#include <Wire.h>

#include <LiquidCrystal.h>

#include <RTClib.h>

DateTime now;

RTC\_DS3231 rtc;

LiquidCrystal lcd(12, 11, 10, 9, 8, 7); // (rs, e, d4, d5, d6, d7)

// Interrupt 0 is hardware pin 4 (digital pin 2)

int btnSet = 0;

// Interrupt 1 is hardware pin 5 (digital pin 3)

int btnSel = 1;

// Interrupt state

int togBtnSet = false;

int togBtnSel = false;

// Time and date variables

int tmpHour = 0;

int tmpMinute = 0;

int tmpDate = 0;

int tmpMonth = 0;

int tmpYear = 0;

int tmpDay = 0;

int tmpSecond = 0;

int counterVal = 0;

// Variable to keep track of where we are in the "menu"

int myMenu[6]; // 0=Hour, 1=Minutes, 2=date, 3=MOnth, 4=Year, 5=DOW

int menuCounter = 0;

// A array of the weekday

char\* days[] = { "NA", "Mon", "Tue", "Wed", "Thu", "Fre", "Sat", "Sun" };

void setup() {

// Interrupt declaration, execute increaseValue/nextItem function

// when btnXXX is RISING

attachInterrupt(btnSet, increaseValue, RISING);

attachInterrupt(btnSel, nextItem, RISING);

**Wire**.begin();

lcd.begin(16,2);

showWelcome();

}

// Interrupt function

void increaseValue()

{

// Variables

static unsigned long lastInterruptTime = 0;

// Making a timestamp

unsigned long interruptTime = millis();

// If timestamp - lastInterruptTime is greater than 200

if (interruptTime - lastInterruptTime > 200)

{

// Toggle the variable

togBtnSet = !togBtnSet;

// Increase the counterVal by 1

counterVal++;

}

// Setting lastInterruptTime equal to the timestamp

// so we know we moved on

lastInterruptTime = interruptTime;

}

// Next menuItem Interrupt function

void nextItem()

{

static unsigned long lastInterruptTime = 0;

unsigned long interruptTime = millis();

if (interruptTime - lastInterruptTime > 200)

{

togBtnSel = !togBtnSel;

// Increase the menu counter so we move to next item

menuCounter++;

// Placing the counterVal in the menucounters array position

myMenu[menuCounter] = counterVal;

// Reset counterVal, now we start at 0 on the next menuItem

counterVal = 0;

}

lastInterruptTime = interruptTime;

}

// Function that convert decimal numbers to binary

byte decToBCD(byte val)

{

return ((val/10\*16) + (val));

}

// Short welcome message, now we know everything is OK

void showWelcome()

{

lcd.setCursor(2,0);

lcd.print("Hello world.");

lcd.setCursor(3,1);

lcd.print("I'm alive.");

delay(500);

lcd.clear();

}

// Funcion to set the hour

void setHour()

{

lcd.setCursor(0,0);

lcd.print("Set hour. ");

// Checks if interrupt has occured = button pressed

if (togBtnSet)

{

// Update array value with counterVal

myMenu[menuCounter] = counterVal;

lcd.setCursor(7,1);

// Print the new value

lcd.print(myMenu[menuCounter]); lcd.print(" ");

}

else

{

// Update array value with counterVal

myMenu[menuCounter] = counterVal;

lcd.setCursor(7,1);

// Print the new value

lcd.print(myMenu[menuCounter]); lcd.print(" ");

}

}

// Function to set minutes

void setMinute()

{

lcd.setCursor(0,0);

lcd.print("Set minute. ");

if (togBtnSet)

{

myMenu[menuCounter] = counterVal;

lcd.setCursor(7,1);

lcd.print(myMenu[menuCounter]); lcd.print(" ");

}

else

{

myMenu[menuCounter] = counterVal;

lcd.setCursor(7,1);

lcd.print(myMenu[menuCounter]); lcd.print(" ");

