Internet of Things (IOT) – lab 4

Objective:

(1) Establish duplex communication between Android app at UDOO and Arduino sketch at UNO.
(2) Explore the use of pulse and oxygen in blood sensor (SP02) and position sensor on e-health sensor platform

Configuration at Arduino UNO

Download the eHealth and PinChangeInt folders (Figure 1) if you have not done so. Copy the folders into Arduino IDE folder libraries, for example c:\Program Files (x86)\Arduino\libraries .

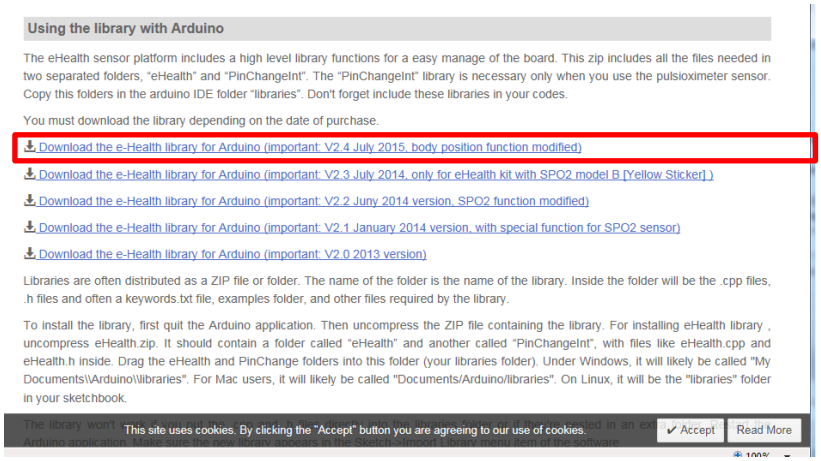

Figure 1: e-Health library

At Arduino IDE, select Sketch -> Import Library … -> eHealth. At Arduino IDE, select Sketch -> Import Library … -> PinChangeInt. At Arduino IDE, compile and upload the lab4_UNO, into Arduino UNO. Then perform the configuration as shown in Figure 2.

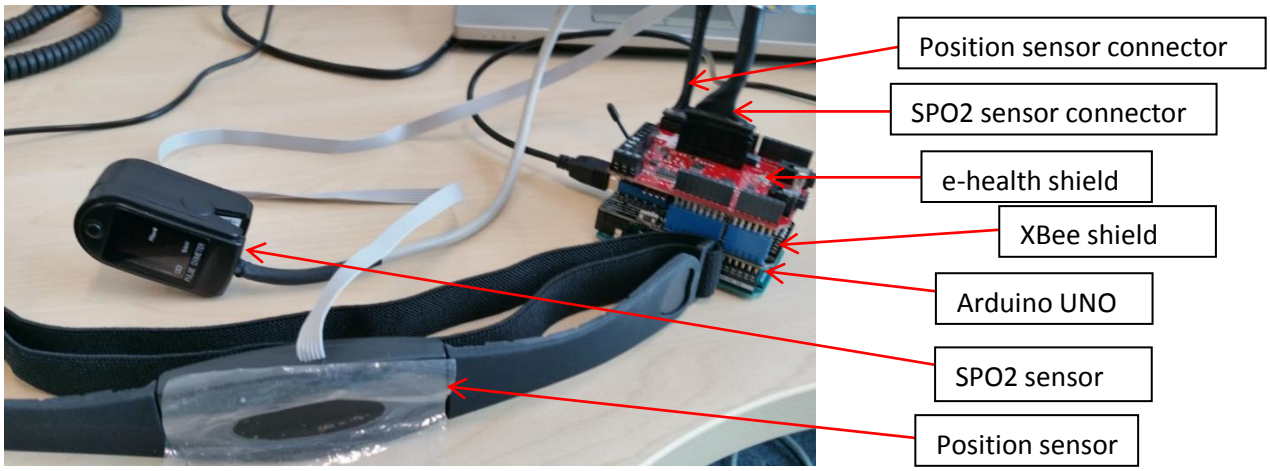

Figure 2: SPO2 and position sensors to Arduino UNO

Place your finger into SPO2 device as shown in Figure 6 and shake the position device. Some readings will be seen in the serial monitor at Arduino UNO (like in Figure 3).

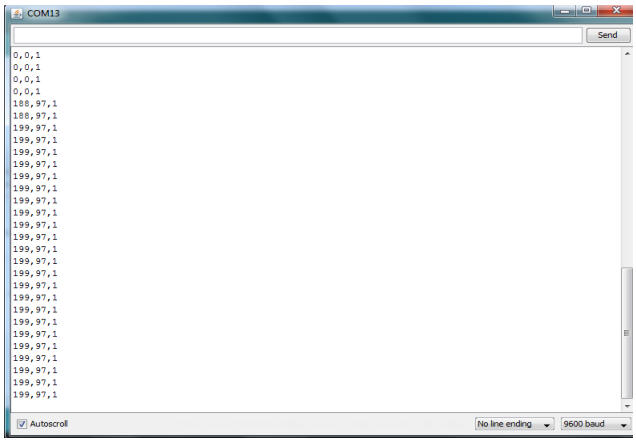

Figure 3: Readings in serial monitor at Arduino UNO

Configuration at UDOO

Follow the same steps as specified in lab 1 to upload the sketch file, lab4_Due, into UDOO Arduino Due. Perform the configuration to communicate with the sketch at Arduino UNO. Part of the configuration is shown in Figure 4. A successful communication set-up with Arduino UNO will display readings like in Figure 5 when a finger is placed in the SPO2 device and the position device is shaken.

