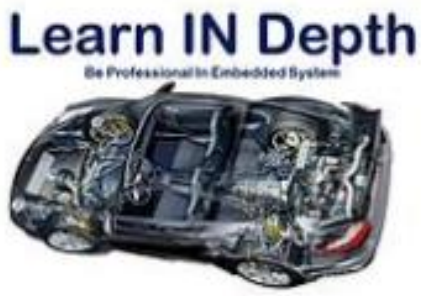


Mastering Embedded System Online Diploma

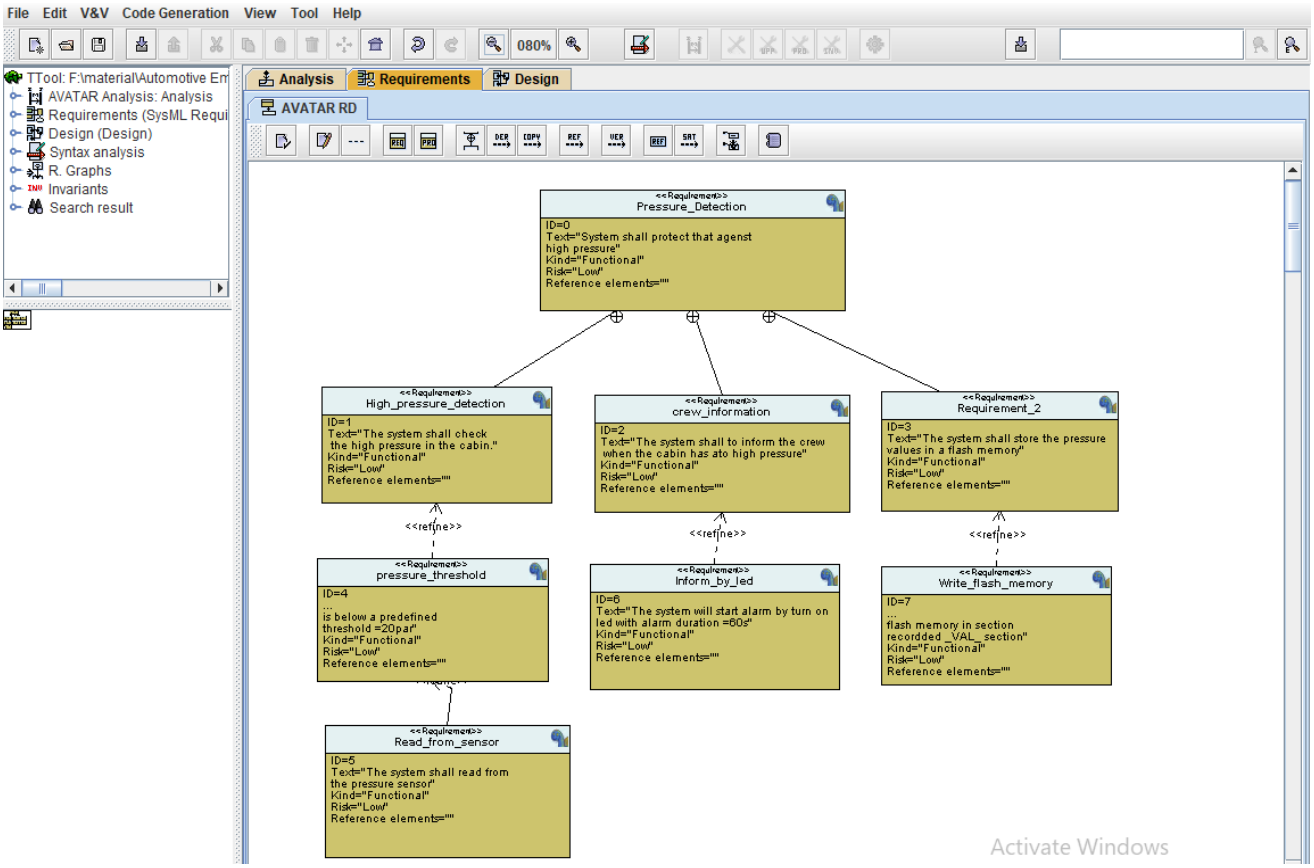
www.learn-in-depth.com

First Term (Final Project 1)

Eng: Hossam Magdy Afifi

My Profile: https://www.learn-in-depth.com/online-diploma/hossammagdy308%40gamil.com

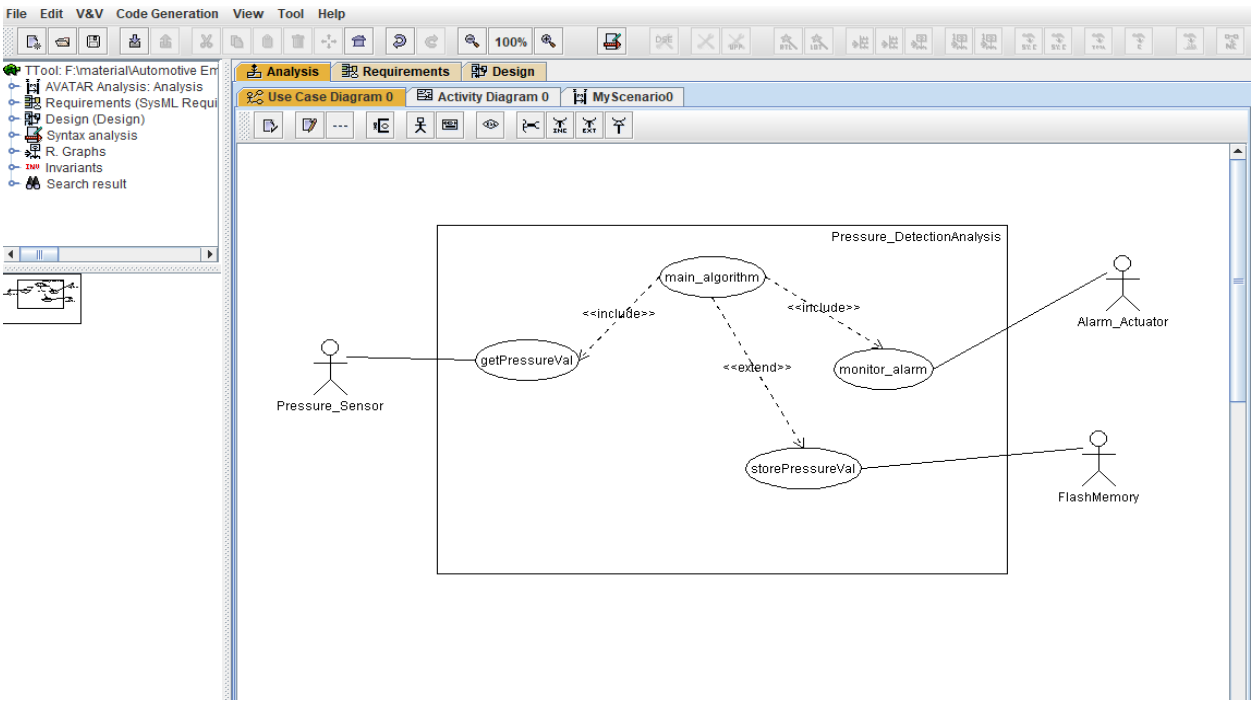
➢ Requirement Diagram:



➢ System Analysis:

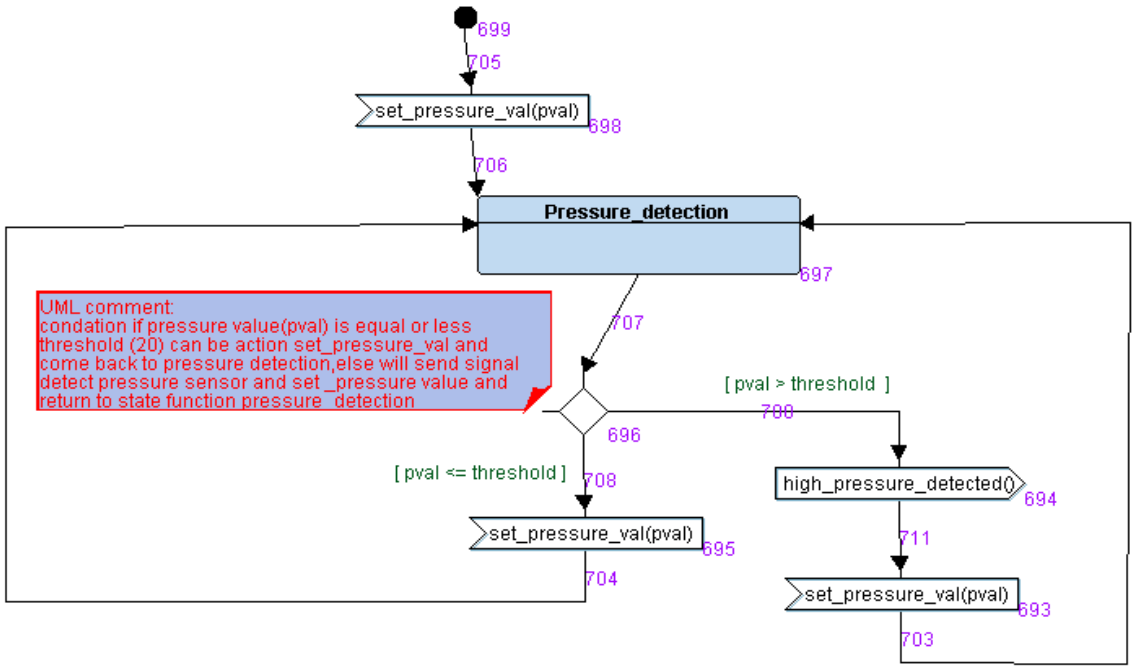
1. Use Case Diagram
2. Activity Diagram
3. Sequence Diagram

