Mastering Embedded System Online Diploma

http://www.learn-in-depth.com/

First Term (Final Project 1)

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My Profile

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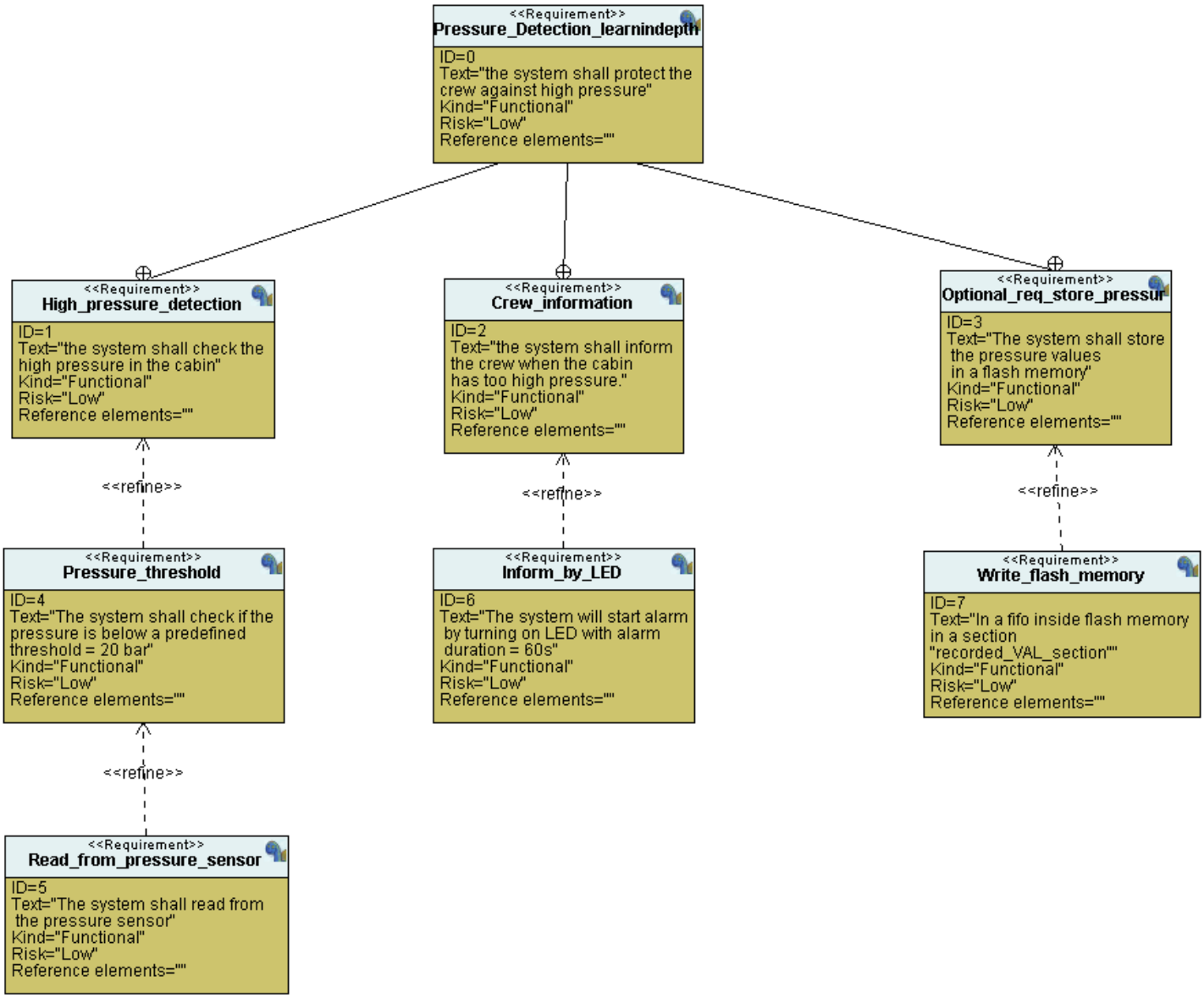
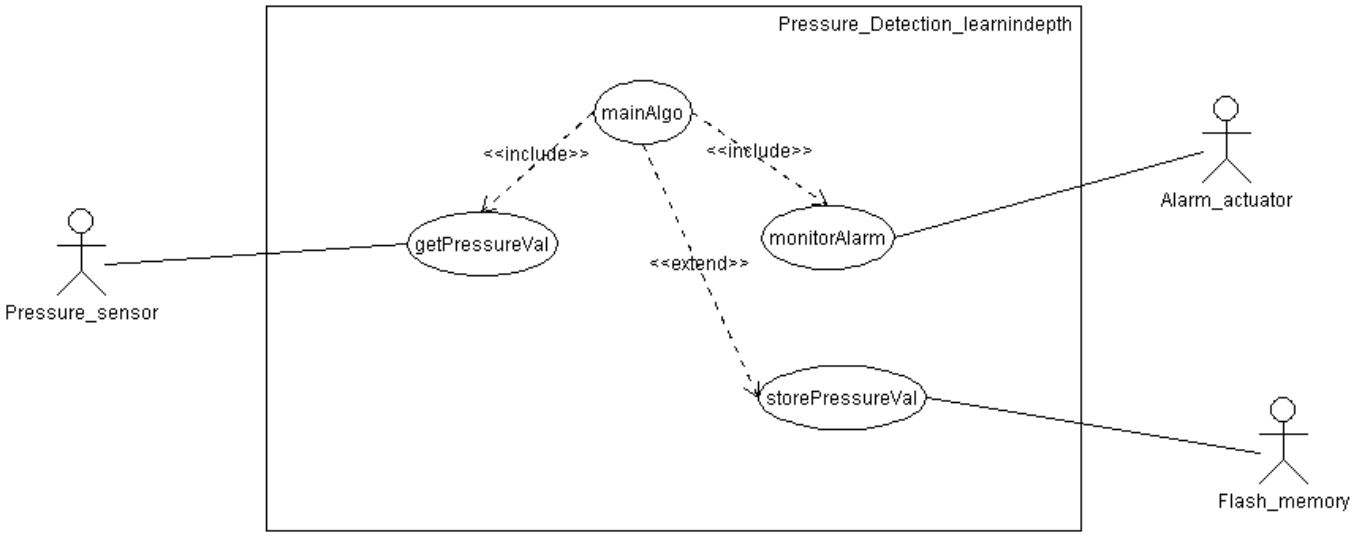
Requirements Diagram

