Electric Water Heater

Swift Act challenge

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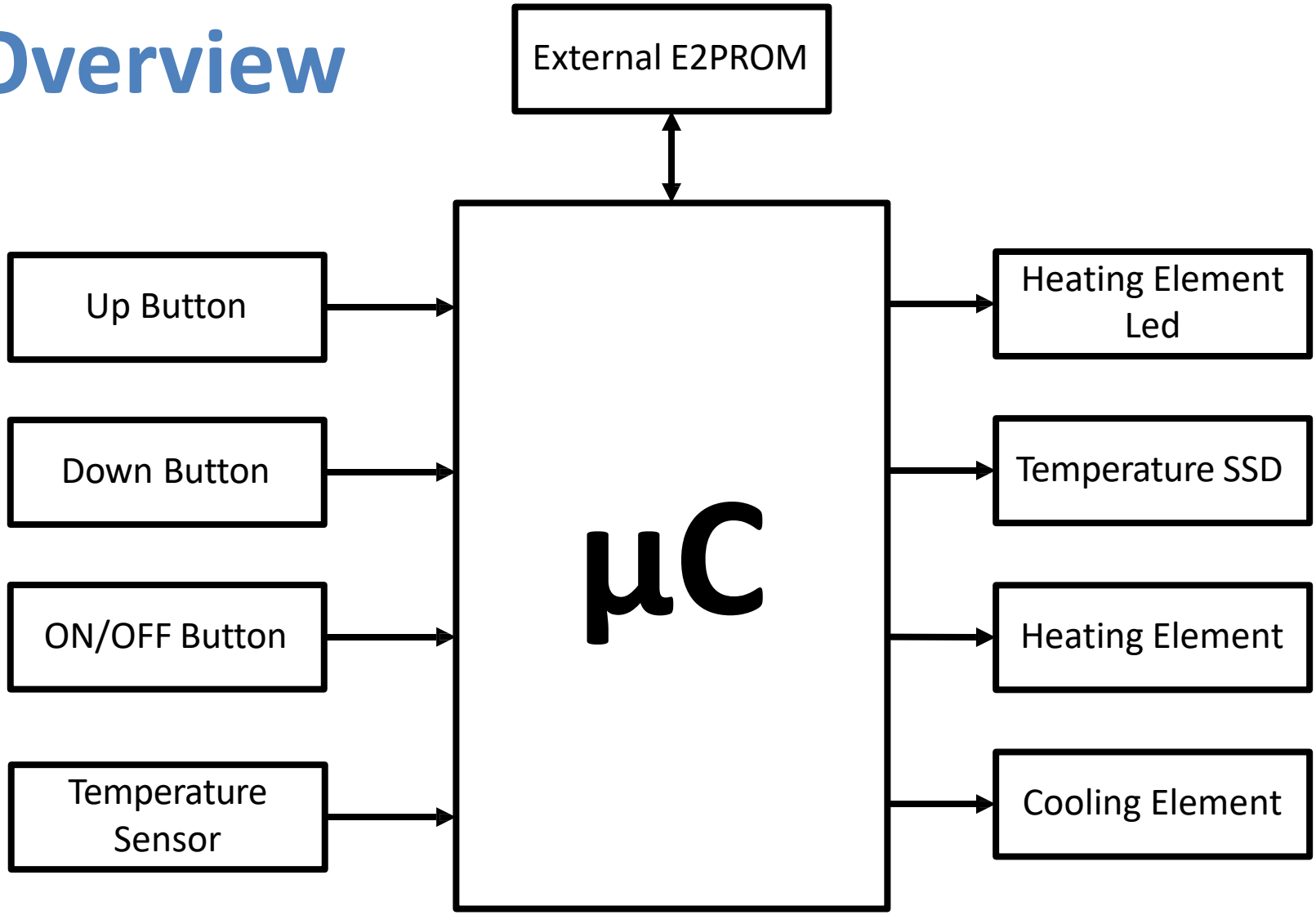
