Electric Water Heater

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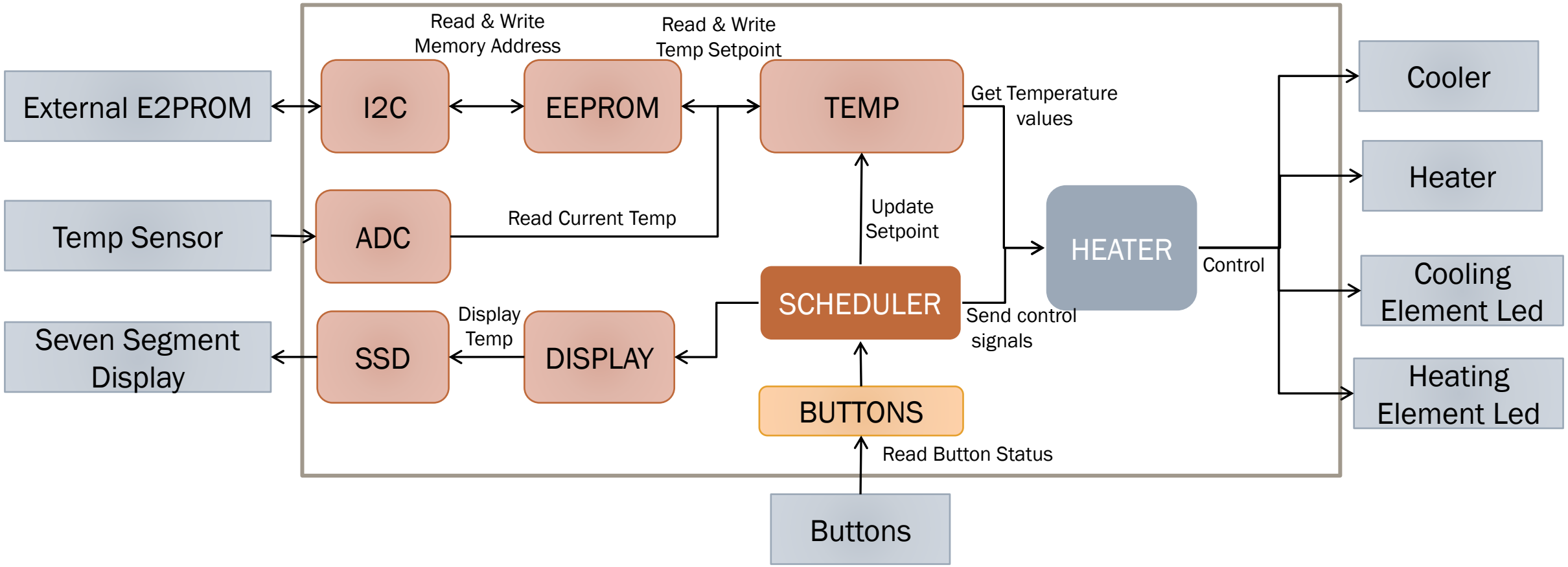
Objective

Creating a robust firmware to control an electric water heater according to the requirements.

Static Architecture



Software Modules

Modules	Function
ADC	Module that configures ADC and Reads ADC Result
Timer	Module that configures Timer0 and Timer1 and enables their interrupts.
I2C	Module that configures the I2C Bus .Sends and receives data from the bus. To be able to communicate with the eeprom memory.
EEPROM	Module that define EEPROM address and Reads/Writes Data to eeprom using I2C.
Buttons	Module that configures and defines the buttons and reads their status.
SSD	Module that configures the seven-segment display and displays values on it.
Temp	Module that get values of current , average and setpoint temperature values, and changes the setpoint temperature based on the user order.
Heater	Module that controls heater , cooler and their leds , based on the temperature.
Display	Module that Configures the state of the SSD and the value displayed on it.

Detailed Design

EEPROM
EEPROM_Read
EEPROM_Write

I2C
I2C_Master_Init
I2C_Master_Wait
I2C_Master_Start
I2C_Master_RepeatedStart
I2C_Master_Stop
I2C_NACK
I2C_Master_Write
I2C_Read_Byte

ADC
ADC_Init
ADC_Read

TIMER
TMR1_Init
TMR0_Init

TEMP
Get_Average_Temp
Update_Temp_Setpoint
UpdateTempArray
Get_Current_Temp
Get_Setpoint_Temp

DISPLAY
Update_Display
Display

SSD
SSD_Init
SSD_Write

BUTTONS
Buttons_Init
Buttons_Read

HEATER
Heater_Init
Disable_Heater
Update_Heater
Update_Heating_Elements

The End