EXPLANATION OF ANY LIMITATIONS OF OUR SOLUTION

1- The sensor only works between 0 Celsius and 100 Celsius.

2- The sensor only works between 3.3 and 5.5 voltages.

3- The relay takes 5-volt values so to connect the needed voltage and current values we had to use an additional circuit

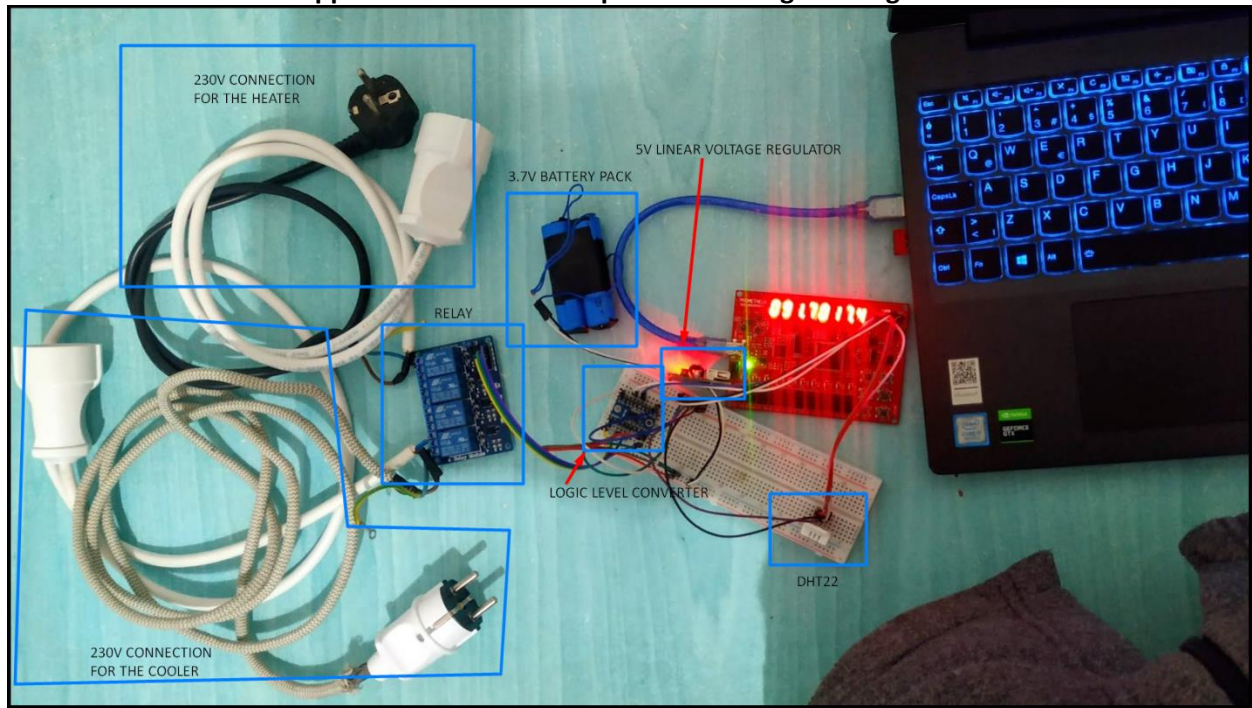**Appendix 2. FPGA Board photos showing working code**

