Module: Internet of Things **2019/2020**

Lab Session 3: Sensor Reading

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3.1 Introduction

In the last lab session we learned how to compile and run code on a sensor node. The goal of this session is to read the values of the light and temperature sensors of a node and output the values to the standard output. We use the program from the last session and extend it with the sensor reading routines.

3.2 Timer

To refresh the readings from the sensors and output them periodically we need timers that rerun a certain part of the code.

Each process that requires a timer has to define it inside the process with

```
static struct etimer timer;
```

After PROCESS_BEGIN`()`, the timer has to be configured, here we set it to 1 second. This is how:

```
etimer_set(&timer, CLOCK_CONF_SECOND/4);
```

Then we create an infinite while loop that runs our command such as reading the sensor values periodically.

```
while(1) {

  PROCESS_WAIT_EVENT_UNTIL(ev=PROCESS_EVENT_TIMER);// wait for
                                                   // the timer

  // do the magic here ... that gets executed every second

  etimer_reset(&timer); // reset the timer
}
```

3.3 Sensor Reading

To access the sensor functionalities, we have to include the header files for the light and temperature sensors.

```
#include "dev/light-sensor.h"
#include "dev/sht11-sensor.h"
```

After the process begins, we have to activate the sensors on the sensor node with:

```
SENSORS_ACTIVATE(light_sensor);
SENSORS_ACTIVATE(sht11_sensor);
```

And then eventually get the sensor readings from them with:

```
light_sensor.value(LIGHT_SENSOR_PHOTOSYNTHETIC);
sht11_sensor.value(SHT11_SENSOR_TEMP);
```

3.4 Exercise

Extend the program from the previous session with periodical timer that outputs the light level and the temperature reading to the standard output every second. Use the guides from above in your source code.

Note: Sensors produce raw readings. You need to find an appropriate function to convert them to meaning values. Please read the sensor data sheet.