print(RTC.getMinutes());
 // updn=RTC.getHours();
   delay(500);
   break;
case 5:  // your hand is a few inches from the sensor
lcd.clear();
lcd.setCursor(5, 0);
   lcd.print("SET DAY"); // You can make spaces using well... spaces
   lcd.setCursor(5, 1); // Or setting the cursor in the desired position.
   lcd.print(RTC.getDay());
   updn=RTC.getDay();
   //dn=RTC.getHours();
   if (sensorVal2 == HIGH) {
       digitalWrite(13, LOW);
         } else {
       digitalWrite(13, HIGH);
       if(updn<59){
         updn=updn+1;
         Serial.println("UP");
         Serial.println(updn);
         delay(1000);
       }else{updn=0;}
   }
   if (sensorVal3 == HIGH) {
         digitalWrite(13, LOW);
         } else {
         digitalWrite(13, HIGH);
         if(updn<59){
         updn=updn-1;
         Serial.println("DN");
         Serial.println(updn);
         delay(1000);
         }else{updn=0;}
   }
   lcd.setCursor(5, 0);
   lcd.print("SET DAY"); // You can make spaces using well... spaces
   lcd.setCursor(5, 1); // Or setting the cursor in the desired position.
   RTC.setDay(updn);
   lcd.print(RTC.getDay());
 // updn=RTC.getHours();
   delay(500);
   break;
case 6:  // your hand is nowhere near the sensor
   lcd.clear();
   lcd.setCursor(5, 0);
   lcd.print("SET MONTH"); // You can make spaces using well... spaces
```

```
lcd.setCursor(5, 1); // Or setting the cursor in the desired position.
lcd.print(RTC.getMonth());
updn=RTC.getMonth();
//dn=RTC.getHours();
if (sensorVal2 == HIGH) {
    digitalWrite(13, LOW);
      } else {
    digitalWrite(13, HIGH);
    if(updn<59){
       updn=updn+1;
       Serial.println("UP");
       Serial.println(updn);
       delay(1000);
      }else{updn=0;}
}
if (sensorVal3 == HIGH) {
      digitalWrite(13, LOW);
      } else {
      digitalWrite(13, HIGH);
      if(updn<59){
      updn=updn-1;
      Serial.println("DN");
      Serial.println(updn);
      delay(1000);
      }else{updn=0;}
}
lcd.setCursor(5, 0);
lcd.print("SET MONTH"); // You can make spaces using well... spaces
lcd.setCursor(5, 1); // Or setting the cursor in the desired position.
RTC.setMonth(updn);
lcd.print(RTC.getMonth());
// updn=RTC.getHours();
delay(500);
break;
case 7:  // your hand is nowhere near the sensor
lcd.clear();
lcd.setCursor(5, 0);
lcd.print("SET YEAR"); // You can make spaces using well... spaces
lcd.setCursor(5, 1); // Or setting the cursor in the desired position.
lcd.print(RTC.getYear());
updn=RTC.getYear();
//dn=RTC.getHours();
if (sensorVal2 == HIGH) {
    digitalWrite(13, LOW);
      } else {
    digitalWrite(13, HIGH);
    if(updn<9999){
       updn=updn+1;
       Serial.println("UP");
       Serial.println(updn);
```

```
       delay(1000);
       }else{updn=0;}
  }
  if (sensorVal3 == HIGH) {
       digitalWrite(13, LOW);
       } else {
       digitalWrite(13, HIGH);
       if(updn<9999){
       updn=updn-1;
       Serial.println("DN");
       Serial.println(updn);
       delay(1000);
       }else{updn=0;}
  }
  lcd.setCursor(5, 0);
  lcd.print("SET YEAR"); // You can make spaces using well... spaces
  lcd.setCursor(5, 1); // Or setting the cursor in the desired position.
  RTC.setYear(updn);
  lcd.print(RTC.getYear());
 // updn=RTC.getHours();
  delay(500);
  break;
case 8:  // your hand is nowhere near the sensor
  lcd.clear();
  lcd.setCursor(5, 0);
  lcd.print("SET WEEK"); // You can make spaces using well... spaces
  lcd.setCursor(5, 1); // Or setting the cursor in the desired position.
  lcd.print(RTC.getWeek());
  updn=RTC.getWeek();
  //dn=RTC.getHours();
  if (sensorVal2 == HIGH) {
      digitalWrite(13, LOW);
        } else {
      digitalWrite(13, HIGH);
      if(updn<59){
         updn=updn+1;
         Serial.println("UP");
         Serial.println(updn);
         delay(1000);
        }else{updn=0;}
  }
  if (sensorVal3 == HIGH) {
       digitalWrite(13, LOW);
       } else {
       digitalWrite(13, HIGH);
       if(updn<59){
       updn=updn-1;
       Serial.println("DN");
       Serial.println(updn);
       delay(1000);
```