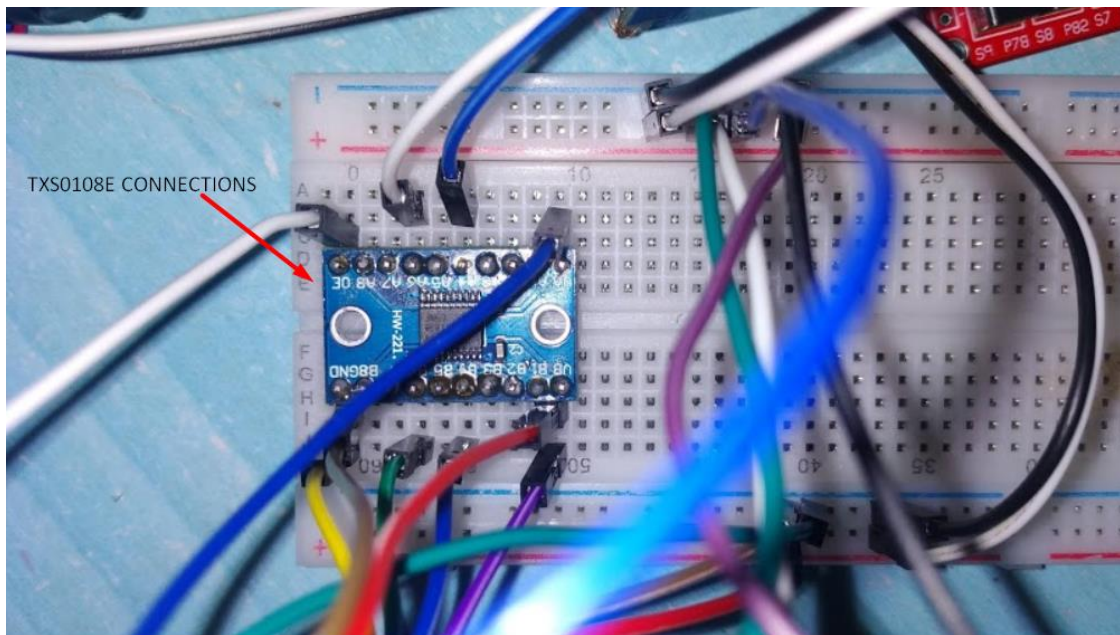Figure9: The electrical components we used for the project

Figure10: TXS0108E has been used as the logic level converter because our relay only takes 5V inputs

