# Library Installation

 Download and install the three libraries that will be used in these examples: a. https://github.com/bsiever/-SIGCSE2016-IoT-Simblee/raw/master/ SIGCSE.zip

c. https://github.com/bsiever/SimbleeForMobile-BarGraph/raw/master/ SimbleeForMobile-BarGraph.zip

b. https://github.com/bsiever/Simblee-PulseSensorAmped/raw/master/ Simblee-PulseSensorAmped.zip

2. Add each Library to the Arduino IDE:





#### Part 1: Parts



#### Part 2: Assembly

A. Plug the USB Shield into the Breadboard. Carefully line up the pins in the locations shown below and push down firmly until the USB shield is flush with the breadboard.



B. Stack the Simblee on top of the USB Shield. Again, carefully line up the pins and push down firmly.



C. Stack the RGB Shield on top of the Simblee, carefully line up the pins, and push down firmly:



D. When assembled the profile should look like:



# Part 3: Programming

- 1. Plug the USB cable into your Computer and the USB Shield
- Load the Blinky Example in Arduino
  File → Examples → SIGCSE 2016 IoT → Blinky
- 3. Save it as "MyBlinky"
- 4. Upload and observe
- 5. Try the TODO items in the comment block

# Exercise 2: RGB Light

# Part 0: Preparation

Before changing parts upload a blank sketch. This ensures that outputs won't inadvertently be turned on when you go to program the new sketch.

#### Part 1: Parts

- Breadboard
- USB Shield
- Simblee
- RGB Shield

#### Part 2: Assembly

Same as Exercise 1.

#### Part 3: Programming

- Load the Blinky Example
  File ► Examples ► SIGCSE 2016 IoT ► SimBLESmartLight
- 2. Save it as "MySmartLight"
- 3. Complete the "TODO" item
- 4. Upload
- 5. Interact via LightBlue. Write 3 bytes to characteristic: 2D30C083-F39F-4CE6-923F-3484EA480596
- 6. Try TODO challenges

# Exercise 3: Sit Bit (SimbleeForMobile)

#### Part 0: Preparation

Before changing parts upload a blank sketch. This ensures that outputs won't inadvertently be turned on when you go to program the new sketch.

#### Part 1: Parts

- Breadboard
- Simblee
- USB Shield (for programming)
- 1 wire
- 1 Tilt Switch



The USB Shield isn't needed.

#### Part 2: Assembly

A. Plug the USB Shield into the Breadboard. Carefully line up the pins in the locations shown below and push down firmly until the USB shield is flush with the breadboard.



B. Stack the Simblee on top of the USB Shield. Again, carefully line up the pins and push down firmly.



C. Connect the wire and tilt switch to the breadboard and Simblee, like:



D. When assembled the profile should look like:



# Part 3: Programming

- Load the SitBit Example
  File ► Examples ► SIGCSE 2016 IoT ► SitBit
- 2. Save it as "MySitBit"
- 3. Read and complete setup() TODO Items
- 4. Upload / Test
- 5. Open SimbleeForMobile on Mobile Device
- 6. Try TODO Items

## Part 4: Extra

Try using your Simblee without the USB cord:

- 1. Disconnect the USB cable
- 2. Put batteries in a Battery Shield
- 3. Ensure that the Battery Shield is Off
- 4. Remove the Siblee and USB Shield
- 5. Place the Battery Shield where the USB shield had been
- 6. Place the Simblee on top of the Battery Shield
- 7. Carefully check all connections:
  - 1. Make sure the GND on the Simblee is aligned with the tilt switch
  - 2. Make sure one side of the wire is aligned with the tilt switch
  - 3. Make sure the opposite side of the wire is plugged into GPIO 6 on the Simblee
- 8. Turn the Battery on

Note that the Shield has an LED indicator that shows when it is on/off. The small switches on the Shield can be used to turn the LED off, which will allow the batteries to last longer.

# Exercise 4: Heart Rate Monitor (SimbleeForMobile)

## Part 0: Preparation

Before changing parts upload a blank sketch. This ensures that outputs won't inadvertently be turned on when you go to program the new sketch.

#### Part 1: Parts

- Breadboard
- Simblee
- USB Shield (for programming)
- PulseSensor (http://pulsesensor.com/ or other sources):



#### Part 2: Assembly

A. Plug the USB Shield into the Breadboard. Carefully line up the pins in the locations shown below and push down firmly until the USB shield is flush with the breadboard.



B. Stack the Simblee on top of the USB Shield. Again, carefully line up the pins and push down firmly.



C. Connect the pulse sensor to the Simblee, like:



Notice that when you are looking at the heart the <u>right wire</u> is connected to the pin marked <u>GPIO6</u>, the <u>middle wire</u> is connected to the pin marked  $\pm 3V$  and the <u>left wire</u> is connected to the pin marked <u>GND</u>.

- D. Affix the velcro circle to the back to the Pulse Sensor and stick it to the soft side of the velcro strip.
- E. When assembled the profile should look like:



## Part 3: Programming

- Load the Blinky Example
  File ► Examples ► SIGCSE 2016 IoT ► PulseMonitor
- 2. Save it as "MyPulseMonitor"
- 3. Read / Complete setup() TODO Items
- 4. Upload / Test
- 5. Open SimbleeForMobile on Mobile Device
- 6. Try TODO Items

To use the Pulse sensor gentle place the center of a finger on the center of the sensor and lightly wrap the velcro around the finger. The sensor should be lightly touching the skin.

#### Part 4: Extra

Try using your Simblee without the USB cord:

- 1. Disconnect the USB cable
- 2. Put batteries in a Battery Shield
- 3. Ensure that the Battery Shield is Off
- 4. Remove the Siblee and USB Shield
- 5. Place the Battery Shield where the USB shield had been
- 6. Place the Simblee on top of the Battery Shield
- 7. Carefully check all connections between the Pulse Sensor and the Simblee
- 8. Turn the Battery on

Note that the Shield has an LED indicator that shows when it is on/off. The small switches on the Shield can be used to turn the LED off, which will allow the batteries to last longer.