ELECTRIC WATER HEATER

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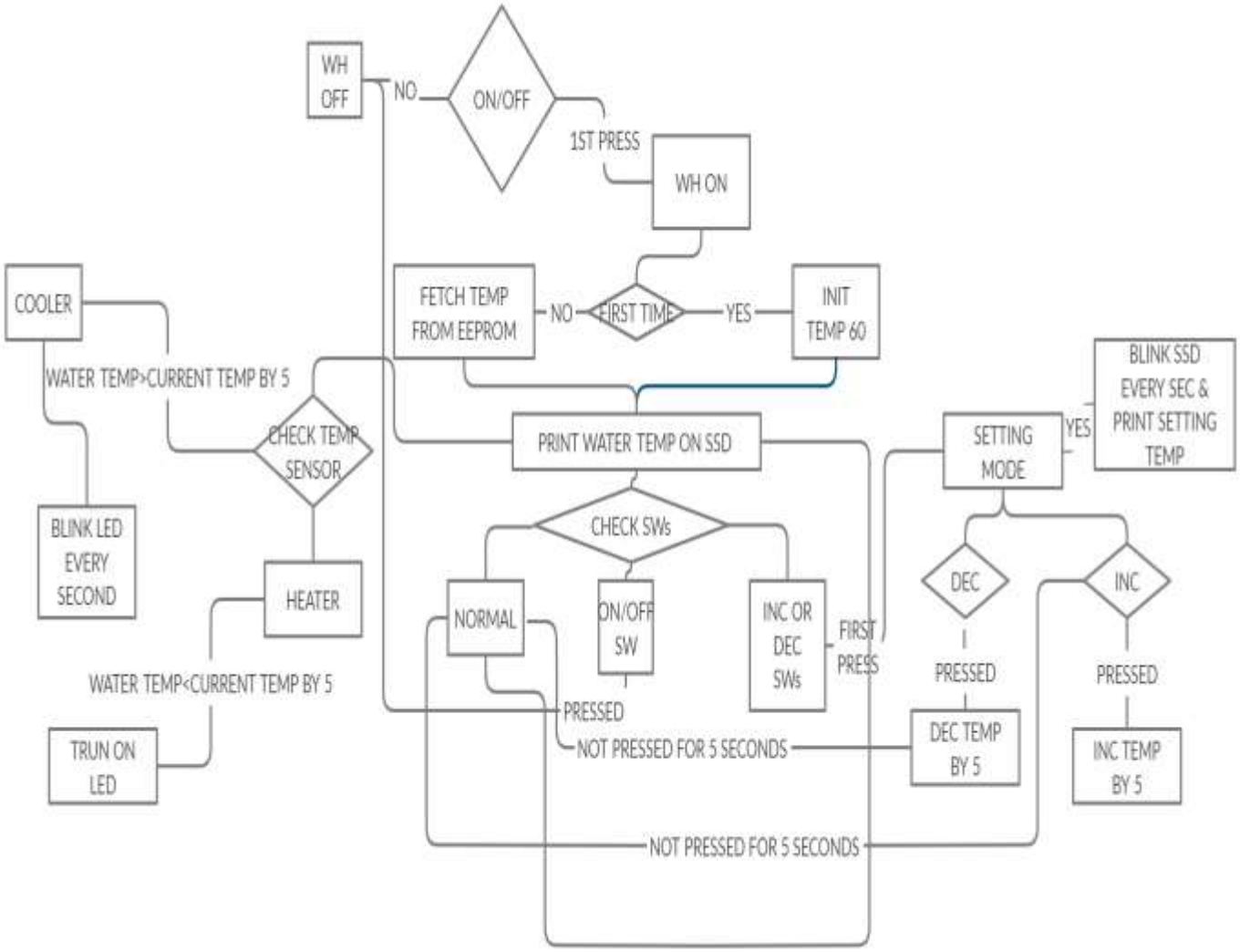
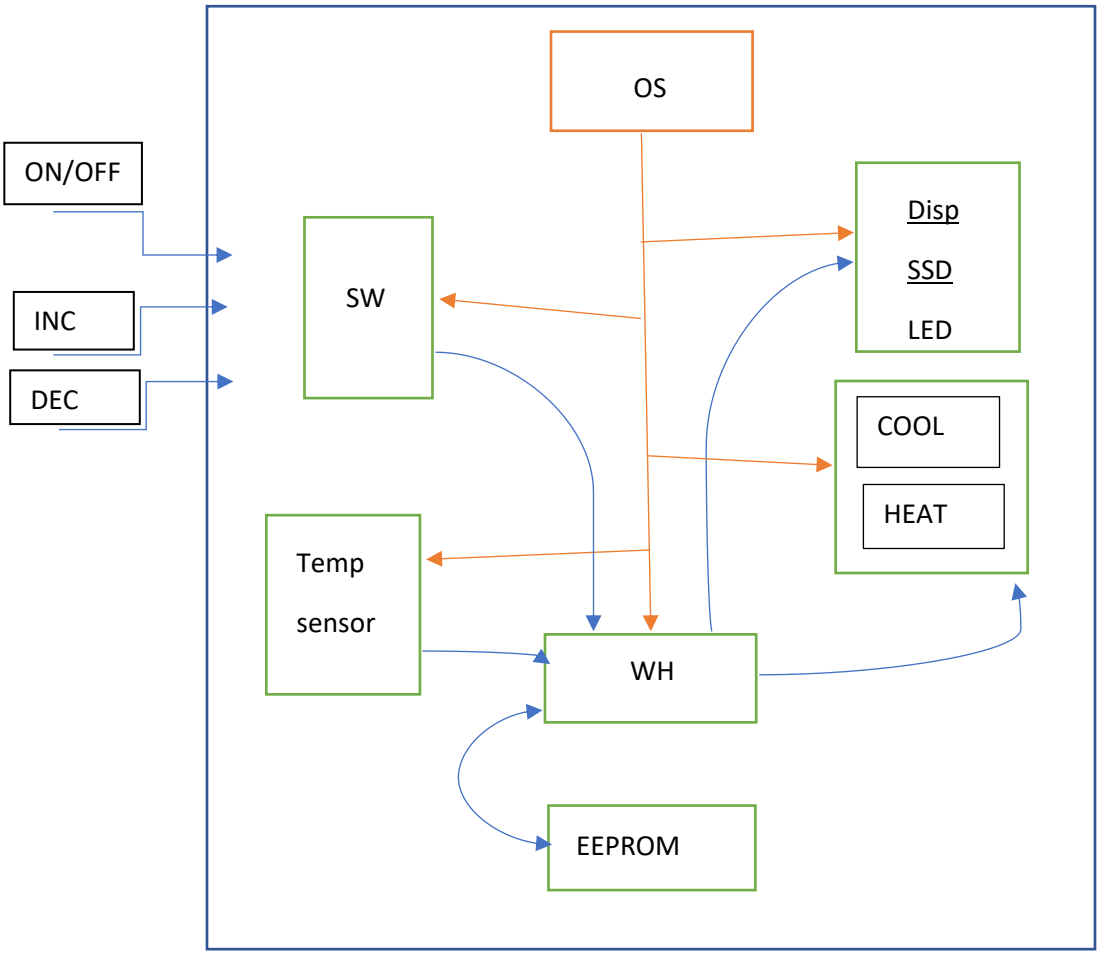
Flow Chart