the humidity: 94.4%
the temperature: 17.3 oC
those values will be taken as the
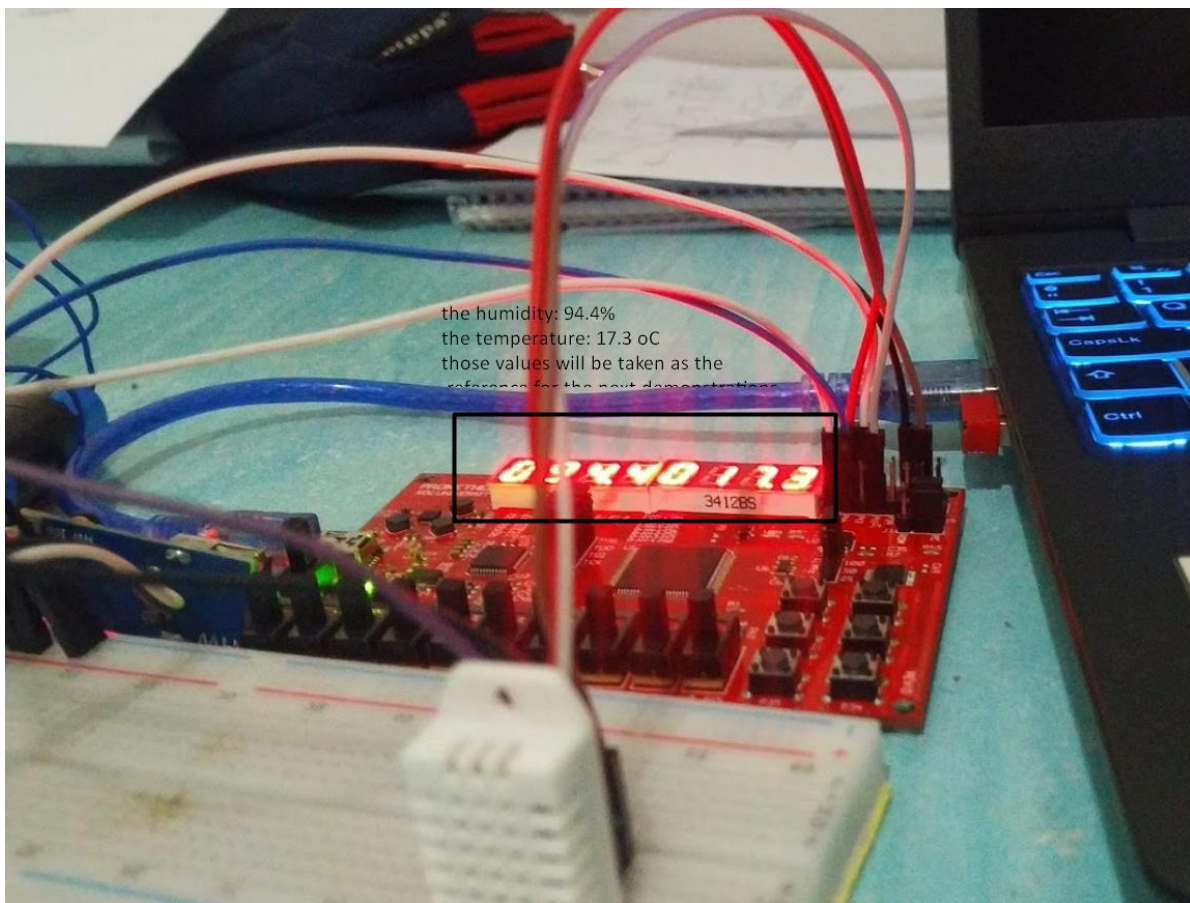reference for the next demonstrations