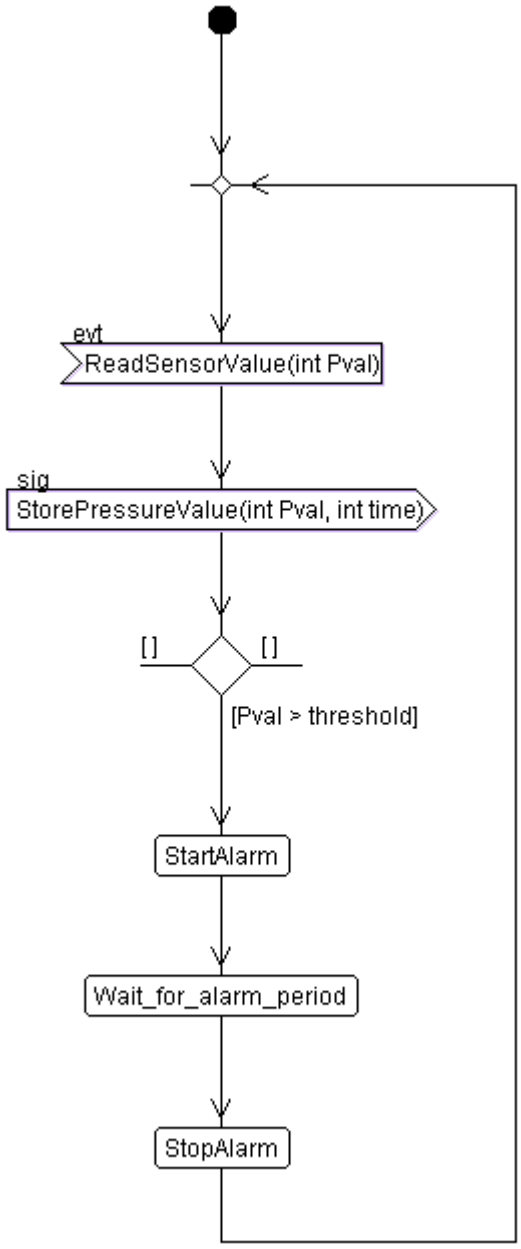


System Analysis

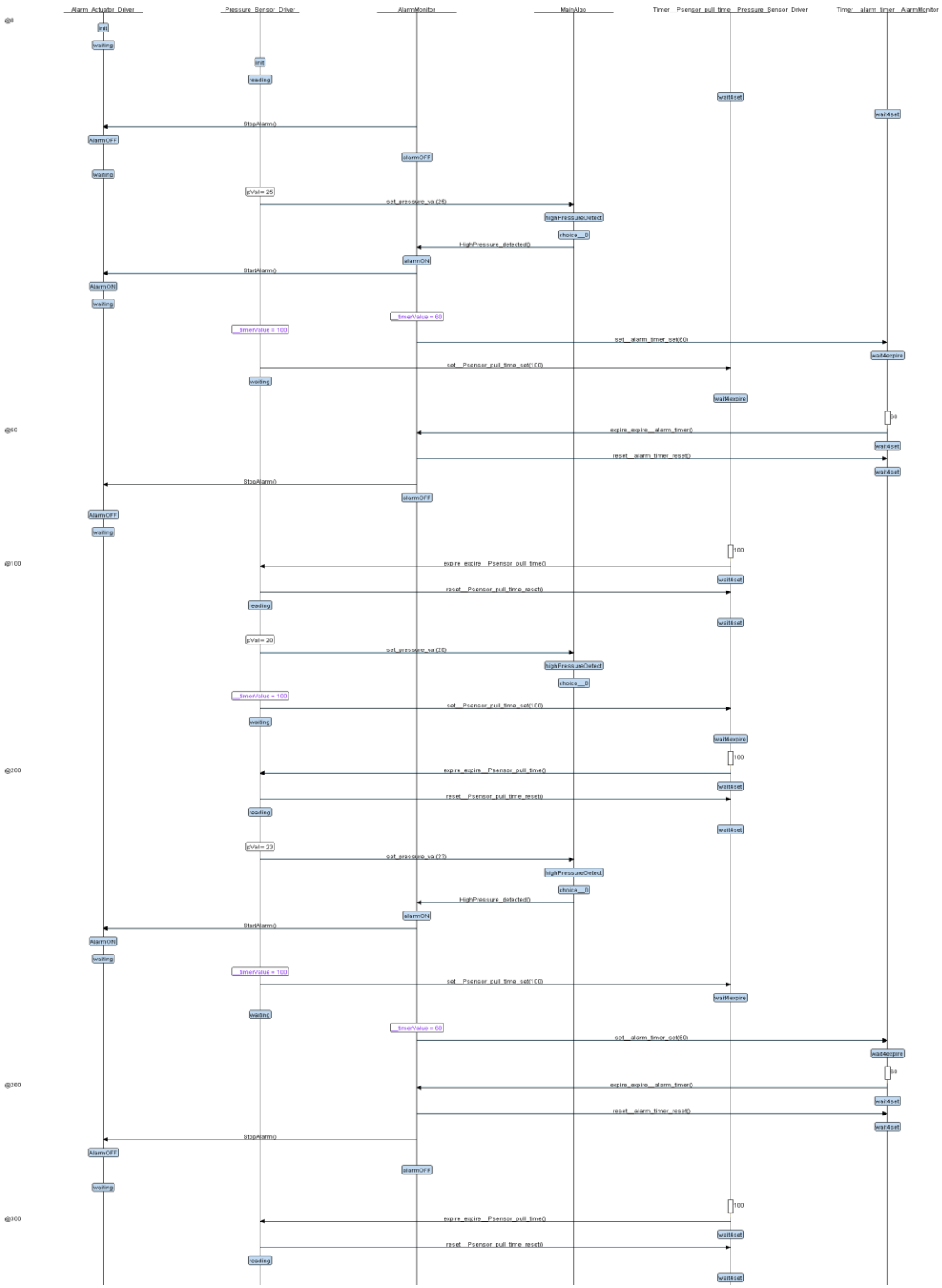
Use Case Diagram

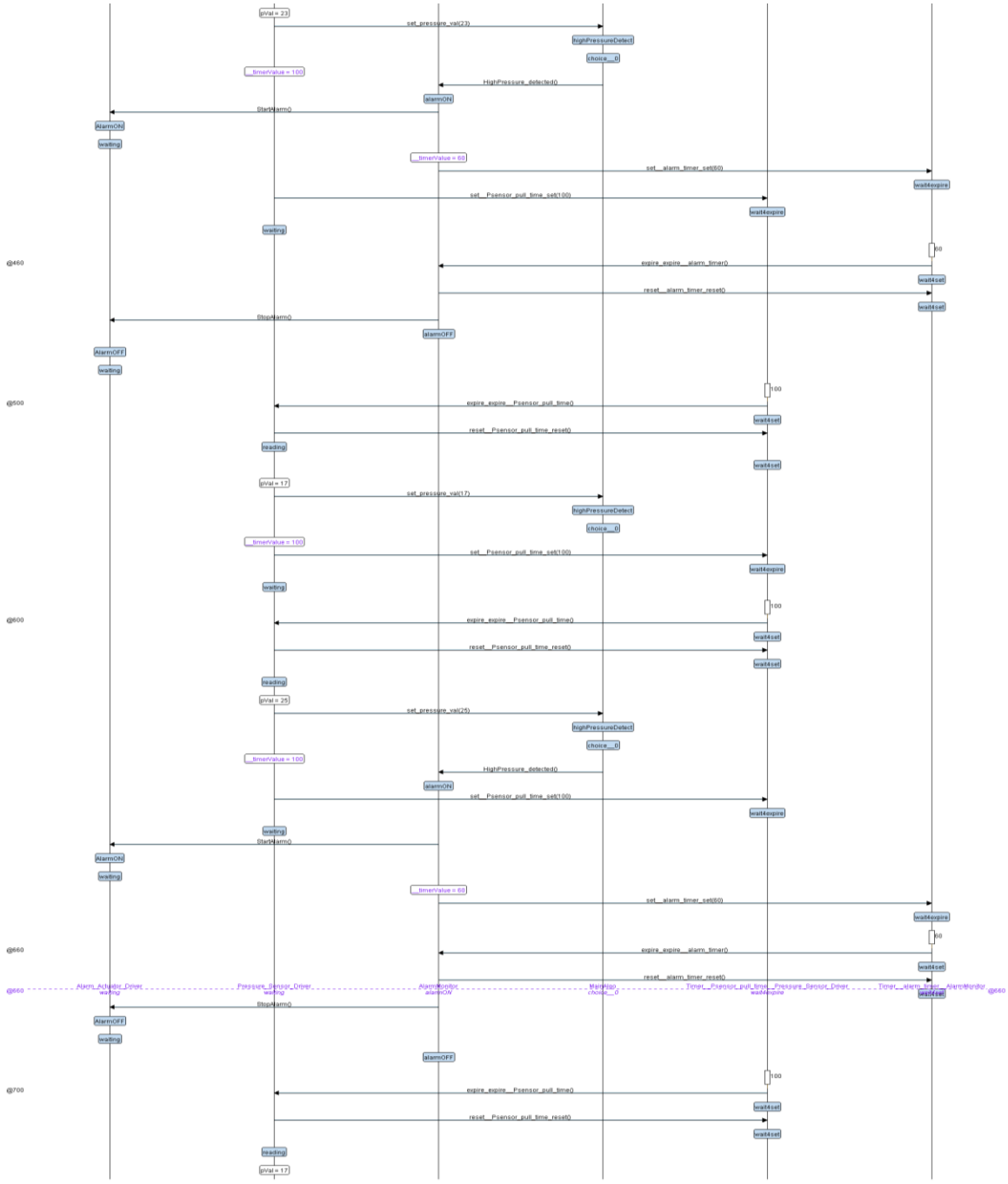


Activity Diagram



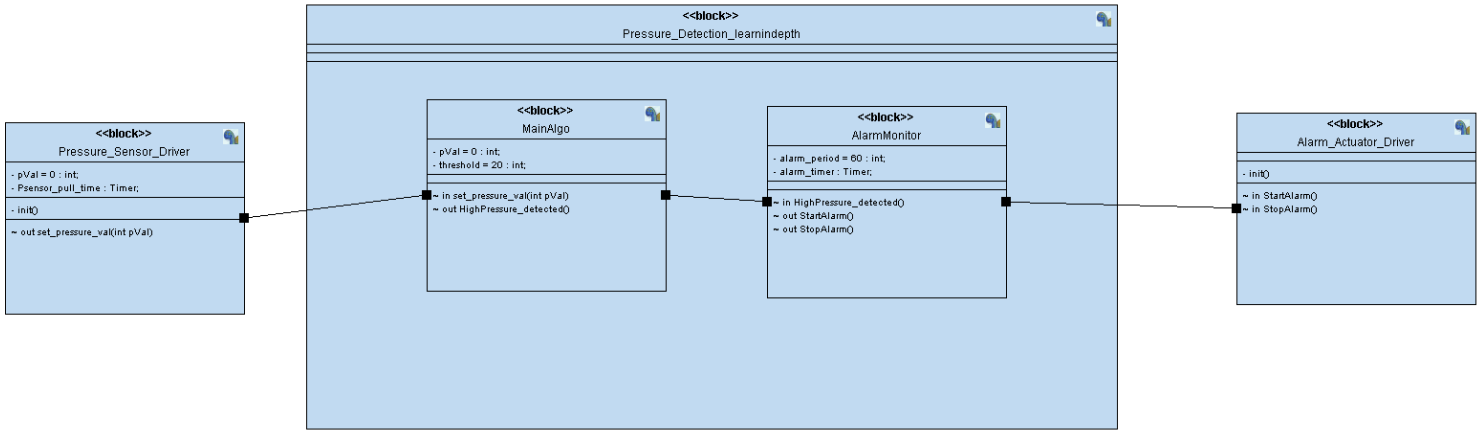
Sequence Diagram



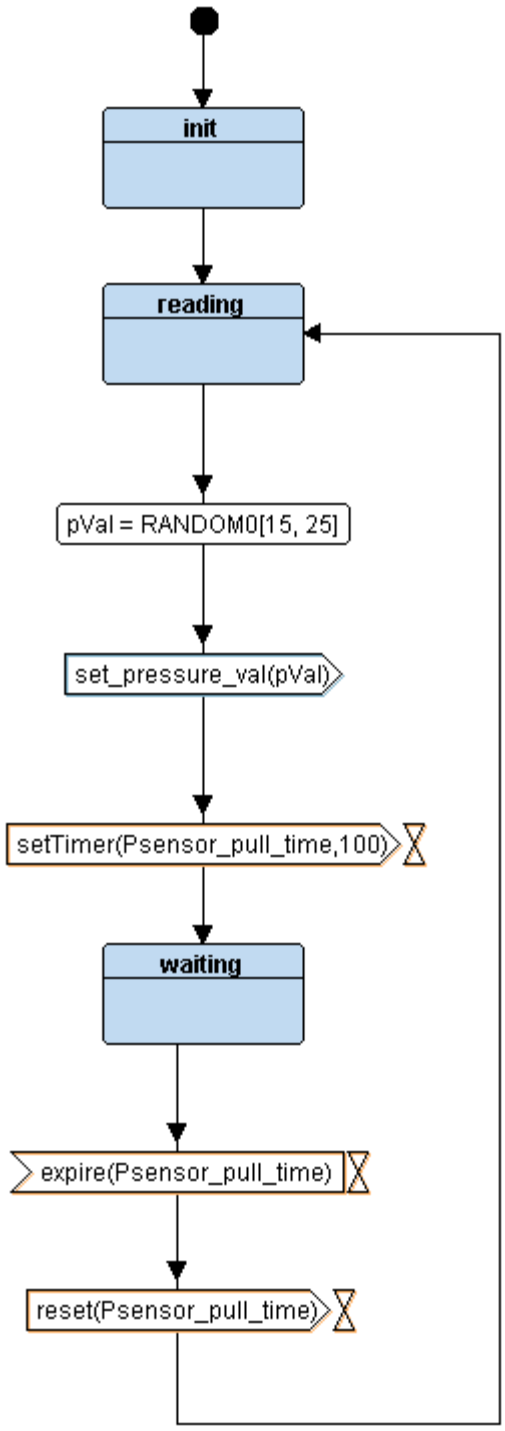

pVal = 23
set_pressure_val(23)
highPressureDetect
choice__0
__timerValue = 100
HighPressure_detected()
alarmON
StartAlarm()
AlarmON
waiting
__timerValue = 60
set__alarm_timer_set(60)
wait4expire
set__Psensor_pull_time_set(100)
wait4expire
reading
60
@460
expire_expire__alarm_timer()