1) Use Case Diagram

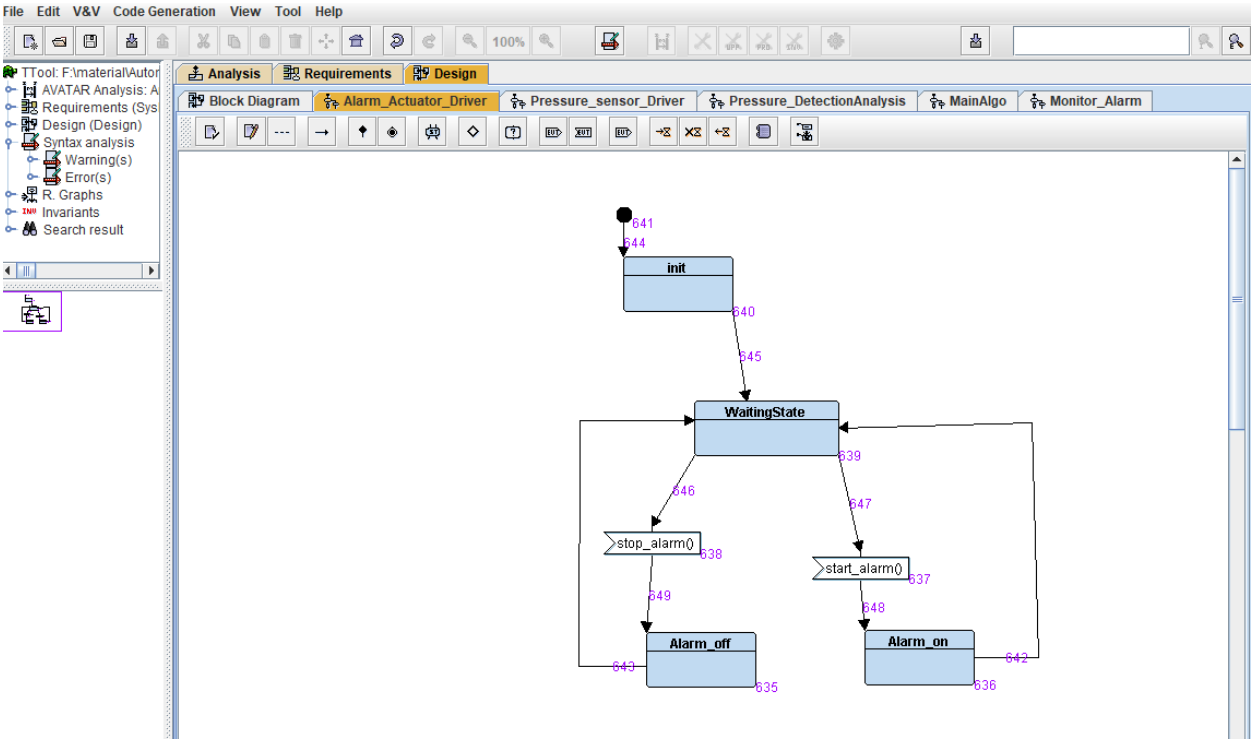


2) Activity Diagram

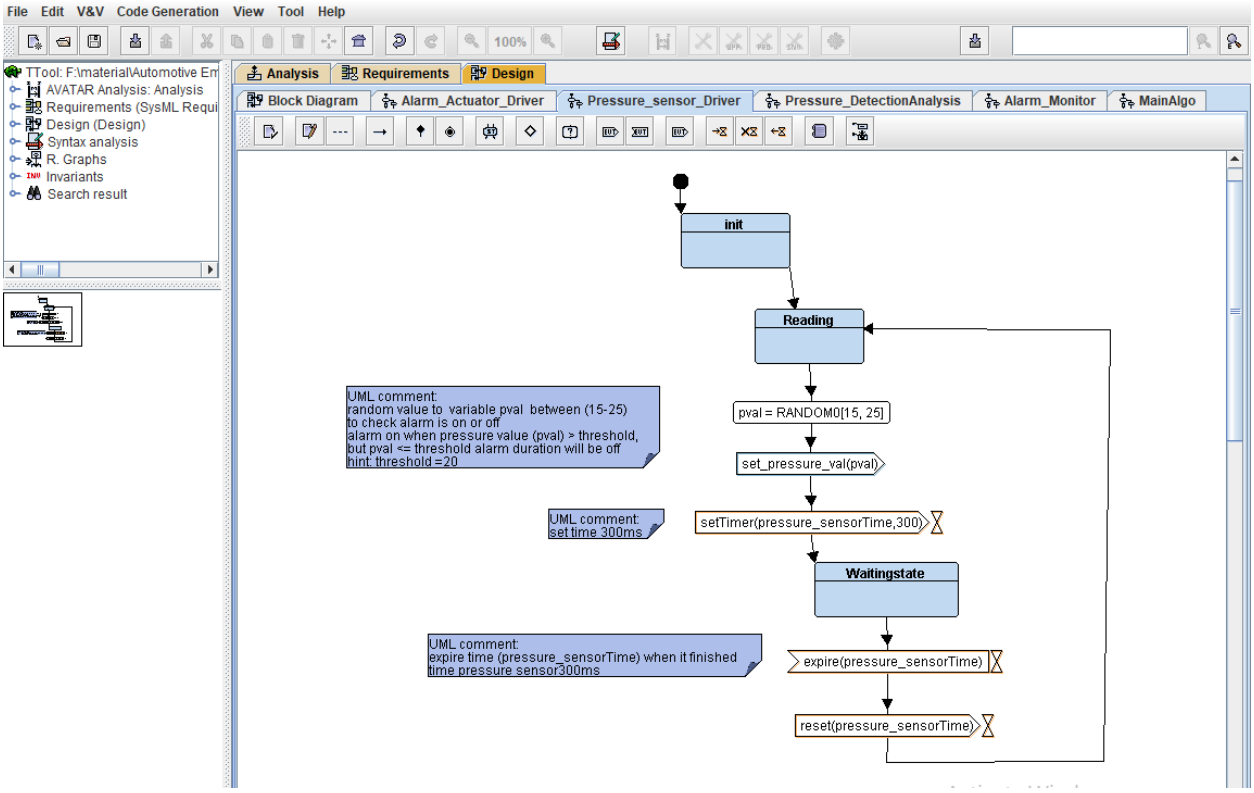
1. Main Algorithm :



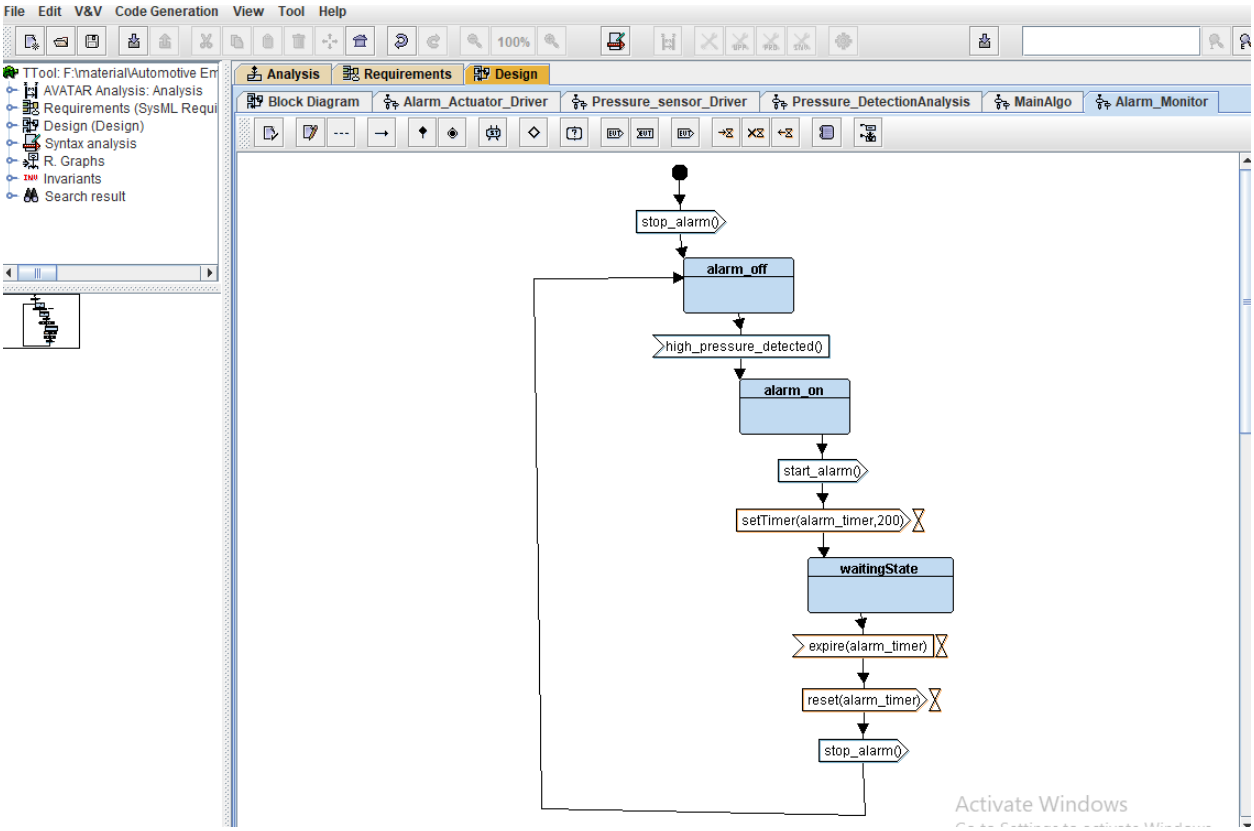
2. Alarm Actuator Driver:



3. Pressure Sensor Driver:

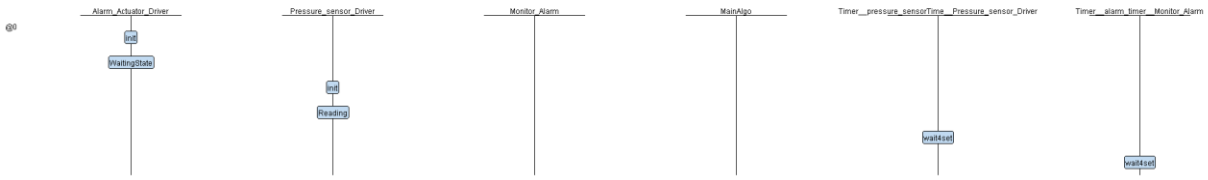


4. Alarm Monitor:



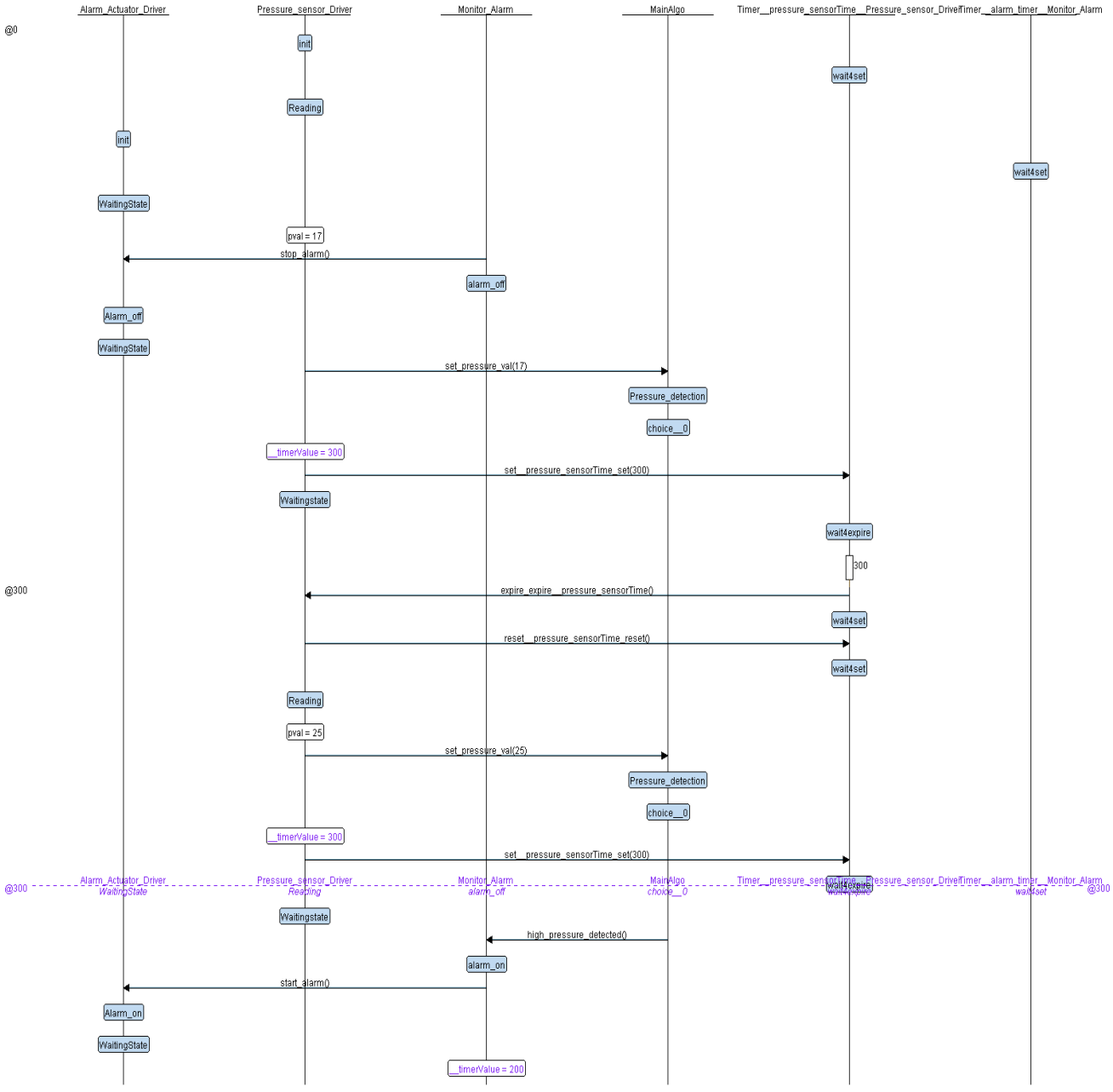
3) Sequence Diagram :

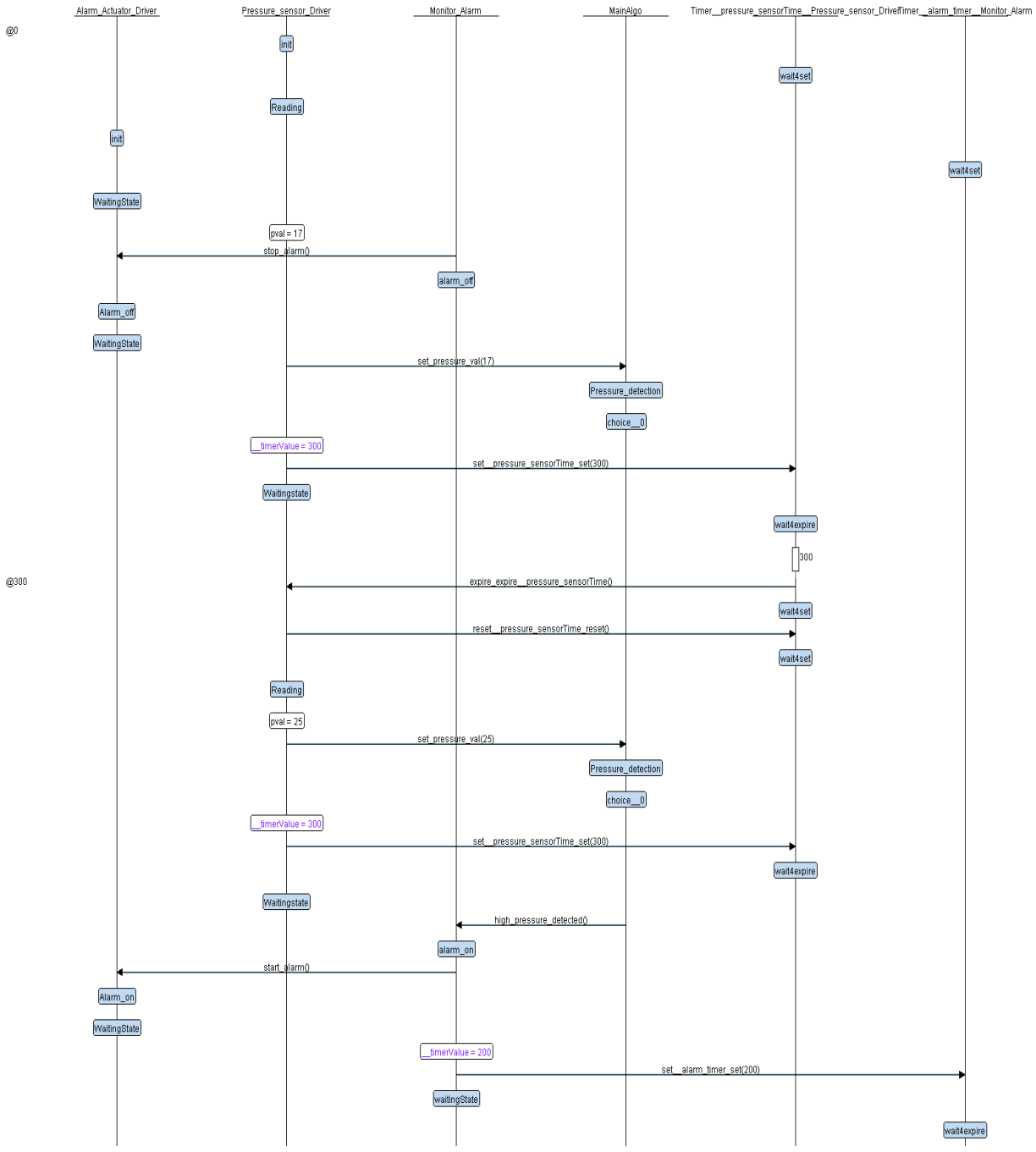
In the First, Pressure sensor reading value and alarm monitor was stated in stop alarm so alarm actuator is turn off.