Figure11: The humidity data: 94.4%, and the temperature data: 17.3°C. For the next two photos, this temperature value will be taken as reference since the room temperature does not change very significantly in a short period of time
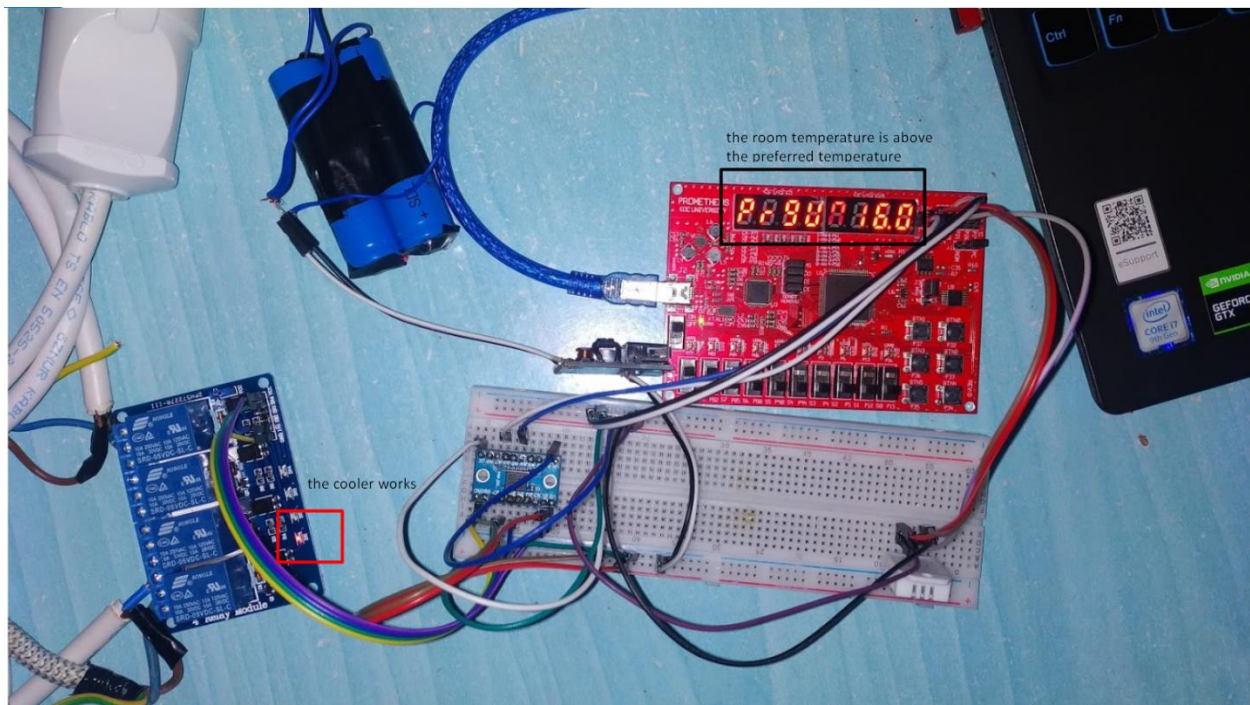
Figure12: The upper boundary has been set to 16°C. Since the room temperature (17.3°C) is above the desired temperature, the cooler works.
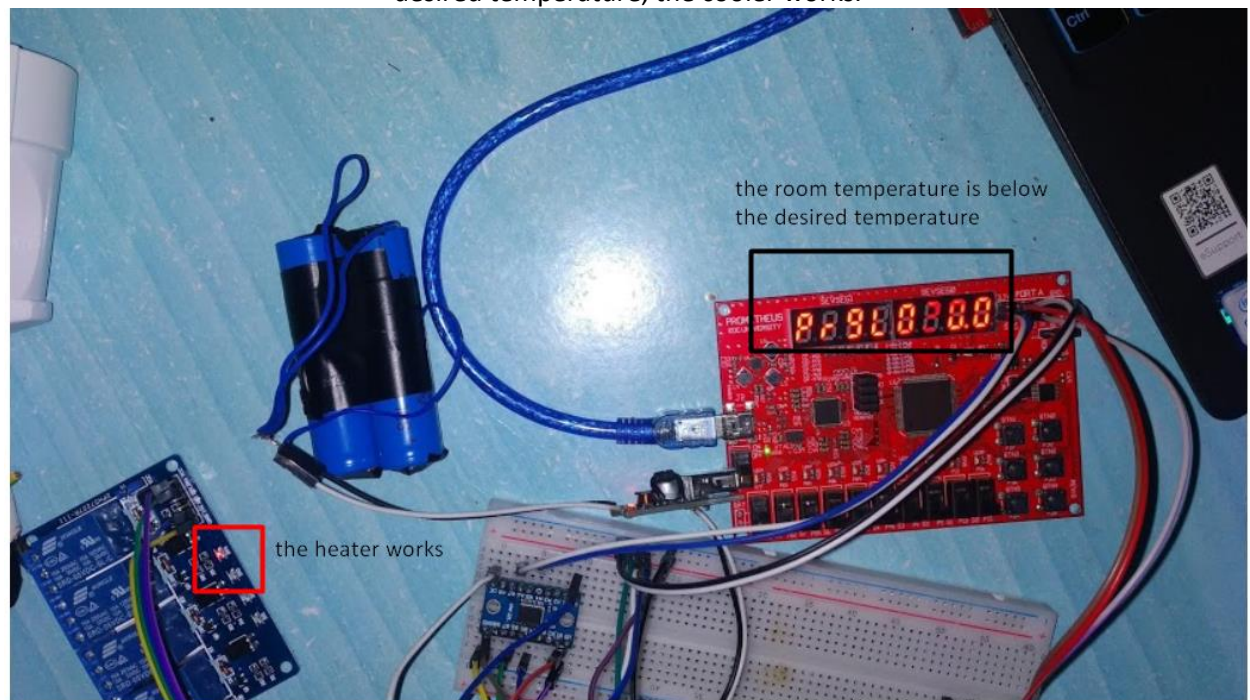