WH OFF
NO
ON/OFF
1ST PRESS
WH ON
FETCH TEMP FROM EEPROM
NO
FIRST TIME
YES
INIT TEMP 60
COOLER
WATER TEMP>CURRENT TEMP BY 5
CHECK TEMP SENSOR
BLINK LED EVERY SECOND
HEATER
WATER TEMP<CURRENT TEMP BY 5
TRUN ON LED
PRINT WATER TEMP ON SSD
CHECK SWs
NORMAL
ON/OFF SW
INC OR DEC SWs
FIRST PRESS
PRESSED
NOT PRESSED FOR 5 SECONDS
SETTING MODE
YES
BLINK SSD EVERY SEC & PRINT SETTING TEMP
DEC
INC
PRESSED
PRESSED
DEC TEMP BY 5
INC TEMP BY 5
NOT PRESSED FOR 5 SECONDS

Static Architecture:



Detailed Design

- SW:
  - SW_Init
  - SW_GetState
  - SW_Update

- Cooling_element
  - Cool_Init
  - Cool_SetState
  - Cool_GetState
  - Cool_Update

- Disp:
  - DISP_Init
  - DISP_Update

- EEPROM
  - EEPROM_Write
  - EEPROM_Read

- Heating_element
  - Heat_Init
  - Heat_SetState
  - Heat_GetState
  - Heat_Update

- SSD
  - SSD_Init
  - SSD_SetValue
  - SSD_GetValue
  - SSD_GetState
  - SSD_SetState
  - SSD_SetDotState

- ADC
  - ADC_Init
  - ADC_Convert

- LED
  - LED_Init
  - LED_SetState
  - LED_GetState
  - LED_Toggle
  - LED_Update

- TempSensor
  - TempS_Init
  - TempS_GetTemp
  - TempS_AvgReadings
  - TempS_ReadDone
  - TempS_CLRReadFlag
  - TempS_Update

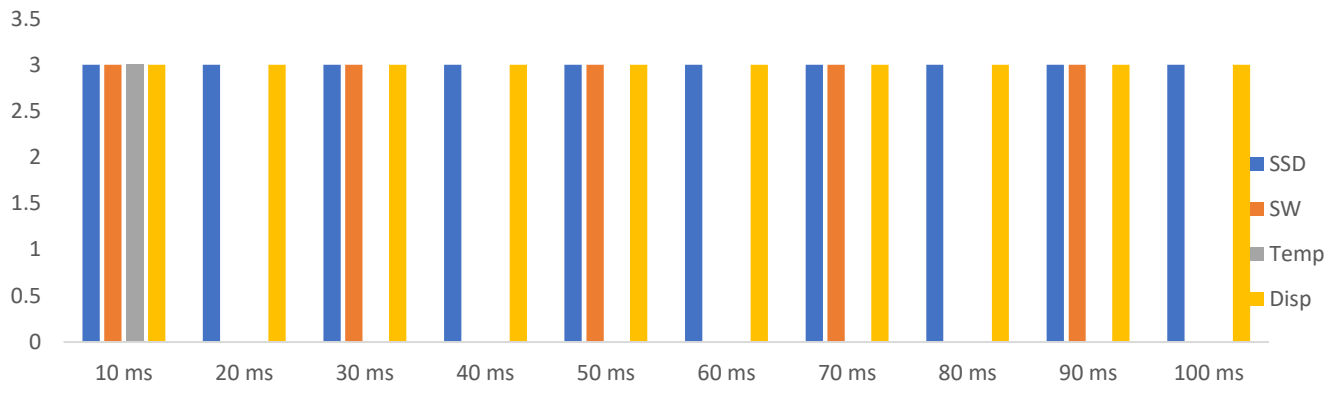
- WH
  - WH_Init
  - WH_GetTemp
  - WH_GetState
  - WH_Set_Temp
  - WH_UsedTemp
  - WH_Update

- TWI
  - I2C_Master_Init
  - I2C_Master_Wait
  - I2C_Master_Start
  - I2C_Master_RepeatedStart
  - I2C_Master_Stop
  - I2C_ACK
  - I2C_NACK
  - I2C_Master_Write
  - I2C_Master_Read

Time Analysis

Task	Actions	BCET (ms)	WCET (ms)	Periods of action (ms)	Period (ms)
-SW update	0	0	0	20	20
-SSD update	0	0	0	10	10
-Temp sensor update	0	0	0	100	100
-Display update	0	0	0	10	10
Water heater update	0	0	0	20	20
				Tick (ms)	10
				Major cycle (ms)	100

Schedulability Check



Gantt Chart Using Simso