**Lab Training Embedded Systems SS2019**

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**Task: Climate Control**

The existing climate control interface in most Zusebau laboratories consists of three buttons/LEDs: Off, Heat, Cool. Besides the manual interaction possibility a time schedule is actively controlling these modes. Your task is to override this time schedule by a fixed target temperature control. A servo motor is to be used to press either the "Heat" or the "Cold" button, a temperature sensor will measure the temperature in the room, and a turning knob should be available to select the desired temperature. No hard modifications to the existing appliance are allowed or needed.

**Solution:**

The temperature sensor continuously measures the temperature in the room and outputs the current temperature value in Celsius degrees and Fahrenheit degrees to the Arduino IDE Serial Monitor.

Servo initial position is 90⁰.

The user sets the desired temperature value with the help of the turning knob. The values are in the range [+10 ⁰C; +60 ⁰C] (that can be modified in the code). The desired temperature value in Celsius degrees and Fahrenheit degrees is also continuously output to the Arduino IDE Serial Monitor.

The tolerance between actual and desired temperature is +- 1 ⁰C.

If the actual temperature is lower than desired, the servo motor changes the position to 180⁰, the red LED turns on and "☼☼☼☼☼☼ HEATING ☼☼☼☼☼☼" message appears on the Serial Monitor.

If the actual temperature is higher than desired, the servo motor changes the position to 0⁰, the green LED turns on and “❄❄❄❄❄❄ COOLING ❄❄❄❄❄❄" message appears on the Serial Monitor.

If the actual temperature is the same as the desired temperature, the servo returns to the original position and both LEDs turn off.

For the correct work the OneWire library for the temperature sensor was downloaded at:

<https://github.com/PaulStoffregen/OneWire>

**Connections**

Servo:

Brown: GROUND, red: +5V, orange: D9;

Green LED:

Cathode: GROUND, anode: 220Ω Resistor + D12;

Red LED:

Cathode: GROUND, anode: 220Ω Resistor + D13;

RW1820 Temperature Sensor:

G: GROUND, R:+5V, Y: D10;

Knob:

Left: +5V, Middle: A0, Right: Ground.