Figure13: The upper boundary has been set to 20°C. Since the room temperature (17.3°C) is below the desired temperature, the heater works.

Appendix3: The simulation outputs for the digital thermostat design
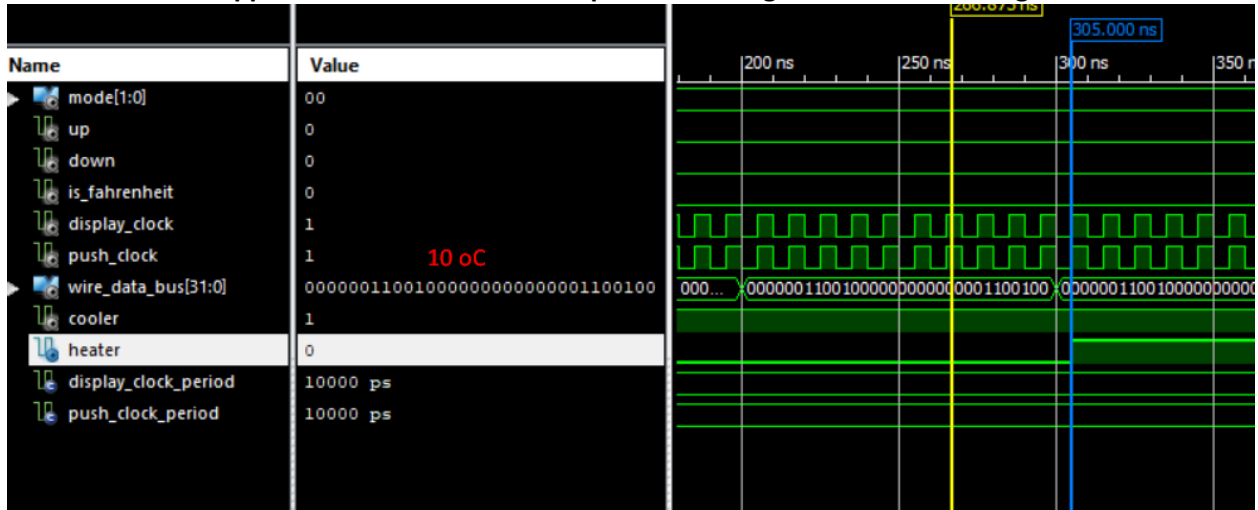

Figure14: At 10°C, the heater works. (The desired room temperature is between 15-25°C as default.)
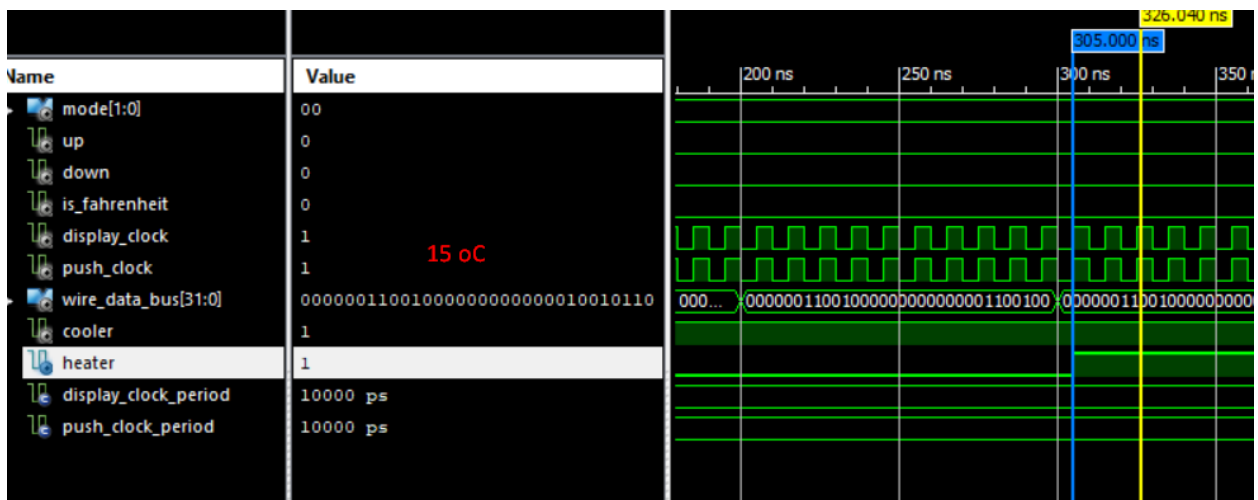