wait4set
reset__alarm_timer_reset()
wait4set
StopAlarm()
alarmOFF
AlarmOFF
waiting
100
@500
expire_expire__Psensor_pull_time()
wait4set
reset__Psensor_pull_time_reset()
reading
wait4set
pVal = 17
set_pressure_val(17)
highPressureDetect
choice__0
__timerValue = 100
set__Psensor_pull_time_set(100)
wait4expire
reading
100
@600
expire_expire__Psensor_pull_time()
wait4set
reset__Psensor_pull_time_reset()
wait4set
reading
pVal = 25
set_pressure_val(25)
highPressureDetect
choice__0
__timerValue = 100
HighPressure_detected()
alarmON
set__Psensor_pull_time_set(100)
wait4expire
reading
StartAlarm()
AlarmON
waiting
__timerValue = 60
set__alarm_timer_set(60)
wait4expire
60
@660
expire_expire__alarm_timer()
wait4set
reset__alarm_timer_reset()
@660
Alarm_Actuator_Driver
waiting
Pressure_Sensor_Driver
waiting
AlarmMonitor
alarmOV
Main_Loop
choice__0
Timer__Psensor_pull_time__Pressure_Sensor_Driver
wait4expire
Timer__alarm_timer__AlarmMonitor
wait4set
@660
StopAlarm()
AlarmOFF
waiting
alarmOFF
100
@700
expire_expire__Psensor_pull_time()
wait4set
reset__Psensor_pull_time_reset()
wait4set
reading
pVal = 17