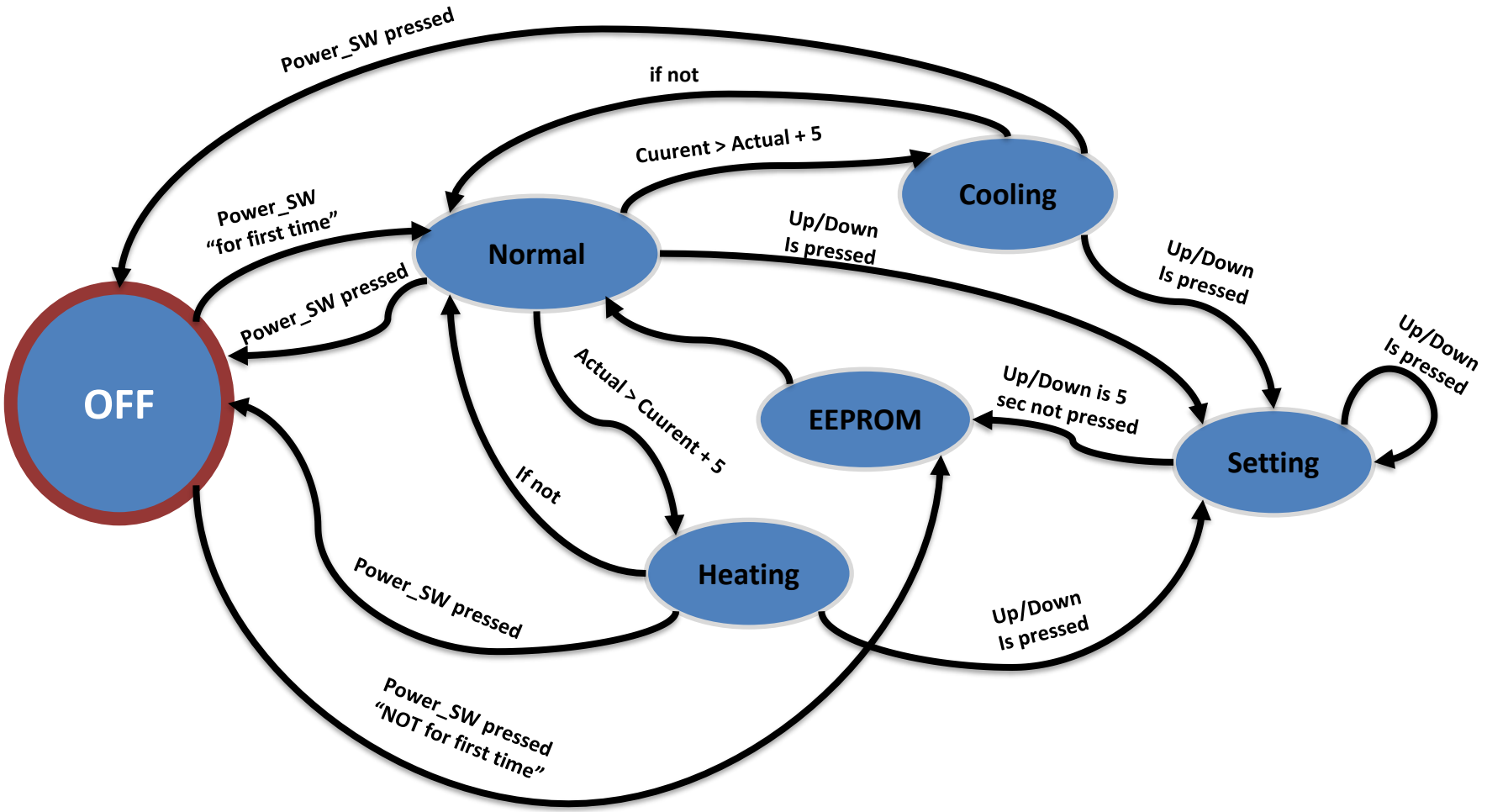
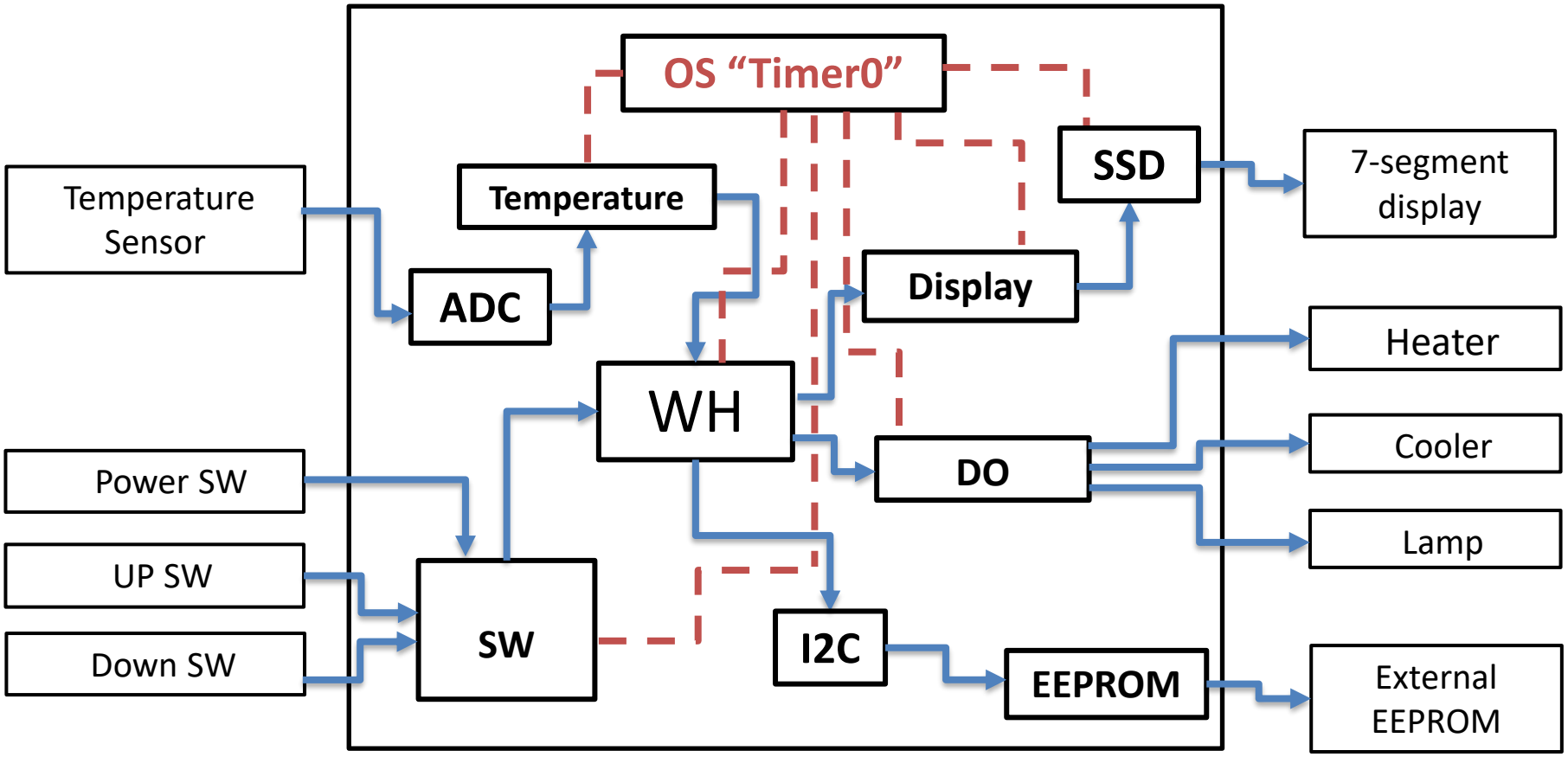
Overview