Figure15: At 15°C, neither the heater, nor the cooler works. (The desired room temperature is between 15-25°C as default.)
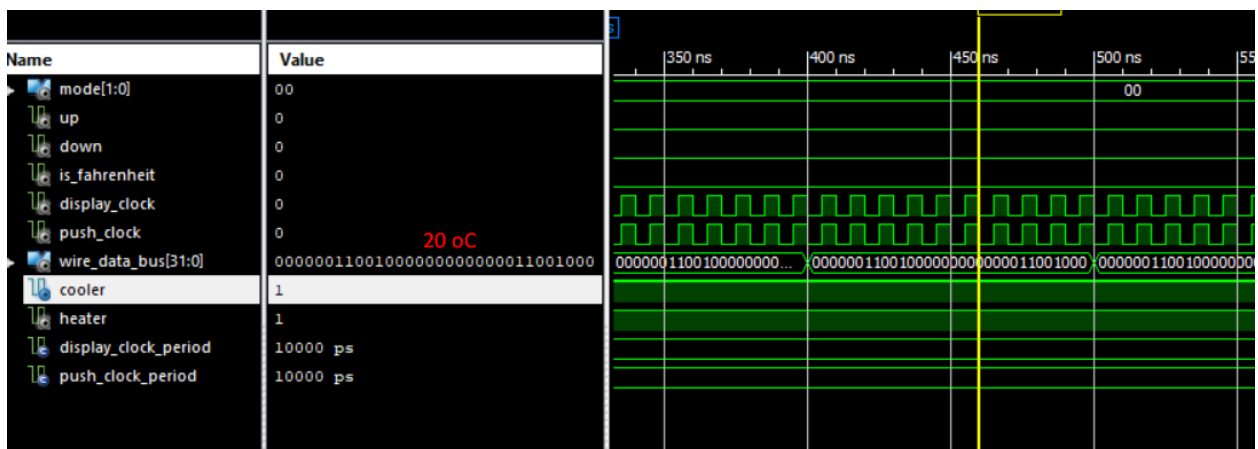