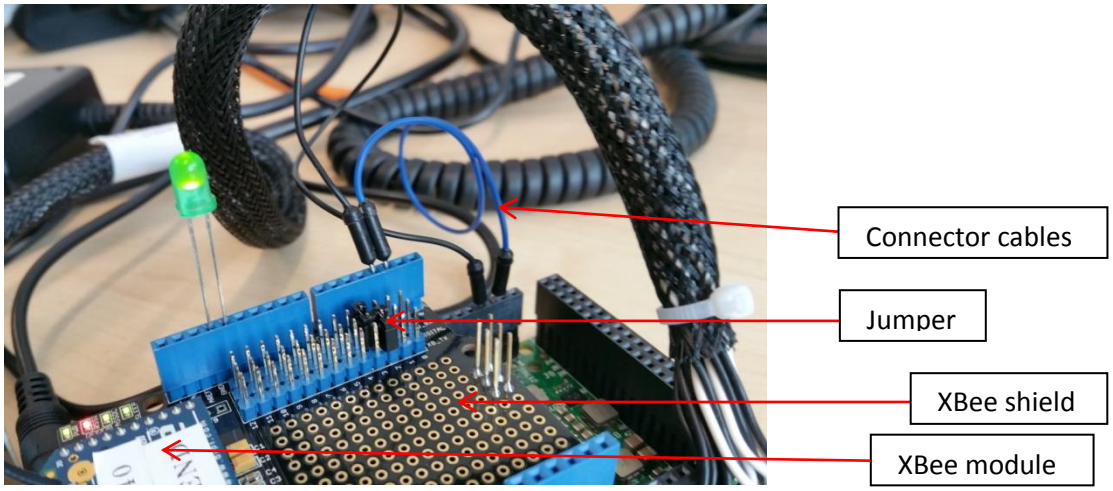

Figure 4: Serial1 port for communication at UDOO

Figure 5: Readings in serial monitor at Arduino Due (UDOO)

Upload the file, lab4_android, into UDOO. If successful, a user interface (like Figure 6) will appear in the LCD. Place a finger into the SPO2 device and shake the position device. Some readings will be seen in the LCD (Figure 6).

One way communication from the sketch in Arduino UNO to Android app at UDOO has been demonstrated.

Figure 6: Readings in LCD at UDOO

Duplex communication between Android app and Arduino UNO

Modify the programs to show duplex communication between Android app at UDOO and Arduino UNO. When the turn on button is pressed at the LCD, the LEDs are lighted at UDOO and Arduino UNO (Figure 7). At the serial monitor of Arduino UNO, the letter 'H' and some readings are displayed (Figure 8). When the turn off button is pressed, the LEDs are turned off.

When the position device is shaken, readings are recorded at the LCD (Figure 7).

After you have finished, get a check off from one of the instructors or TA's by system demonstration.

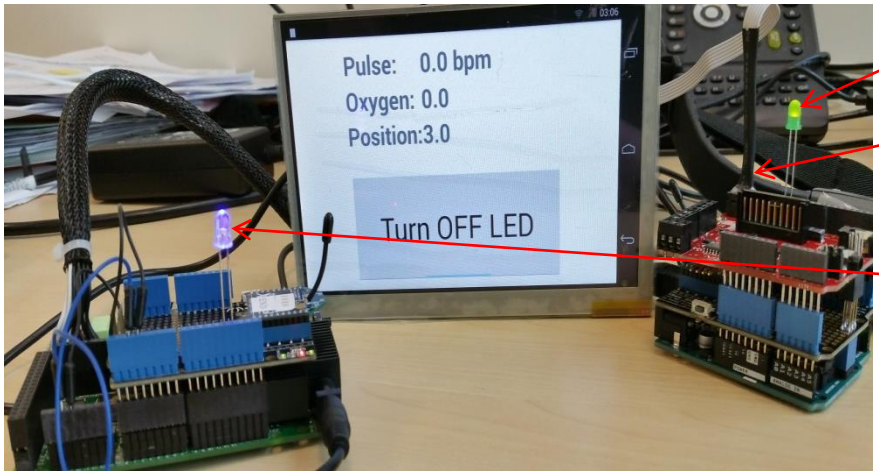

Figure 7: Duplex communication between Android app at UDOO and sketch at Arduino UNO

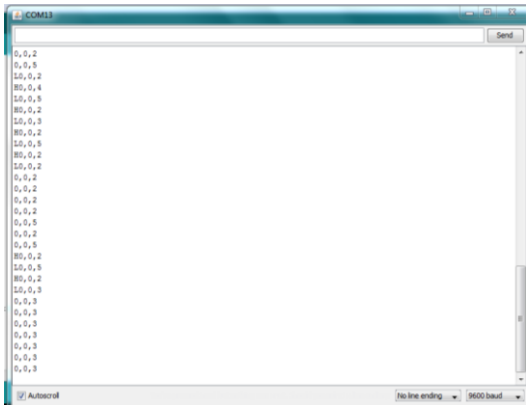

Figure 8: 'H' and some readings in serial monitor at Arduino UNO