}

}

// Function to set date

void setDate()

{

lcd.setCursor(0,0);

lcd.print("Set date. ");

if (togBtnSet)

{

myMenu[menuCounter] = counterVal;

lcd.setCursor(7,1);

lcd.print(myMenu[menuCounter]); lcd.print(" ");

}

else

{

myMenu[menuCounter] = counterVal;

lcd.setCursor(7,1);

lcd.print(myMenu[menuCounter]); lcd.print(" ");

}

}

// Function to set month

void setMonth()

{

lcd.setCursor(0,0);

lcd.print("Set month. ");

if (togBtnSet)

{

myMenu[menuCounter] = counterVal;

lcd.setCursor(7,1);

lcd.print(myMenu[menuCounter]); lcd.print(" ");

}

else

{

myMenu[menuCounter] = counterVal;

lcd.setCursor(7,1);

lcd.print(myMenu[menuCounter]); lcd.print(" ");

}

}

// Function to set year

void setYear()

{

lcd.setCursor(0,0);

lcd.print("Set year. ");

if (togBtnSet)

{

myMenu[menuCounter] = counterVal;

lcd.setCursor(7,1);

lcd.print(myMenu[menuCounter]); lcd.print(" ");

}

else

{

myMenu[menuCounter] = counterVal;

lcd.setCursor(7,1);

lcd.print(myMenu[menuCounter]); lcd.print(" ");

}

}

// Function to set the day of week

void setDOW()

{

lcd.setCursor(0,0);

lcd.print("Set day (1=mon).");

if (togBtnSet)

{

myMenu[menuCounter] = counterVal;

lcd.setCursor(7,1);

lcd.print(myMenu[menuCounter]); lcd.print(" ");

}

else

{

myMenu[menuCounter] = counterVal;

lcd.setCursor(7,1);

lcd.print(myMenu[menuCounter]); lcd.print(" ");

}

}

// Write the data to the RTC

void writeRTC()

{

**Wire**.beginTransmission(0x68);

**Wire**.write(0); // Start address

**Wire**.write(0x00); // seconds

**Wire**.write(decToBCD(myMenu[1])); // convert tmpMinutes to BCD and write them

**Wire**.write(decToBCD(myMenu[0])); // convert tmpHour to BCD and write them

**Wire**.write(decToBCD(myMenu[5])); // convert tmpDay to BCD and write them

**Wire**.write(decToBCD(myMenu[2])); // convert tmpDate to BCD and write them

**Wire**.write(decToBCD(myMenu[3])); // convert tmpMonth to BCD and write them

**Wire**.write(decToBCD(myMenu[4])); // convert tmpYear to BCD and write them

**Wire**.write(0b00010000); // enable 1Hz Square wave on PIN7

**Wire**.endTransmission(); // close the transmission

}

// Show the time

// You need to use the other program to see the RTC is working

void showTime()

{

lcd.setCursor(0,0);

lcd.print(" ");

lcd.print(myMenu[0]); lcd.print(":"); // hour

lcd.print(myMenu[1]); lcd.print(":"); lcd.print("00 "); // minute

lcd.setCursor(3,1);

lcd.print(days[myMenu[5]]); lcd.print(" "); // DOW

lcd.print(myMenu[2]); lcd.print("."); // date

lcd.print(myMenu[3]); lcd.print("."); // month

lcd.print(myMenu[4]); lcd.print(" "); // year

// Call the writeRTC function

writeRTC();

}

void loop()

{

if (menuCounter == 0)

{

setHour();

}

if (menuCounter == 1)

{

setMinute();

}

if (menuCounter == 2)

{

setDate();

}

if (menuCounter == 3)

{

setMonth();

}

if (menuCounter == 4)

{

setYear();

}

if (menuCounter == 5)

{

setDOW();

}

if (menuCounter == 6)

{

showTime();

}

}