External E2PROM
Up Button
Down Button
ON/OFF Button
Temperature Sensor
µC
Heating Element Led
Temperature SSD
Heating Element
Cooling Element

State Machine



Context-Diagram



Detailed Design

- SW
  - SW_Init
  - SW_Update
  - SW_GetState
- Timer
  - TMR _Init
  - TMR _start
  - TMR _stop
  - TMR_Update
- Tempertaure
  - Tempertaure _Init
  - Tempertaure _Update
  - Tempertaure _GetValue
- Display
  - DISP_Init
  - DISP_Update
- SSD
  - SSD_Init
  - SSD_Update
  - SSD_SetSymbol
  - SSD_GetSymbol
  - SSD_SetState
  - SSD_GetState

Detailed Design

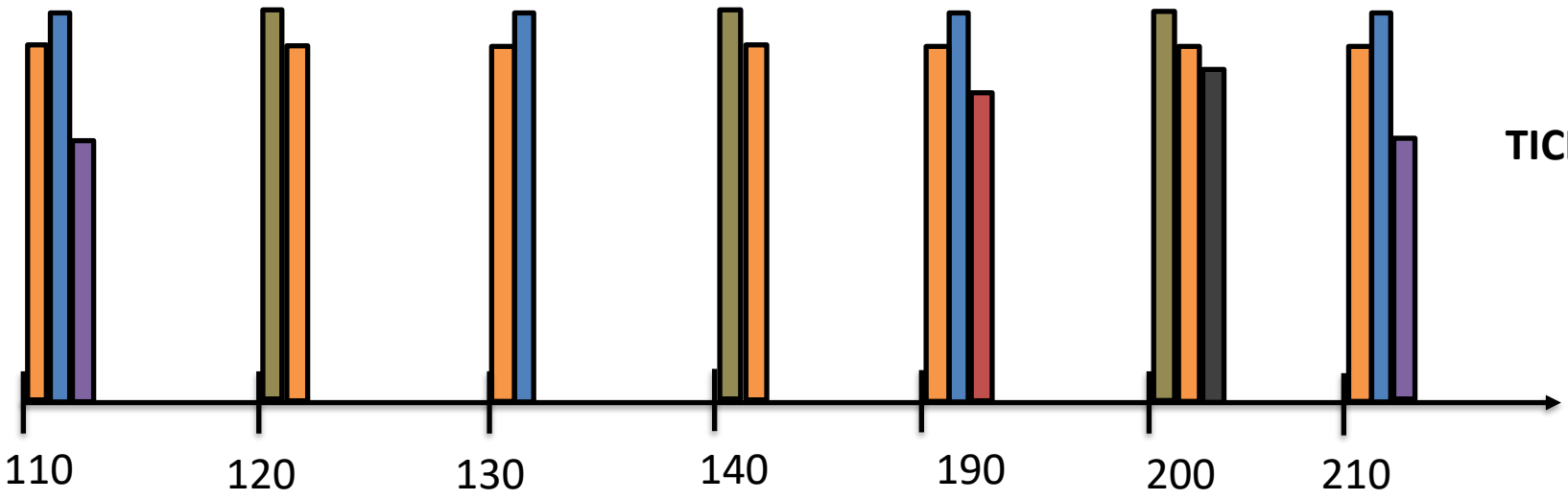
- DO
  - void DO_Init
  - void DO_Update
  - void Set_Led_State
  - void DO_SetState
- EEPROM
  - EEPROM_Write
  - EEPROM_Write_Page
  - EEPROM_Read
  - EEPROM_Read_Page
- ADC
  - ADC _Init
  - ADC _Convert
- WH
  - WH _Update
  - WH_Get_Current_state
- I2C
  - I2C_Master_Init
  - I2C_Master_Wait
  - I2C_Master_Start
  - I2C_Master_Stop
  - I2C_ACK
  - I2C_NACK
  - I2C_Master_Write
  - I2C_Read_Byte

Timing Analysis

Task	Actions	BCET (ms)	WCET(ms)	Period of Action (ms)	Period of task (ms)
SW	Update samples Update SW state	~0 ~0	~0 ~0	20 20	20
DO	Update DO state	~0	~0	100	100
Display	Update display state	~0	~0	100	100
SSD	Update SSD	~0	~0	10	10
WH	Update WH state	~0	~0	20	20
Temperature	Update Temperature	~0	~0	100	100
				Tick (ms)	10
				Major Cycle (ms)	100

Schedulability Check

*** Tasks blockage occurs at the rise of the system to make sure that the sum of tasks execution times per TICK is less than TICK period**



- **SW** @20 ms "blockage = 0 ms"
- **WH** @20 ms "blockage = 10 ms"
- **Temperature** @100 ms "blockage = 0 ms"
- **Display** @100 ms "blockage = 10 ms"
- **SSD** @10 ms "blockage = 0 ms"
- **DO** @100 ms "blockage = 90 ms"


thank you
danke
謝謝
gracias
merci
obrigado
dziękuję
bedankt
go raibh maith agat
teşekkür ederim
ngiyabonga
спасибо
Баярлалаа
рахмат
mersi
barka
welalin
tack
dank je
tapadh leat
mochchakkeram
sukriya
kop khun krap
terima kasih
arigatô
dakujem
grazie
hvala
mauruuru
sagolun
faafetai lava
vinaka
blagodaram
misaotra
matondo
paldies
grazzi
mahalo
kiitos
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