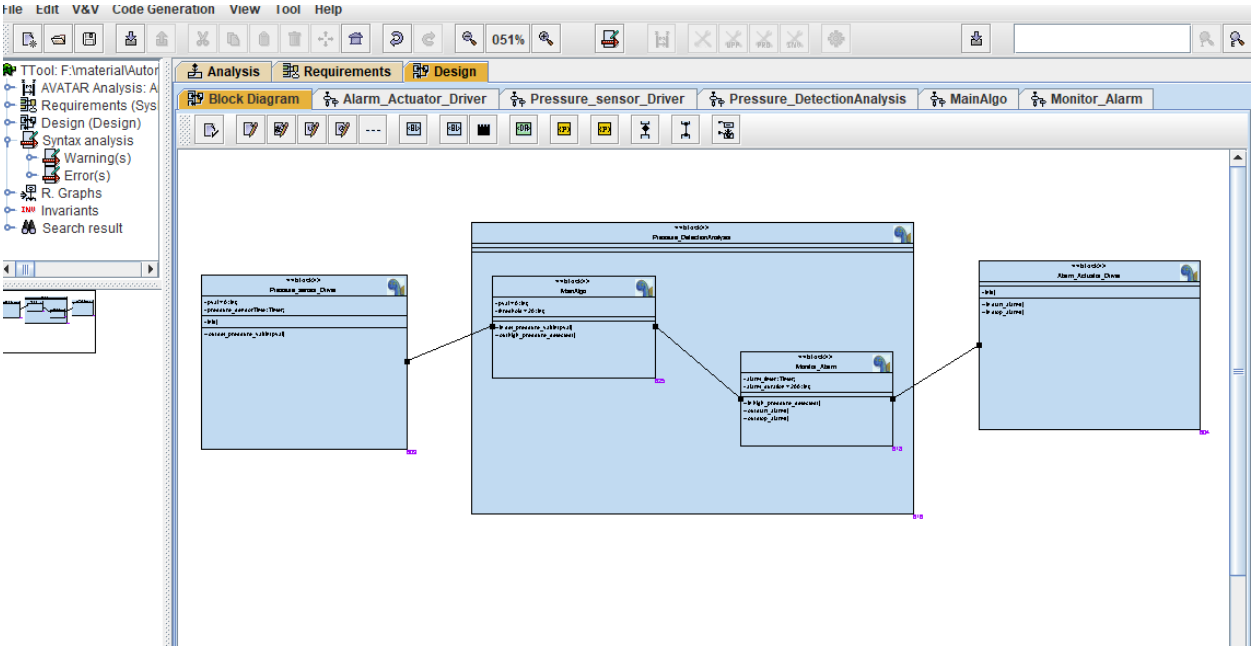
When pressure sensor reads less than threshold value, alarm actuator turned off and monitor alarm stop.

Next step, pressure sensor driver reads 25bar man algorithm check this value is less or more than threshold value, if pval is more than threshold start alarm monitor and alarm actuator turn on, alarm monitor turn on for delay time 300sec and turn off ,otherwise alarm monitor and alarm actuator stopped.

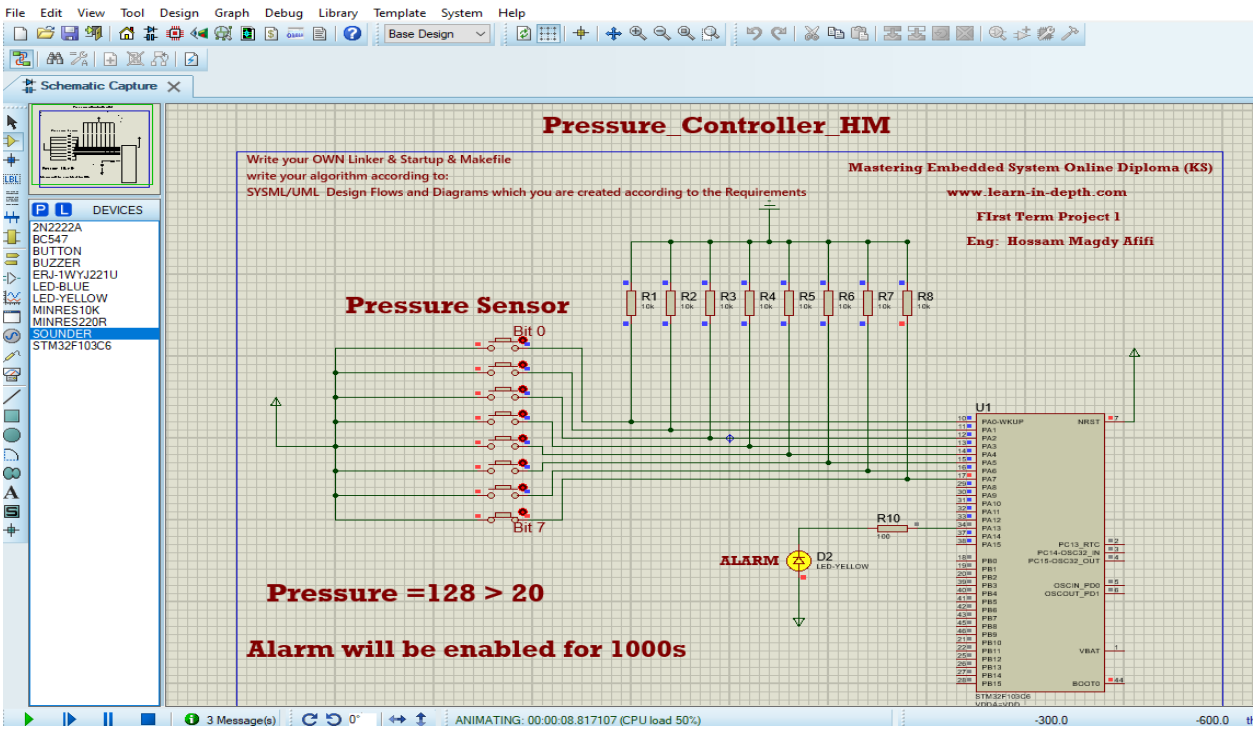


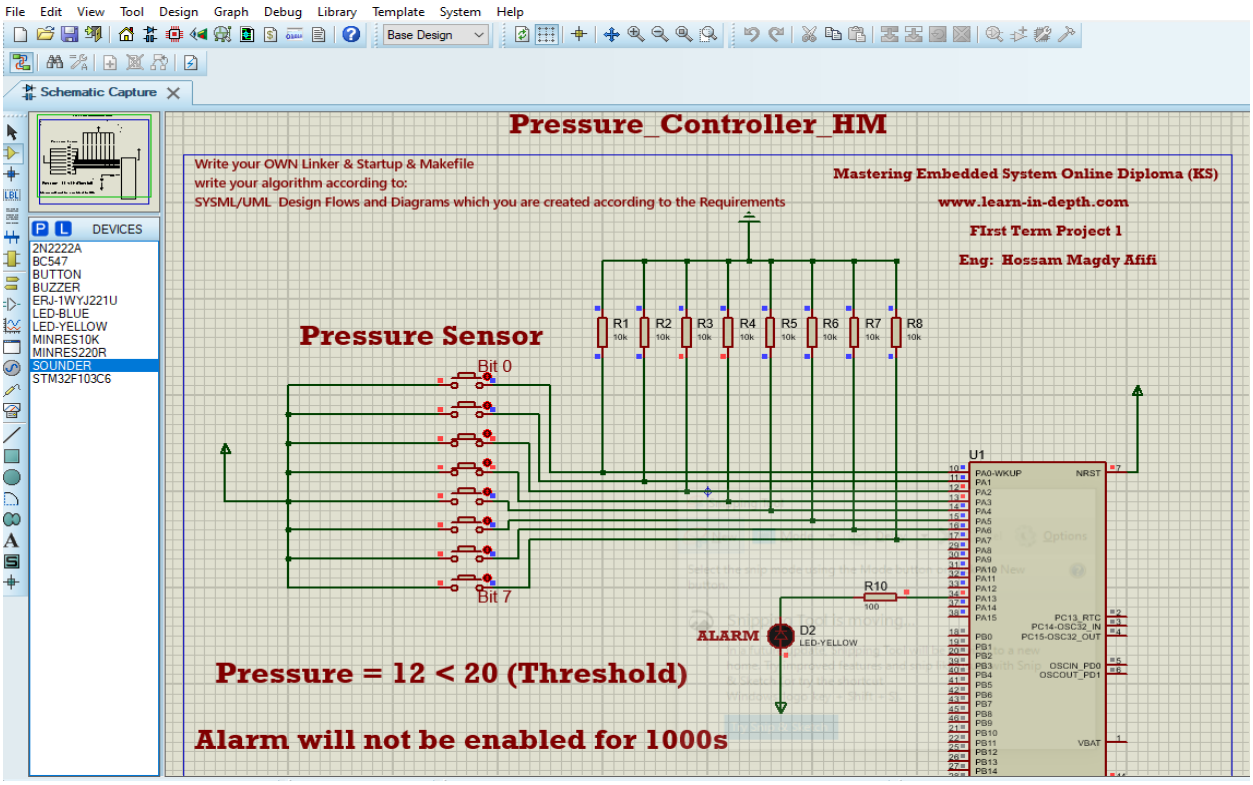

Alarm_Actuator_Driver
Pressure_sensor_Driver
Monitor_Alarm
MainAlgo
Timer__pressure_sensorTime__Pressure_sensor_DriverTimer__alarm_timer__Monitor_Alarm
@0
init
wait4set
Reading
init
wait4set
WaitingState
pval = 17
stop_alarm()
alarm_off
Alarm_off
WaitingState
set_pressure_val(17)
Pressure_detection
choice__0
__timerValue = 300
set__pressure_sensorTime_set(300)
Waitingstate
wait4expire
300
@300
expire_expire__pressure_sensorTime()
wait4set
reset__pressure_sensorTime_reset()
wait4set
Reading
pval = 25
set_pressure_val(25)
Pressure_detection
choice__0
__timerValue = 300
set__pressure_sensorTime_set(300)
wait4expire
Waitingstate
high_pressure_detected()
alarm_on
start_alarm()
Alarm_on
WaitingState
__timerValue = 200
set__alarm_timer_set(200)
waitingState
wait4expire