System Design

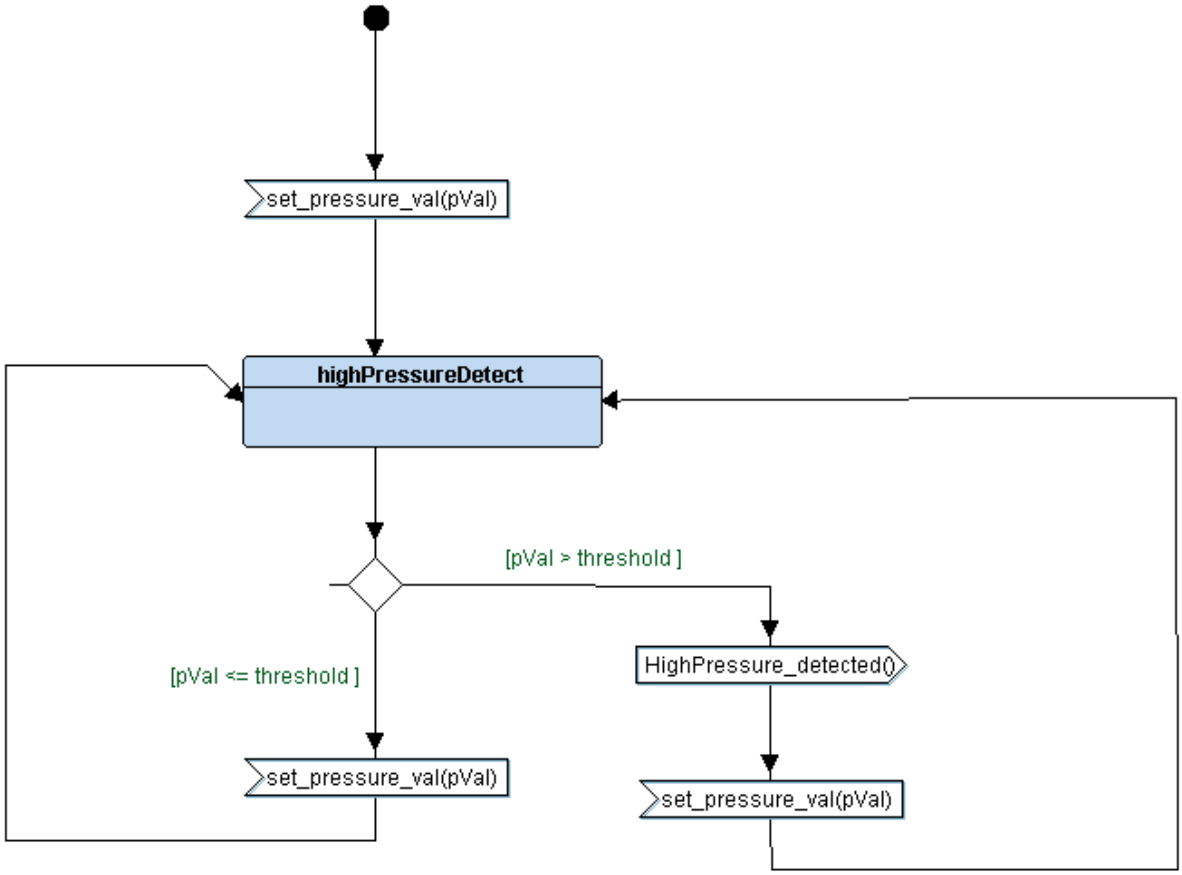
Block Diagram



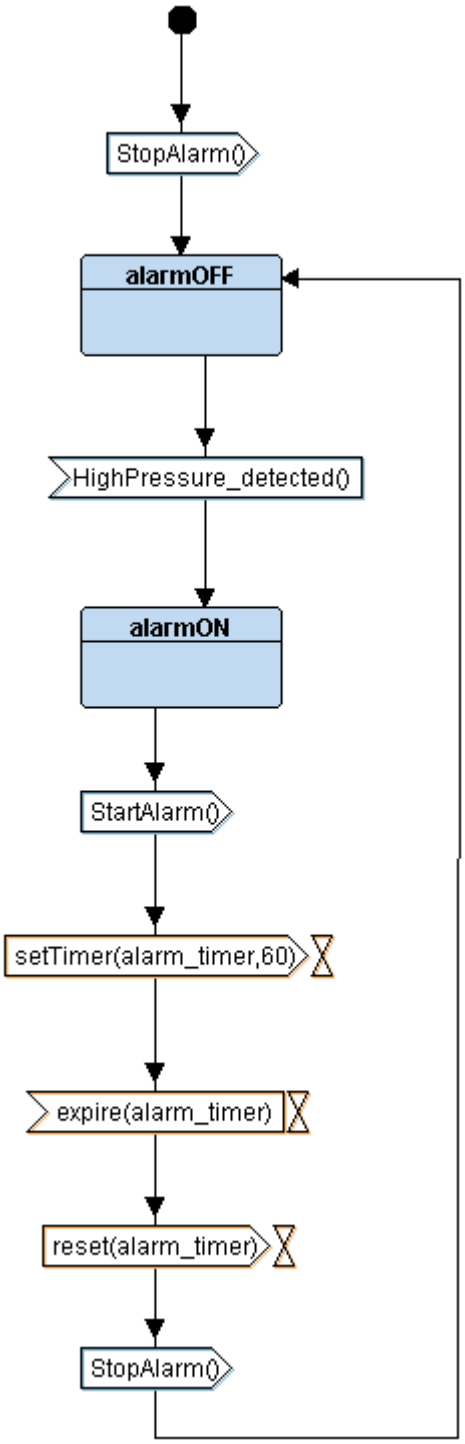
Pressure Sensor Driver



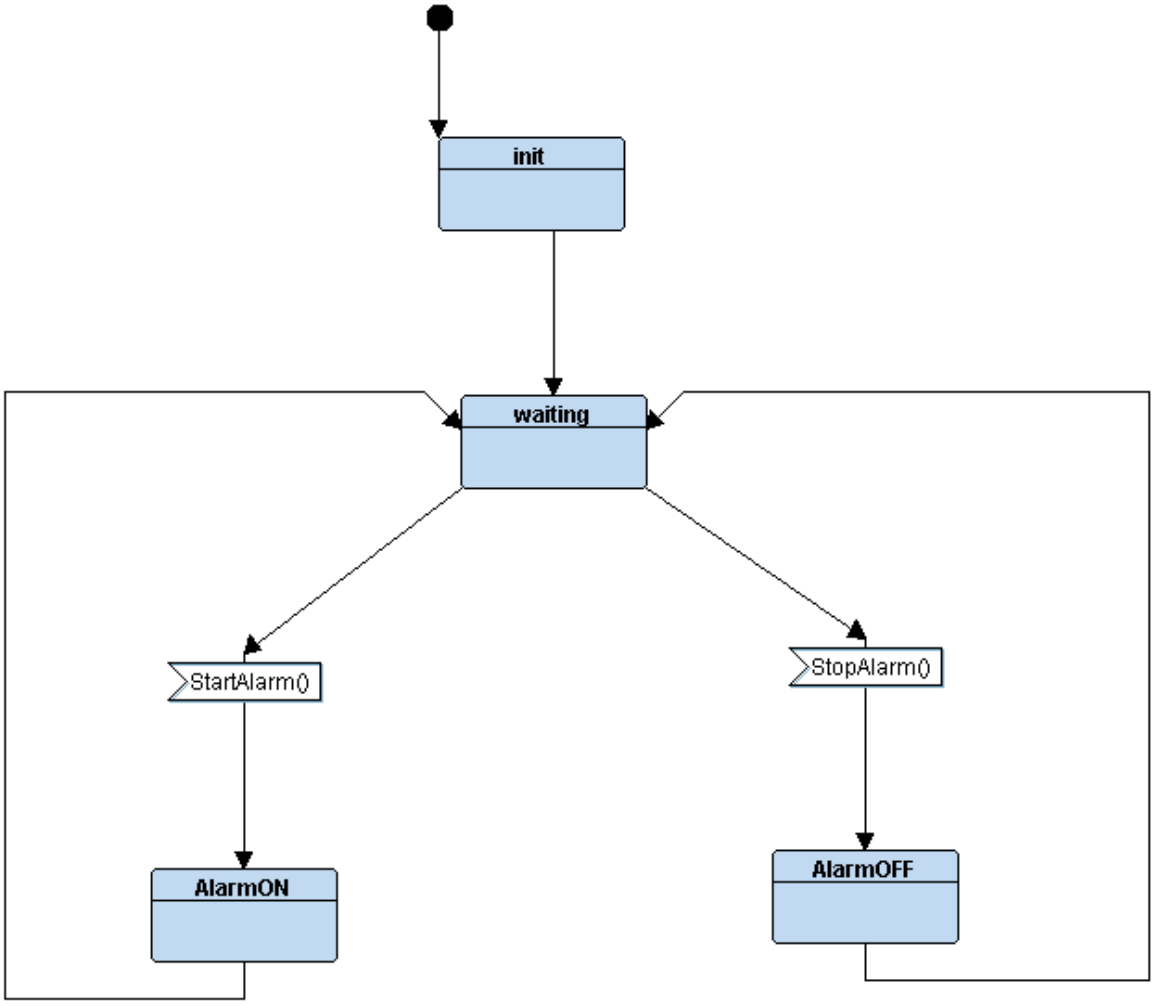
Main Algorithm



Alarm Monitor