```
            }else{updn=0;}
          }
        lcd.setCursor(5, 0);
        lcd.print("SET WEEK"); // You can make spaces using well... spaces
        lcd.setCursor(5, 1); // Or setting the cursor in the desired position.
        RTC.setWeek(updn);
        lcd.print(RTC.getWeek());
      // updn=RTC.getHours();
        delay(500);
        break;

        case 9:  // your hand is nowhere near the sensor
        lcd.clear();
        lcd.setCursor(1, 0);
        lcd.print("PRESS UP DN KEYS"); // You can make spaces using well... spaces
        lcd.setCursor(1, 1); // Or setting the cursor in the desired position.
        lcd.print("TO EXIT MENU");
        delay(500);
      while ((sensorVal2) == LOW  && (sensorVal3) == LOW)
        {
          mainclockdisplay();
        }
        break;

  }
  delay(1);  // delay in between reads for stability


}

void mainclockdisplay()

{

  int sensorVal1 = digitalRead(2);
  int sensorVal2 = digitalRead(3);
  int sensorVal3 = digitalRead(4);
  int sensorVal4 = digitalRead(5);


#define HOUR_AM 0
#define HOUR_PM 1

  switch (RTC.getWeek())
  {
    case 1:
      Serial.print("SUN");
      lcd.setCursor(13, 1);
      lcd.print("SUN");
      break;
```

```
    case 2:
      Serial.print("MON");
      lcd.setCursor(13, 1);
      lcd.print("MON");
      break;
    case 3:
      Serial.print("TUE");
      lcd.setCursor(13, 1);
      lcd.print("TUE");
      break;
    case 4:
      Serial.print("WED");
      lcd.setCursor(13, 1);
      lcd.print("WED");
      break;
    case 5:
      Serial.print("THU");
      lcd.setCursor(13, 1);
      lcd.print("THU");
      break;
    case 6:
      Serial.print("FRI");
      lcd.setCursor(13, 1);
      lcd.print("FRI");
      break;
    case 7:
      Serial.print("SAT");
      lcd.setCursor(13, 1);
      lcd.print("SAT");
      break;
  }
  Serial.print(" ");
  Serial.print(RTC.getDay());
  Serial.print("-");
  Serial.print(RTC.getMonth());
  Serial.print("-");
  Serial.print(RTC.getYear());

  Serial.print(" ");

  Serial.print(RTC.getHours());
  Serial.print(":");
  Serial.print(RTC.getMinutes());
  Serial.print(":");
  Serial.print(RTC.getSeconds());
  Serial.print(" ");
  Serial.println(RTC.getMeridiem());
  Serial.print(" ");

  if (RTC.getHourMode() == CLOCK_H12)
```

```
{
  if(RTC.getMeridiem() == HOUR_AM)
  {
    Serial.println(" AM");
    lcd.setCursor(10, 1);
    lcd.print("AM");
  }
  else
  {
   // (RTC.getMeridiem() == HOUR_PM)
    Serial.println(" PM");
    lcd.setCursor(10, 1);
    lcd.print("PM");
  }
}

Serial.print(RTC.getTemp());
Serial.print(" ");
lcd.setCursor(11, 0);
    lcd.print(RTC.getTemp());
    lcd.setCursor(15, 0);
    lcd.print("C");

//delay(100);
lcd.setCursor(0, 0);
if(RTC.getDay()<10){
lcd.print("0");
lcd.print(RTC.getDay()); // You can make spaces using well... spaces
} else {
 lcd.print(RTC.getDay()); // You can make spaces using well... spaces
}
lcd.setCursor(2, 0);
lcd.print("/");
lcd.setCursor(3, 0);
if(RTC.getMonth()<10){
lcd.print("0");
lcd.print(RTC.getMonth()); // You can make spaces using well... spaces
}
else {
lcd.print(RTC.getMonth()); // You can make spaces using well... spaces
}

lcd.setCursor(5, 0);
lcd.print("/");
lcd.setCursor(6, 0);
lcd.print(RTC.getYear()); // You can make spaces using well... spaces
lcd.setCursor(1, 1);
if(RTC.getHours()<10){
lcd.print("0");
lcd.print(RTC.getHours());
```

```
    }
    else {
    lcd.print(RTC.getHours());
    }

    lcd.print(":");
    if(RTC.getMinutes()<10){
    lcd.print("0");
    lcd.print(RTC.getMinutes());
    }
    else {
    lcd.print(RTC.getMinutes());
    }
    lcd.print(":");
    if(RTC.getSeconds()<10){
    lcd.print("0");
    lcd.print(RTC.getSeconds());
    } else {
    lcd.print(RTC.getSeconds());
    }

    lcd.print(" ");



    delay(1000);
    // BACKLIGHT FUNCTION TURNED OFF
    //lcd.clear();
    // lcd.backlight();
         // delay(5);
    //lcd.noBacklight();
    //WHEN QUIT BUTTON PRESSED CLOCK
    while ((sensorVal4) == LOW )
       {
         loop();
       }

}
```