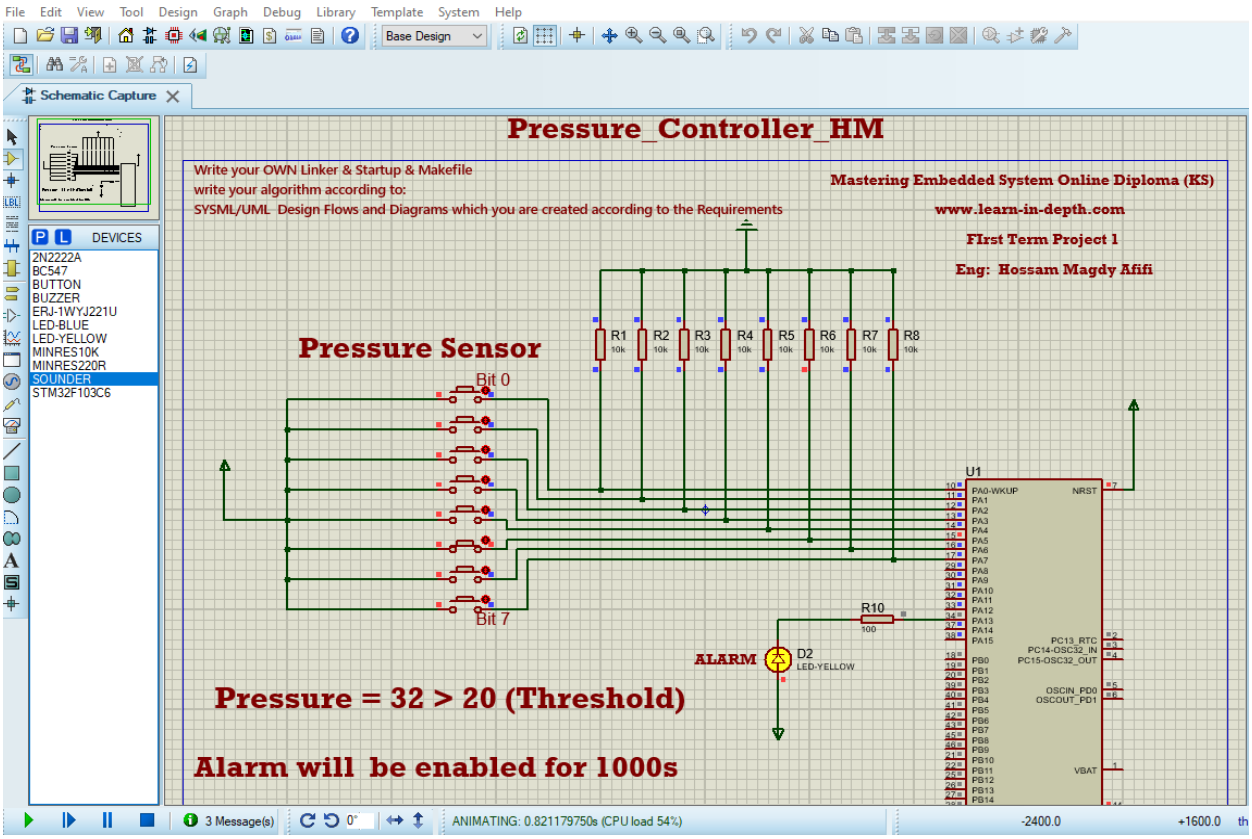
➢System design (State Machine):

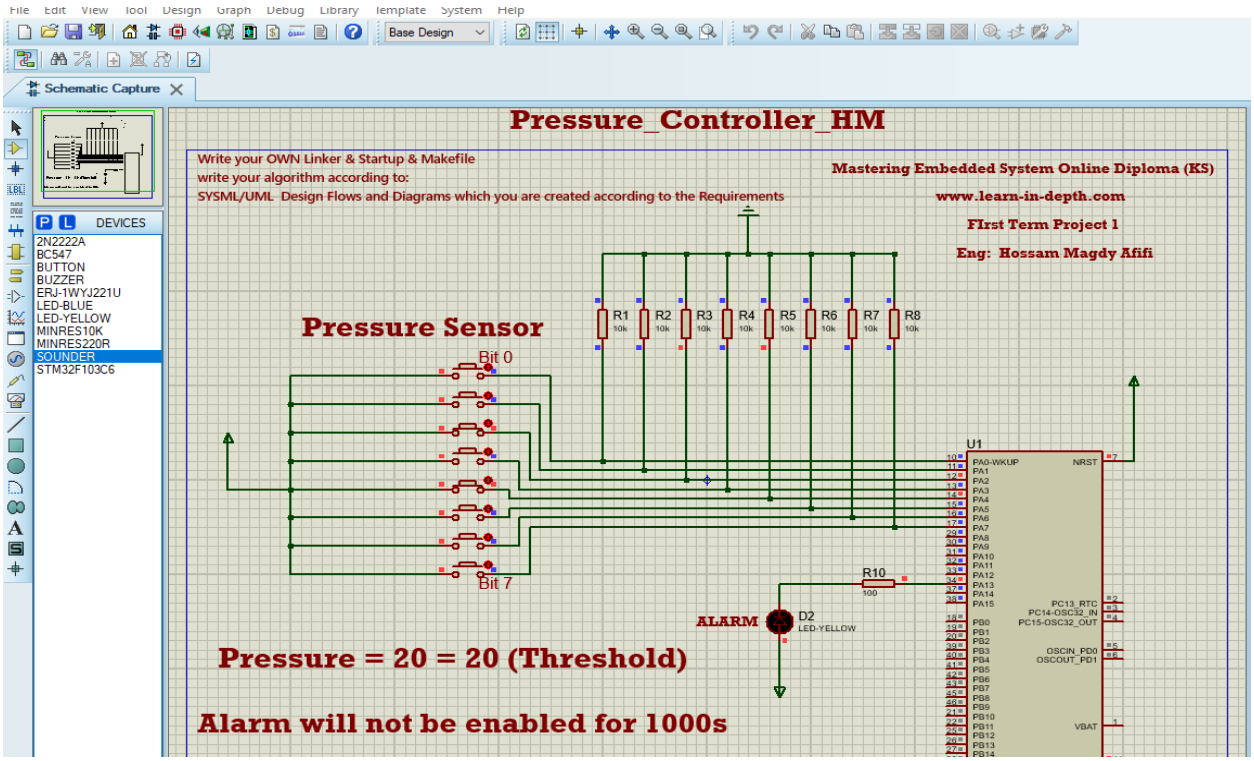


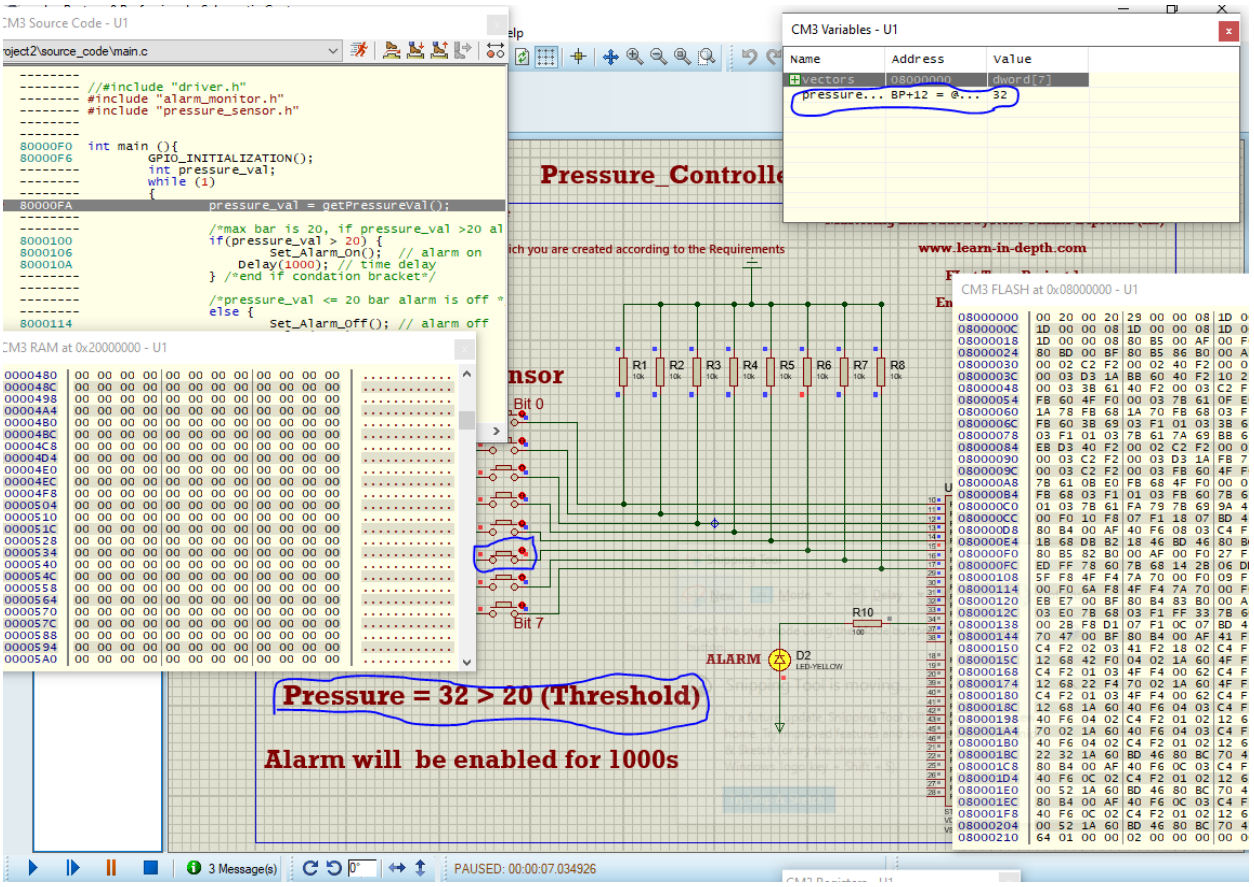
➢Simulation analysis:

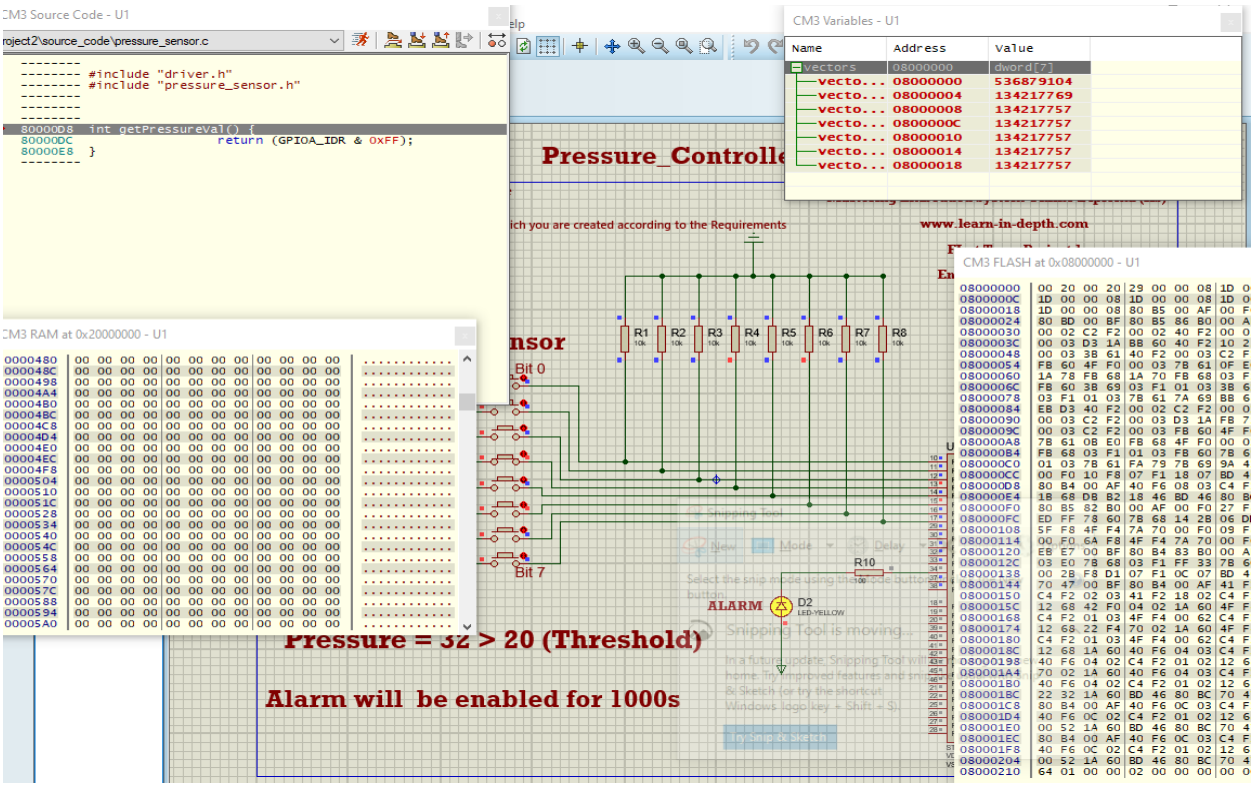


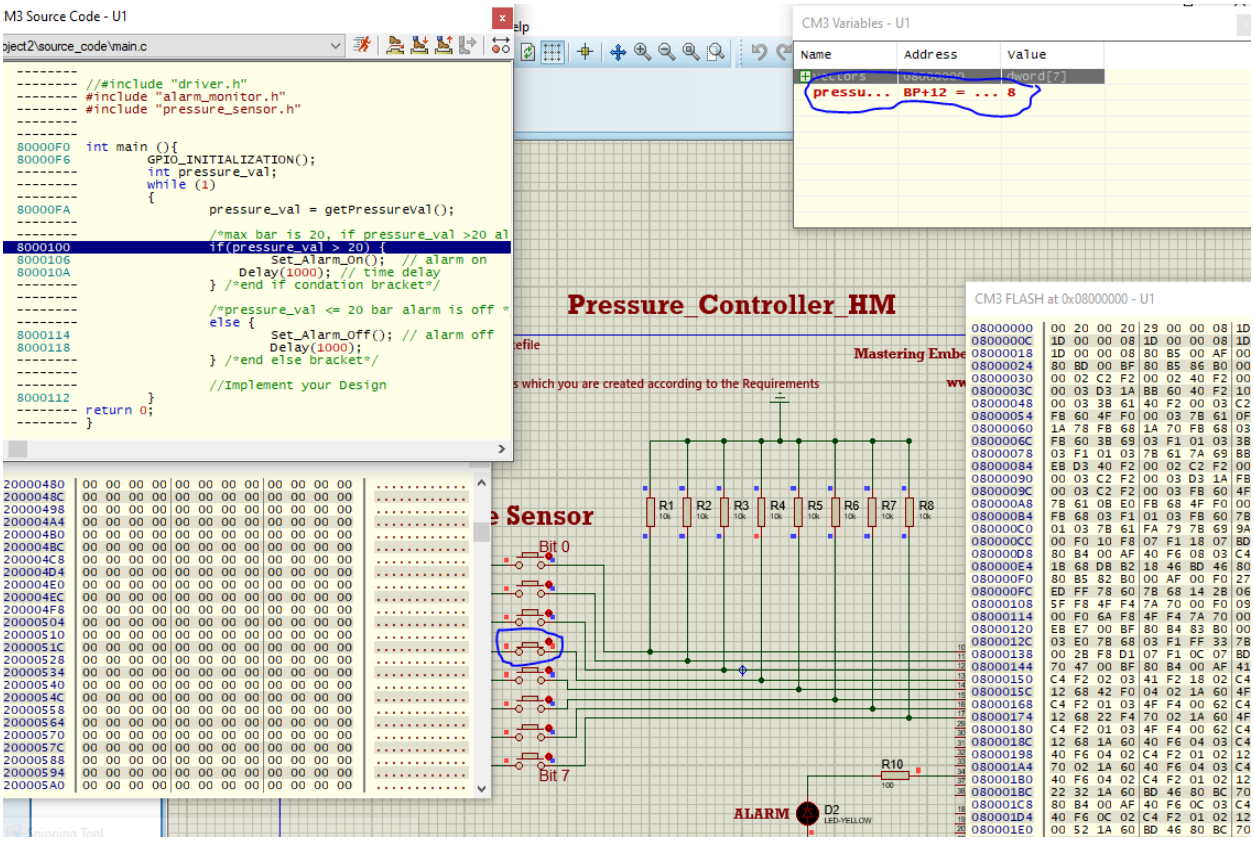

File Edit View Tool Design Graph Debug Library Template System Help
Base Design
Schematic Capture
DEVICES
2N2222A
BC547
BUTTON
BUZZER
ERJ-1WYJ221U
LED-BLUE
LED-YELLOW
MINRES10K
MINRES220R
SOUNDER
STM32F103C6
Pressure_Controller_HM
Write your OWN Linker & Startup & Makefile
write your algorithm according to:
SYSML/UML Design Flows and Diagrams which you are created according to the Requirements
Mastering Embedded System Online Diploma (KS)
www.learn-in-depth.com
FIrst Term Project 1
Eng: Hossam Magdy Afifi
Pressure Sensor
Bit 0
Bit 7
R1 R2 R3 R4 R5 R6 R7 R8
10k
U1
R10
100
ALARM
D2
LED-YELLOW
Pressure = 12 < 20 (Threshold)
Alarm will not be enabled for 1000s