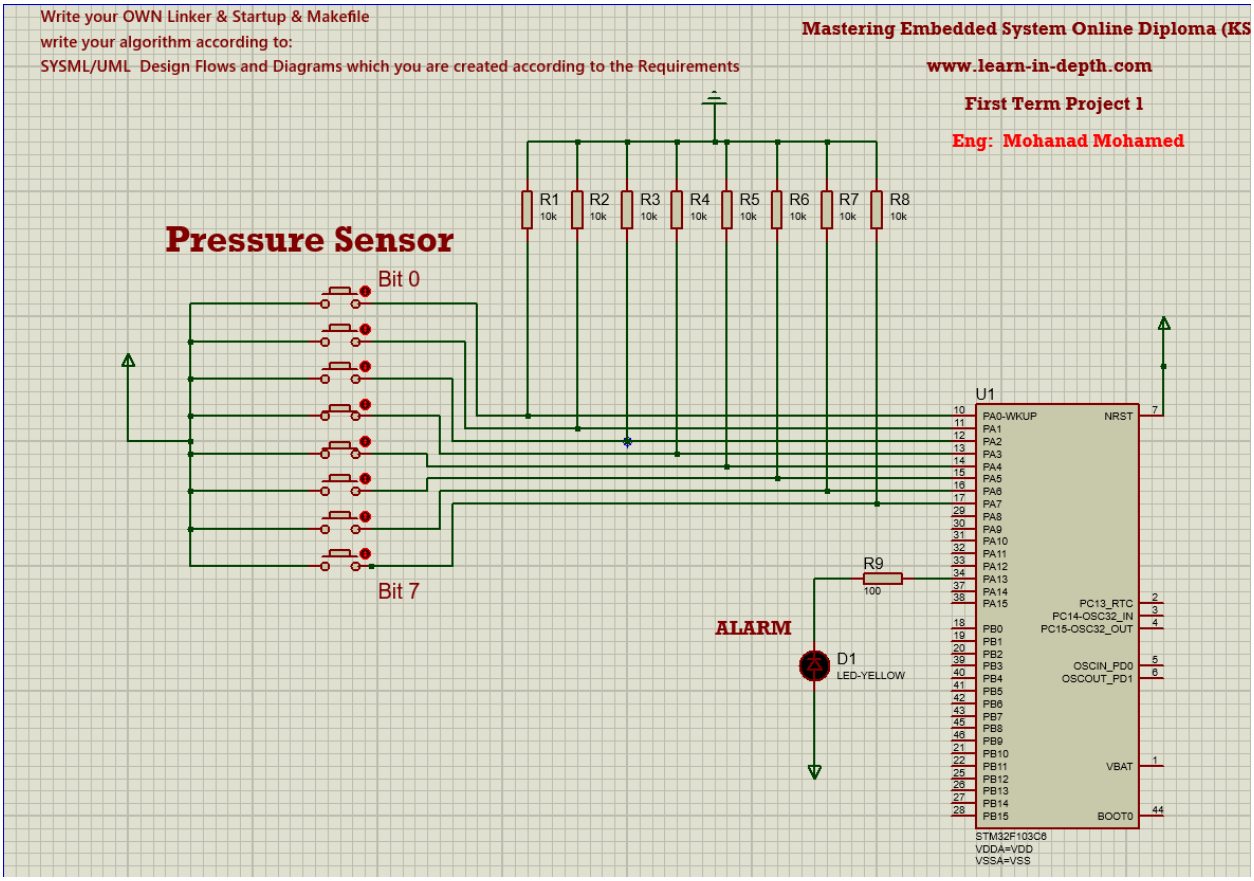


Alarm Actuator Driver



Simulation Results

Proteus Design

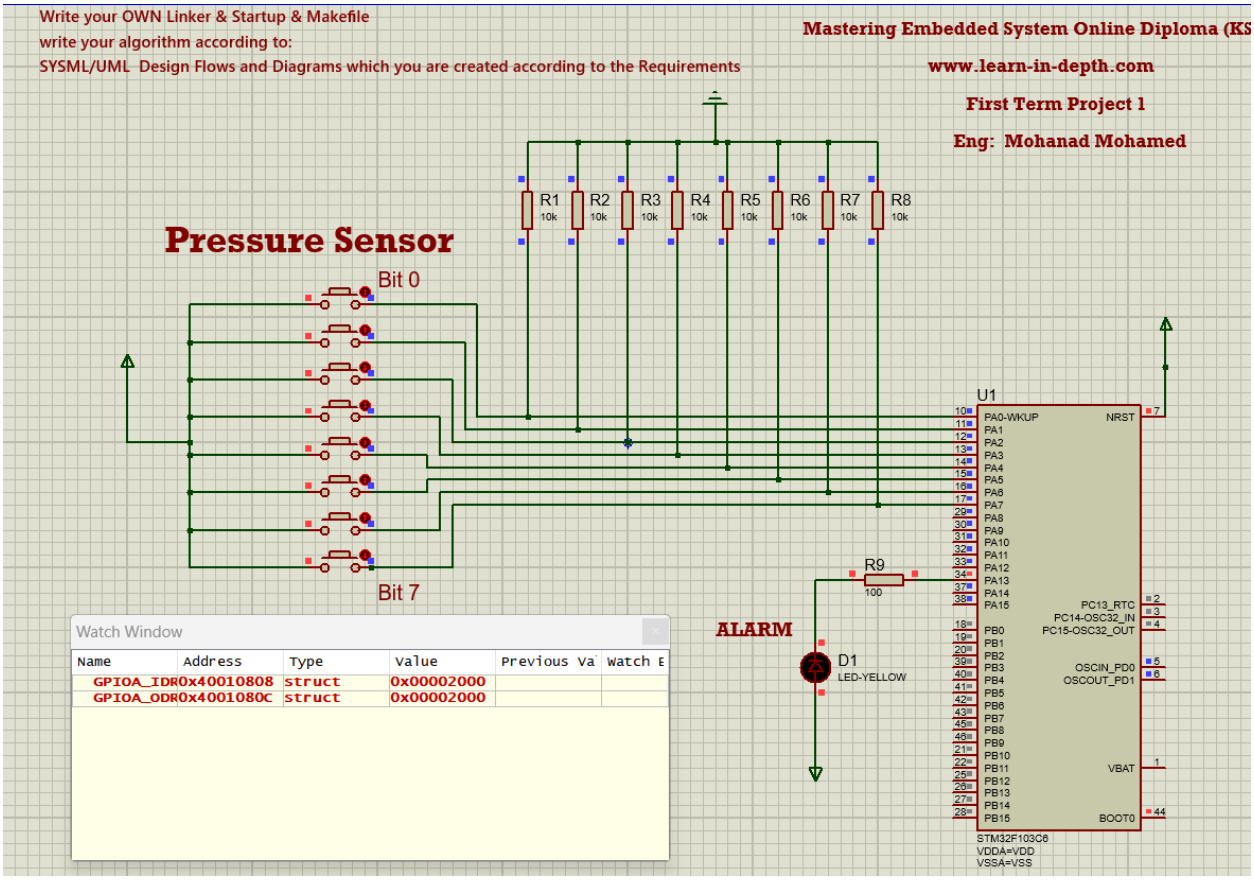


When the input value (represented in binary using push buttons) is more than the