**#include "MAX30100\_PulseOximeter.h" #include <Wire.h>**

**#define sampling\_time 500**

**PulseOximeter pox;**

**const int number\_of\_readings = 10; float weighted\_avg = 0.4; uint32\_t last\_report\_generated = 0; uint32\_t last\_beat\_detected = 0; uint32\_t previous\_beat = 0; uint32\_t new\_beat = 0;**

**uint32\_t HR\_var = 0; int readings = 0;**

**int average\_heart\_rate = 0; int average\_SP02 = 0;**

**int average\_heart\_rate\_var = 0; byte Heart\_rate = 0;**

**byte SP02 = 0**

**byte heart\_rate\_var = 0; bool initialized = false;**

**bool calculating\_values = false;**

**void displayinitially()**

**{**

**if (not initialized)**

**{**

**Serial.println("");**

**Serial.println("please place your finger on the sensor");**

**initialized = true;**

**}**

**}**

**void beatdetected()**

**{**

**last\_beat\_detected = millis();**

**}**

**void HRV()**

**{**

**new\_beat = last\_beat\_detected;**

**HR\_var = new\_beat - previous\_beat;**

**previous\_beat = new\_beat;**

**}**

**void displayduringcalc(int i)**

**{**

**if (not calculating\_values)**

**{**

**calculating\_values =true;**

**initialized = false;**

**Serial.println("Processing...");**

**}**

**Serial.print(" .");**

**}**

**void output\_display()**

**{**

**Serial.println("");**

**Serial.println("Heart rate: ");**

**Serial.print(average\_heart\_rate);**

**Serial.println("BPM");**

**Serial.print("|");**

**Serial.println("");**

**Serial.println("Oxygen saturation Level:");**

**Serial.print(average\_SP02);**

**Serial.print("%");**

**Serial.print("|");**

**Serial.println("");**

**Serial.println("Heart rate variability: ");**

**Serial.println(average\_heart\_rate\_var);**

**Serial.println(" msec");**

**Serial.print("|");**

**}**

**void calc\_average(int Heart\_rate, int SP02)**

**{**

**if (Heart\_rate > 30 and Heart\_rate<220 and SP02 >50)**

**{**

**average\_heart\_rate = weighted\_avg \* (Heart\_rate) + (1- weighted\_avg)**

**\* average\_heart\_rate;**

**average\_SP02 = weighted\_avg \* (SP02) + (1- weighted\_avg) \* average\_SP02;**

**readings++;**

**displayduringcalc(readings);**

**}**

**if(readings== number\_of\_readings){**

**readings = 0;**

**output\_display();**

**}**

**}**

**void setup()**

**{**

**Serial.begin(115200);**

**pox.begin();**

**pox.setOnBeatDetectedCallback(beatdetected);**

**displayinitially();**

**}**

**void loop()**

**{**

**pox.update();**

**if ((sampling\_time < millis() - last\_report\_generated))**

**{**

**calc\_average(pox.getHeartRate(), pox.getSpO2());**

**last\_report\_generated = millis();**

**}**

**if((millis() - last\_beat\_detected > 3000))**

**{**

**average\_heart\_rate = 0;**

**average\_SP02 = 0;**

**displayinitially();**

**}**

**}**