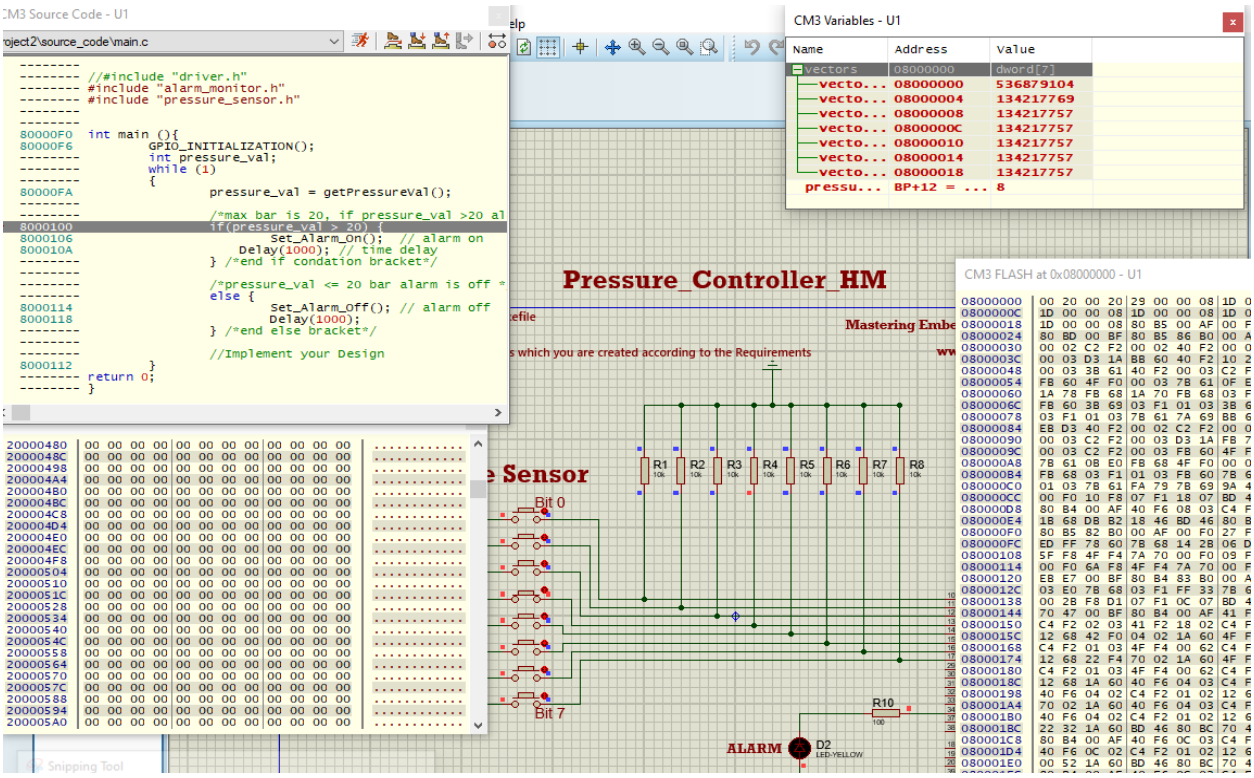

File Edit View Tool Design Graph Debug Library Template System Help
Base Design
Schematic Capture
DEVICES
2N2222A
BC547
BUTTON
BUZZER
ERJ-1WYJ221U
LED-BLUE
LED-YELLOW
MINRES10K
MINRES220R
SOUNDER
STM32F103C6
Pressure_Controller_HM
Write your OWN Linker & Startup & Makefile
write your algorithm according to:
SYSML/UML Design Flows and Diagrams which you are created according to the Requirements
Mastering Embedded System Online Diploma (KS)
www.learn-in-depth.com
FIrst Term Project 1
Eng: Hossam Magdy Afifi
Pressure Sensor
Bit 0
Bit 7
R1 R2 R3 R4 R5 R6 R7 R8
10k
U1
R10
100
ALARM
D2
LED-YELLOW
Pressure = 32 > 20 (Threshold)
Alarm will be enabled for 1000s
3 Message(s)
ANIMATING: 0.821179750s (CPU load 54%)
-2400.0
+1600.0

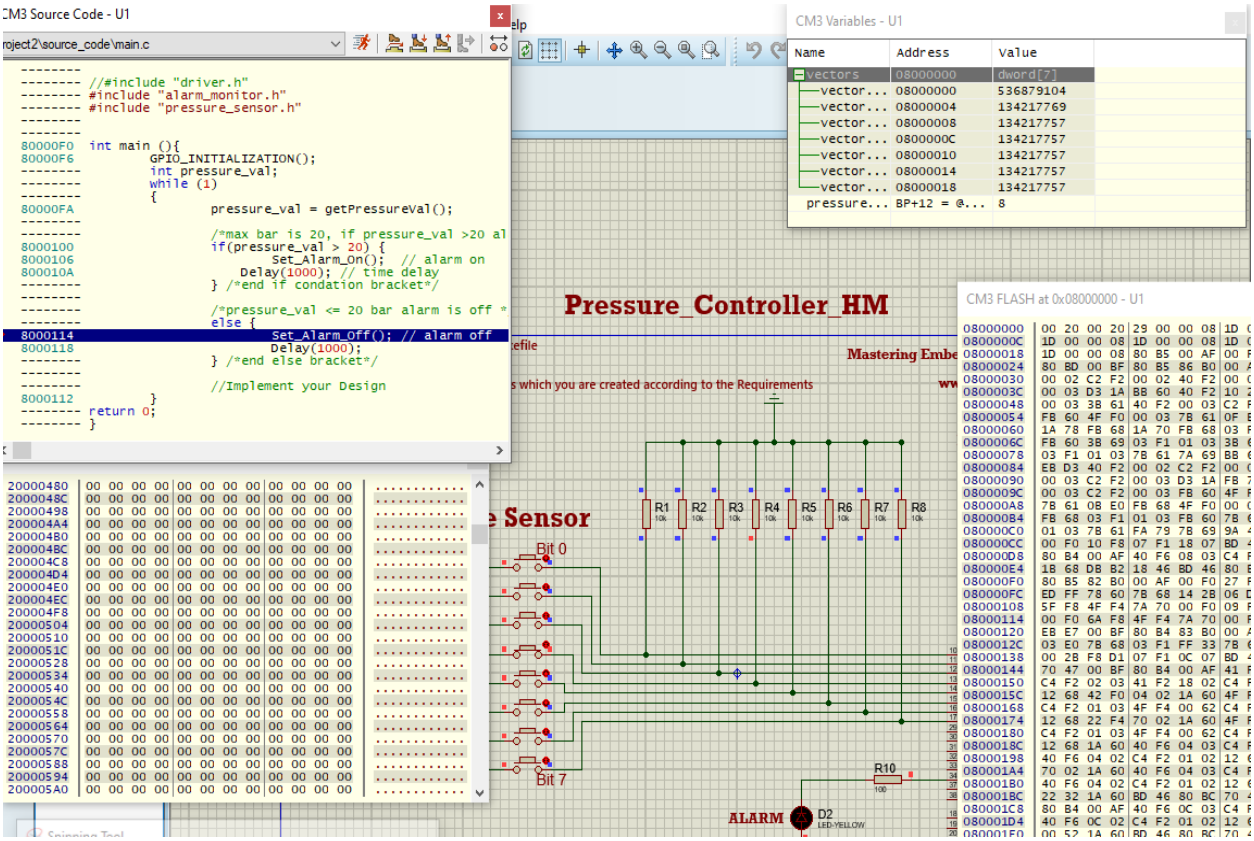

Schematic Capture
Pressure_Controller_HM
Write your OWN Linker & Startup & Makefile
write your algorithm according to:
SYSML/UML Design Flows and Diagrams which you are created according to the Requirements
Mastering Embedded System Online Diploma (KS)
www.learn-in-depth.com
FIrst Term Project 1
Eng: Hossam Magdy Afifi
DEVICES
2N2222A
BC547
BUTTON
BUZZER
ERJ-1WYJ221U
LED-BLUE
LED-YELLOW
MINRES10K
MINRES220R
SOUNDER
STM32F103C6
Pressure Sensor
Bit 0
Bit 7
R1
R2
R3
R4
R5
R6
R7
R8
R10
U1
ALARM
D2
LED-YELLOW
Pressure = 20 = 20 (Threshold)
Alarm will not be enabled for 1000s

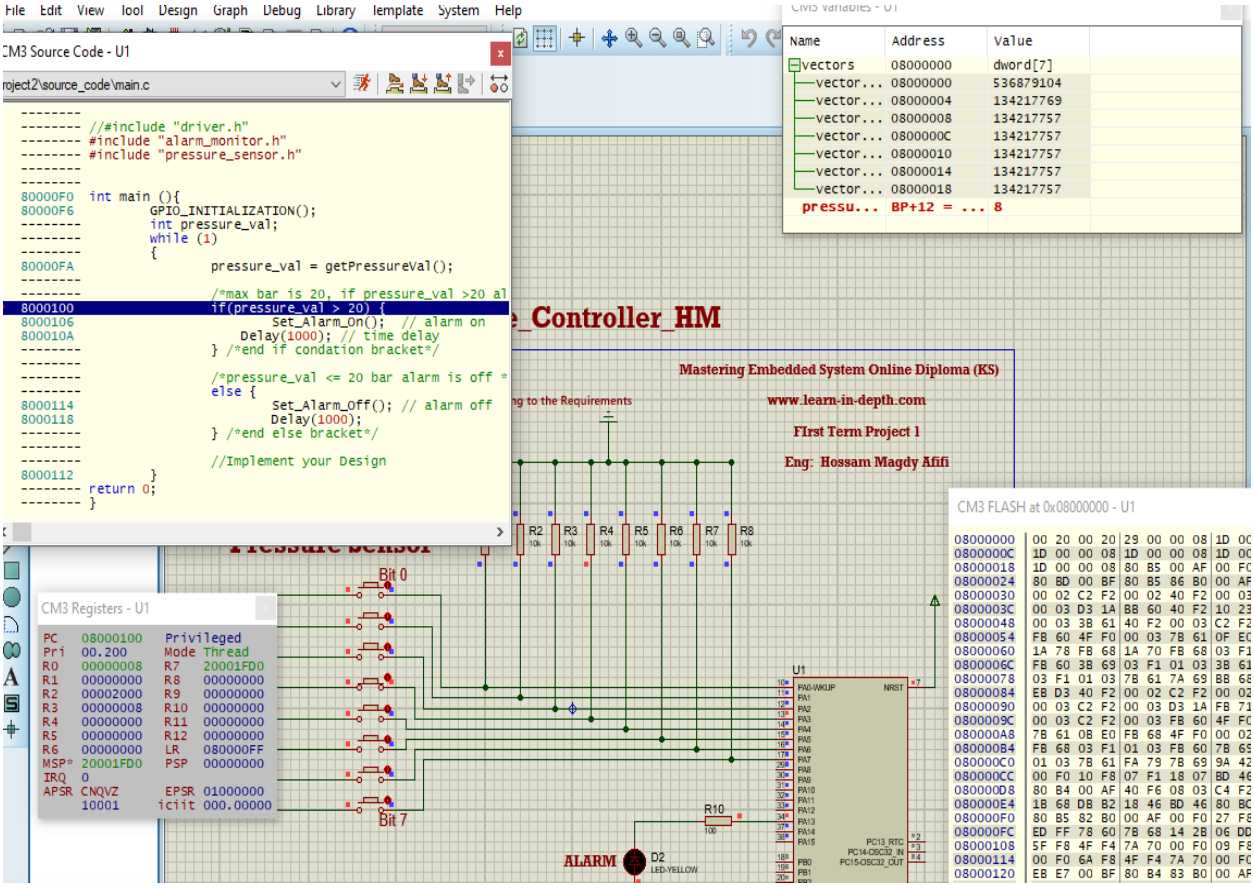

CM3 Source Code - U1
CM3 Variables - U1
Name
Address
Value
pressure... BP+12 = @... 32
CM3 RAM at 0x20000000 - U1
CM3 FLASH at 0x08000000 - U1
Pressure_Controlle
www.learn-in-depth.com
Bit 0
Bit 7
R1
R2
R3
R4
R5
R6
R7
R8
R10
ALARM
D2
LED-YELLOW
Pressure = 32 > 20 (Threshold)
Alarm will be enabled for 1000s
3 Message(s)
PAUSED: 00:00:07.034926