threshold value (20), the alarm turns on for 60 seconds.

If the input value is less than the threshold, the alarm stays off.

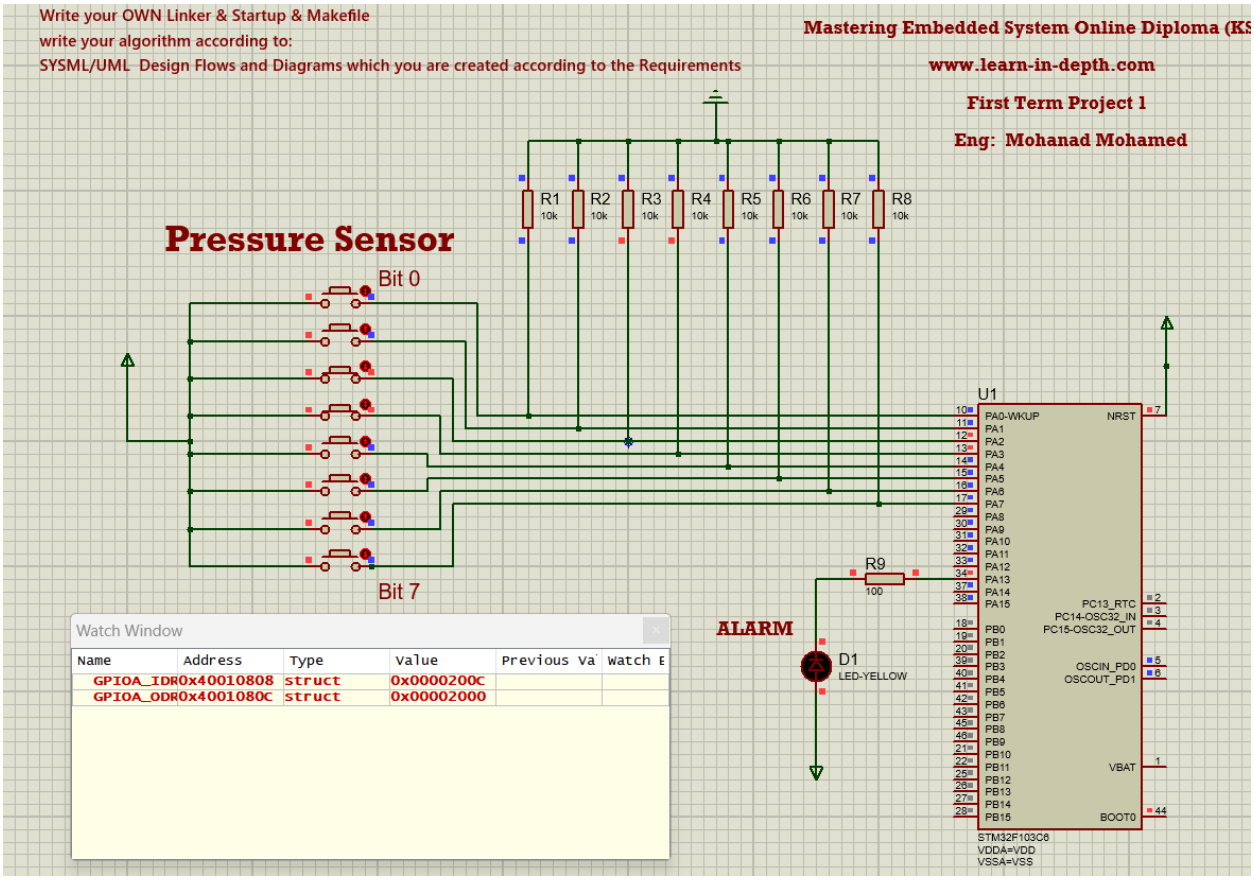
The pull time between every two inputs is 10 seconds.