Figure16: At 20°C, none works. (The desired room temperature is between 15-25°C as default.)
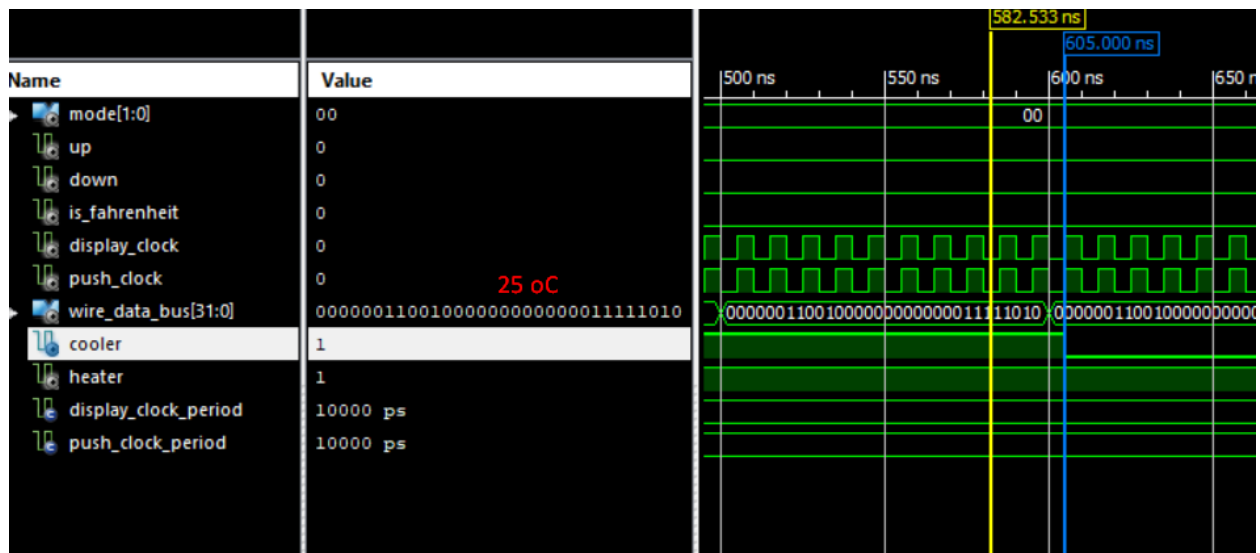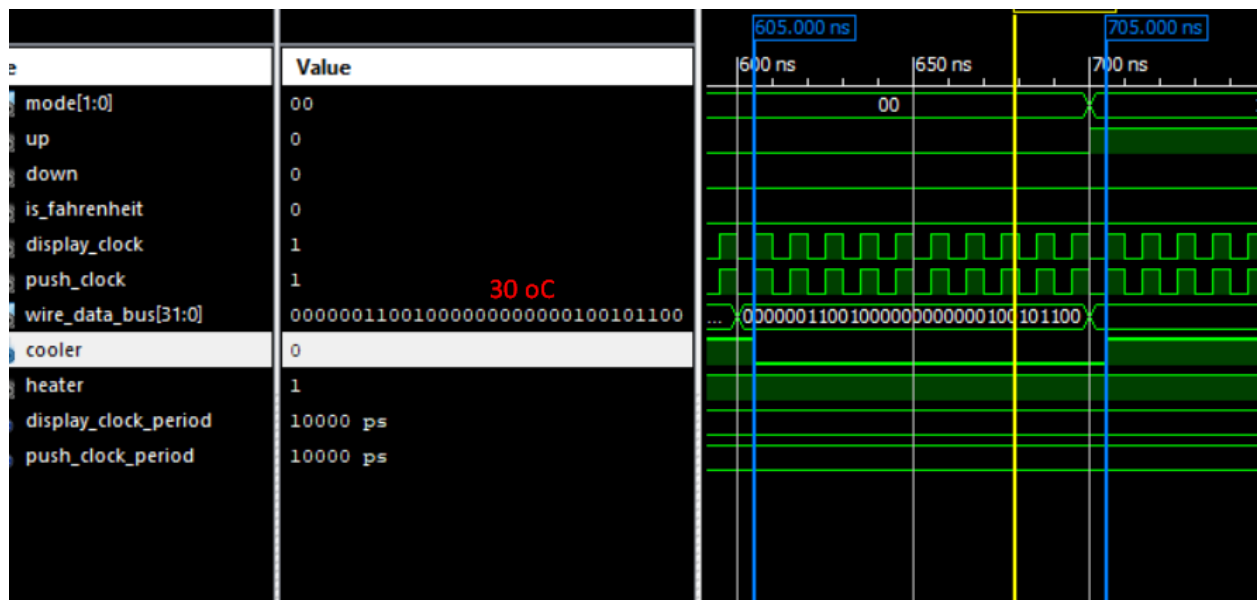
Figure17: At 25ºC, none works. (The desired room temperature is between 15-25ºC as default.)

Figure18: At 20ºC, the cooler works. (The desired room temperature is between 15-25ºC as default.)