Lab Exercise 3 – Networking with Contiki (Part 2)

Objectives:.

- Introduction to digital/analog peripherals in Contiki.
- Use the sensors (button, light, temperature) on the sensortag.
- Gain familiarity with 6LoWPAN, the IPv6 implementation for wireless sensor networks.
- Create and access a webserver on the sensortags.

Introduction:

There are two parts in this practical.

The first part introduces you to the sensor event functionality of Contiki. The goal is to understand the basics of Contiki, gain familiarity with the programing environment and the SensorTags.

The second part introduces you to the Contiki 6LoWPAN networking stack interface. The goal is to understand the basics of 6LoWPAN/RPL and to gain familiarity with using TCP connections to transfer information from the Sensortags.

TCP Webserver (5 Marks + 2 bonus)

Create a folder called *prac3* in your repo folder and set *prac3* as your Contiki project name (Makefile). See the main lab page on the website for submission instructions.

Implement a webserver using the `tcp-server` in order to control the Sensortag's LED, buzzer, pressure sensor (BMP_280), and humidity sensor (HDC_1000, bonus). Use a sensor sample rate of 2Hz. You must display the LEDs status or sensor values, uptime, node id, and set the Sensortag's LEDs (red, green, all) and buzzer using the web-browser.

HINT: you will need to implement the HTTP POST and GET functions.

You do not need to display HTML buttons, labels or text boxes.

Example web browser URLs are:

Toggle red LED (**1 Mark**): `[aaaa::212:4b00:afe:3302]/leds/r/1`

Turn on/off buzzer at 1kHz (**2 Marks**): `[aaaa::212:4b00:afe:3302]/buzzer/1000`

Collect 10 samples from the pressure sensor at 2Hz (**2 Marks**):
`[aaaa::212:4b00:791:3302]/pressure/10`

(Bonus 2 Marks) Collect 6 samples from the humidity sensor at 2Hz:
`[aaaa::212:4b00:afe:3302]/humidity/6`

References:

- Tutorial 5 – Sensors
- Tutorial 6 – 6LoWPAN Introduction
- Simple HTML guide: http://www.simplehtmlguide.com/basics.php