Final Project: Thermostat Proto-type Scheduler Documentation

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This program is to be used to prototype the functionality of a thermostat using the CC3220S\_LAUNCHXL microcontroller by Texas Instruments. There are two expected inputs, which both come from the user. These are the GPIO interrupt buttons built into the microcontroller. The user is allowed to decrement the set point at which our heater turn on or off, or the user can increment the set point. When the user hits a button this executes a GPIO interrupt call back function which sets a flag. Then, every 200ms the scheduler checks to see if the flag has been raised.

Everyone millisecond we have a timer interrupt callback function execute which raises a timer flag for the scheduler to know to stop waiting. We also check to see if the timer is less than the setpoint or greater than or equal to the set point. This then will update the state machine accordingly. This component also allows us to see how long our program has been running since start up in the main scheduler and enables the scheduler to execute different functionality at different intervals of time.

Every 200ms we check to see if the user has raised either the increment or decrement flag with the GPIO interrupt. Every 500ms we will check and update the temperature variable, call the latch function which gets the current state and raises the heater flag or lowers it depending on the state we are in. Then the 500ms block of code will turn on the led or turn off the led depending on the state of our machine. It does this by checking the heater flag variable if it is raised by the latch function. Then every 1000ms we update our server through UART. We do this by transmitting the temperature, set point, state of the machine, and time sense the program started. In this order. Note, a ‘\r’ is appended to the end of this message to make the serial terminal readable. If this causes an issue take it out.