Pressure Value = 0



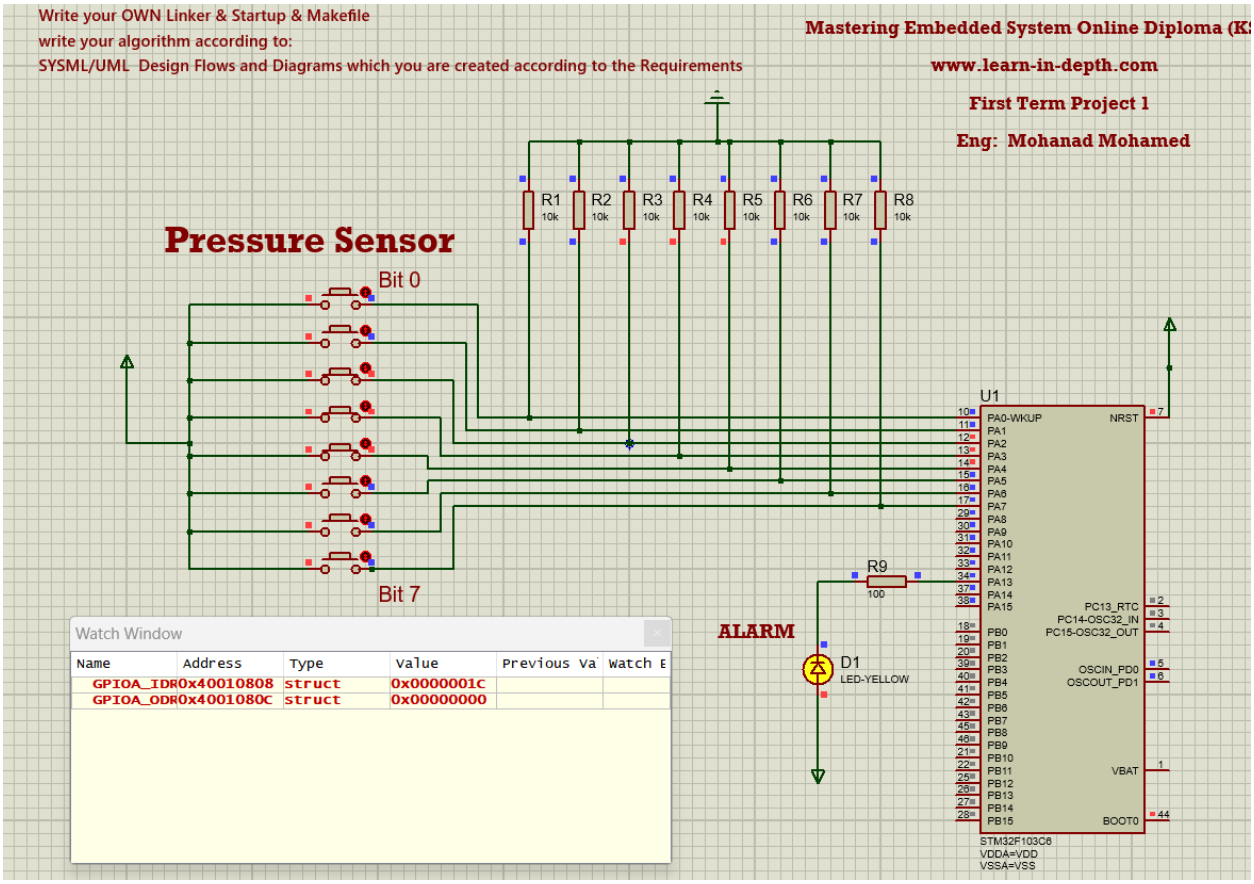
Value 0 is less than threshold 20, Alarm is off

Pressure Value = 12



Value 12 is less than threshold 20, Alarm is off

Pressure Value = 28



Value 28 is more than threshold 20, Alarm is on for 60 seconds.

State Machine Example

Pressure Sensor initialization

Alarm Actuator Driver initialization

Pressure Sensor Driver reading state --> Pval = 23

Pressure Sensor Driver ------ Set Pressure Value ------ Main Algo

Main Algo ------ High Pressure Detected ------ Alarm Monitor

MainAlgo High Pressure Detect state --> Pval = 23

Alarm Monitor ------ Start Alarm ------ Alarm Actuator Driver

Alarm Monitor alarmON state

Timer on 60 seconds

Alarm Actuator Driver waiting state

Pressure Sensor Driver waiting state --> Pval = 23, delay = 100

MainAlgo High Pressure Detect state --> Pval = 23

Alarm Monitor ------ Stop Alarm ------ Alarm Actuator Driver

Alarm Monitor waiting state --> delay = 60

Alarm Actuator Driver waiting state

Pressure Sensor Driver reading state --> Pval = 24

Pressure Sensor Driver ------ Set Pressure Value ------ Main Algo

Main Algo ------ High Pressure Detected ------ Alarm Monitor

MainAlgo High Pressure Detect state --> Pval = 24

Alarm Monitor ------ Start Alarm ------ Alarm Actuator Driver

Alarm Monitor alarmON state

Timer on 60 seconds

Alarm Actuator Driver waiting state

Pressure Sensor Driver waiting state --> Pval = 24, delay = 100

MainAlgo High Pressure Detect state --> Pval = 24

Alarm Monitor ------ Stop Alarm ------ Alarm Actuator Driver

Alarm Monitor waiting state --> delay = 60

Alarm Actuator Driver waiting state

Pressure Sensor Driver reading state --> Pval = 24

Pressure Sensor Driver ------ Set Pressure Value ------ Main Algo

Main Algo ------ High Pressure Detected ------ Alarm Monitor

MainAlgo High Pressure Detect state --> Pval = 24

Alarm Monitor ------ Start Alarm ------ Alarm Actuator Driver

Alarm Monitor alarmON state

Timer on 60 seconds

Alarm Actuator Driver waiting state

Pressure Sensor Driver waiting state --> Pval = 24, delay = 100

MainAlgo High Pressure Detect state --> Pval = 24

Alarm Monitor ------ Stop Alarm ------ Alarm Actuator Driver

Alarm Monitor waiting state --> delay = 60

Alarm Actuator Driver waiting state

Pressure Sensor Driver reading state --> Pval = 16

Pressure Sensor Driver ------ Set Pressure Value ------ Main Algo

MainAlgo High Pressure Detect state --> Pval = 16

Alarm Monitor alarmOFF state

Alarm Actuator Driver waiting state

Pressure Sensor Driver waiting state --> Pval = 16, delay = 100

MainAlgo High Pressure Detect state --> Pval = 16

Alarm Monitor alarmOFF state

Alarm Actuator Driver waiting state