CM3 Source Code - U1
CM3 Variables - U1
CM3 RAM at 0x20000000 - U1
CM3 FLASH at 0x08000000 - U1
Pressure_Controlle
www.learn-in-depth.com
Pressure = 32 > 20 (Threshold)
Alarm will be enabled for 1000s
ALARM
D2


M3 Source Code - U1
CM3 Variables - U1
CM3 FLASH at 0x08000000 - U1
Pressure_Controller_HM
Mastering Embe
ALARM
D2


CM3 Source Code - U1
project2\source_code\main.c
//#include "driver.h"
#include "alarm_monitor.h"
#include "pressure_sensor.h"
int main (){
GPIO_INITIALIZATION();
int pressure_val;
while (1)
{
pressure_val = getPressureVal();
/*max bar is 20, if pressure_val >20 al
if(pressure_val > 20) {
Set_Alarm_On(); // alarm on
Delay(1000); // time delay
} /*end if condation bracket*/
/*pressure_val <= 20 bar alarm is off *
else {
Set_Alarm_Off(); // alarm off
Delay(1000);
} /*end else bracket*/
//Implement your Design
}
return 0;
}
CM3 Variables - U1
Name
Address
Value
vectors
08000000
dword[7]
vecto... 08000000 536879104
vecto... 08000004 134217769
vecto... 08000008 134217757
vecto... 0800000C 134217757
vecto... 08000010 134217757
vecto... 08000014 134217757
vecto... 08000018 134217757
pressu... BP+12 = ... 8
CM3 FLASH at 0x08000000 - U1
Pressure_Controller_HM
Mastering Embe
which you are created according to the Requirements
Sensor
Bit 0
Bit 7
R1
R2
R3
R4
R5
R6
R7
R8
R10
ALARM
D2
LED-YELLOW


CM3 Source Code - U1
project2\source_code\main.c
//#include "driver.h"
#include "alarm_monitor.h"
#include "pressure_sensor.h"
int main (){
GPIO_INITIALIZATION();
int pressure_val;
while (1)
{
pressure_val = getPressureVal();
/*max bar is 20, if pressure_val >20 al
if(pressure_val > 20) {
Set_Alarm_On(); // alarm on
Delay(1000); // time delay
} /*end if condation bracket*/
/*pressure_val <= 20 bar alarm is off *
else {
Set_Alarm_Off(); // alarm off
Delay(1000);
} /*end else bracket*/
//Implement your Design
}
return 0;
}
CM3 Variables - U1
Name
Address
Value
vectors
08000000
dword[7]
vector... 08000000 536879104
vector... 08000004 134217769
vector... 08000008 134217757
vector... 0800000C 134217757
vector... 08000010 134217757
vector... 08000014 134217757
vector... 08000018 134217757
pressure... BP+12 = @... 8
CM3 FLASH at 0x08000000 - U1
Pressure_Controller_HM
Mastering Embe
which you are created according to the Requirements
Sensor
Bit 0
Bit 7
R1
R2
R3
R4
R5
R6
R7
R8
R10
ALARM
D2
LED-YELLOW



➢Make File:

```
amagd@DESKTOP-C1I4UHM MINGW32 /f/material/Automotive Embedded System Course/kerolis shon
oda/cource embededd system online/first term project/Project2/source_code
$ mingw32-make all
arm-none-eabi-gcc.exe -c  -I . -mcpu=cortex-m3 -mthumb -gdwarf-2 startup.c -o startup.o
#####Finished compiler#####
arm-none-eabi-gcc.exe -c  -I . -mcpu=cortex-m3 -mthumb -gdwarf-2 pressure_sensor.c -o pr
essure_sensor.o
#####Finished compiler#####
arm-none-eabi-gcc.exe -c  -I . -mcpu=cortex-m3 -mthumb -gdwarf-2 main.c -o main.o
#####Finished compiler#####
arm-none-eabi-gcc.exe -c  -I . -mcpu=cortex-m3 -mthumb -gdwarf-2 driver.c -o driver.o
#####Finished compiler#####
arm-none-eabi-gcc.exe -c  -I . -mcpu=cortex-m3 -mthumb -gdwarf-2 alarm_monitor.c -o alar
m_monitor.o
#####Finished compiler#####
arm-none-eabi-ld.exe  -T linker_script.ld -nostartfiles    startup.o pressure_sensor.o m
ain.o driver.o alarm_monitor.o  -o Pressure_Detection.elf       -Map=output.map
 Finished linker_script
arm-none-eabi-objcopy.exe -O binary Pressure_Detection.elf Pressure_Detection.hex
#####Finished hex file#####
 ----------------------------
#####DONE ALL#####
```

➢SW analysis:

```
MINGW32:/f/material/Automotive Embedded System Course/kerolis shonoda/cource embededd system online/first term project/Project2/source_code
oda/cource embededd system online/first term project/Project2/source_code
$ arm-none-eabi-nm.exe driver.o
00000000 T Delay
00000024 T GPIO_INITIALIZATION

amagd@DESKTOP-C174UHM MINGW32 /f/material/Automotive Embedded System Course/kerolis shon
oda/cource embededd system online/first term project/Project2/source_code
$ arm-none-eabi-nm.exe alarm_monitor.o
00000024 T Set_Alarm_Off
00000000 T Set_Alarm_On

amagd@DESKTOP-C174UHM MINGW32 /f/material/Automotive Embedded System Course/kerolis shon
oda/cource embededd system online/first term project/Project2/source_code
$ arm-none-eabi-nm.exe pressure_sensor.o
00000000 T getPressureVal

amagd@DESKTOP-C174UHM MINGW32 /f/material/Automotive Embedded System Course/kerolis shon
oda/cource embededd system online/first term project/Project2/source_code
$ arm-none-eabi-nm.exe startup.o
         U _E_bss
         U _E_DATA
         U _E_text
         U _S_bss
         U _S_DATA
         U _stack_top
00000000 W Bus_fault_Handler
00000000 T Default_Handler
00000000 W H_fault_Handler
         U main
00000000 W MM_fault_Handler
00000000 W NMT_Handler
0000000c T Reset_Handler
00000000 W Usage_fault_Handler
00000000 D vectors
```

```
amagd@DESKTOP-C174UHM MINGW32 /f/material/Automotive Embedded System Course/kerolis shon
oda/cource embededd system online/first term project/Project2/source_code
$ arm-none-eabi-nm.exe main.o
         U Delay
         U getPressureVal
         U GPIO_INITIALIZATION
00000000 T main
         U Set_Alarm_Off
         U Set_Alarm_On

amagd@DESKTOP-C174UHM MINGW32 /f/material/Automotive Embedded System Course/kerolis shon
oda/cource embededd system online/first term project/Project2/source_code
$ arm-none-eabi-nm.exe Pressure_Detection.elf
20000000 B _E_bss
20000000 T _E_DATA
08000214 T _E_text
20001000 B _heap_End
20000000 B _S_bss
20000000 T _S_DATA
20002000 B _stack_top
0800001c W Bus_fault_Handler
0800001c T Default_Handler
08000128 T Delay
080000d8 T getPressureVal
0800014c T GPIO_INITIALIZATION
0800001c W H_fault_Handler
080000f0 T main
0800001c W MM_fault_Handler
0800001c W NMT_Handler
08000028 T Reset_Handler
080001f0 T Set_Alarm_Off
080001cc T Set_Alarm_On
0800001c W Usage_fault_Handler
08000000 T vectors
```

MINGW32:/f/material/Automotive Embedded System Course/kerolis shonoda/cource embededd system online/first term project/Project2/source_code

```
amagd@DESKTOP-C174UHM MINGW32 /f/material/Automotive Embedded System Course/kerolis shon
oda/cource embededd system online/first term project/Project2/source_code
$ arm-none-eabi-objdump.exe -h alarm_monitor.o

alarm_monitor.o:     file format elf32-littlearm

Sections:
Idx Name          Size      VMA       LMA       File off  Algn
  0 .text         00000048  00000000  00000000  00000034  2**2
                  CONTENTS, ALLOC, LOAD, READONLY, CODE
  1 .data         00000000  00000000  00000000  0000007c  2**0
                  CONTENTS, ALLOC, LOAD, DATA
  2 .bss          00000000  00000000  00000000  0000007c  2**0
                  ALLOC
  3 .debug_info   000000af  00000000  00000000  0000007c  2**0
                  CONTENTS, RELOC, READONLY, DEBUGGING
  4 .debug_abbrev 0000004d  00000000  00000000  0000012b  2**0
                  CONTENTS, READONLY, DEBUGGING
  5 .debug_loc    00000058  00000000  00000000  00000178  2**0
                  CONTENTS, READONLY, DEBUGGING
  6 .debug_aranges 00000020  00000000  00000000  000001d0  2**0
                  CONTENTS, RELOC, READONLY, DEBUGGING
  7 .debug_line   00000087  00000000  00000000  000001f0  2**0
                  CONTENTS, RELOC, READONLY, DEBUGGING
  8 .debug_str    00000156  00000000  00000000  00000277  2**0
                  CONTENTS, READONLY, DEBUGGING
  9 .comment      00000012  00000000  00000000  000003cd  2**0
                  CONTENTS, READONLY
 10 .ARM.attributes 00000033  00000000  00000000  000003df  2**0
                  CONTENTS, READONLY
 11 .debug_frame  00000040  00000000  00000000  00000414  2**2
                  CONTENTS, RELOC, READONLY, DEBUGGING
```

MINGW32:/f/material/Automotive Embedded System Course/kerolis shonoda/cource embededd system online/first term project/Project2/source_code

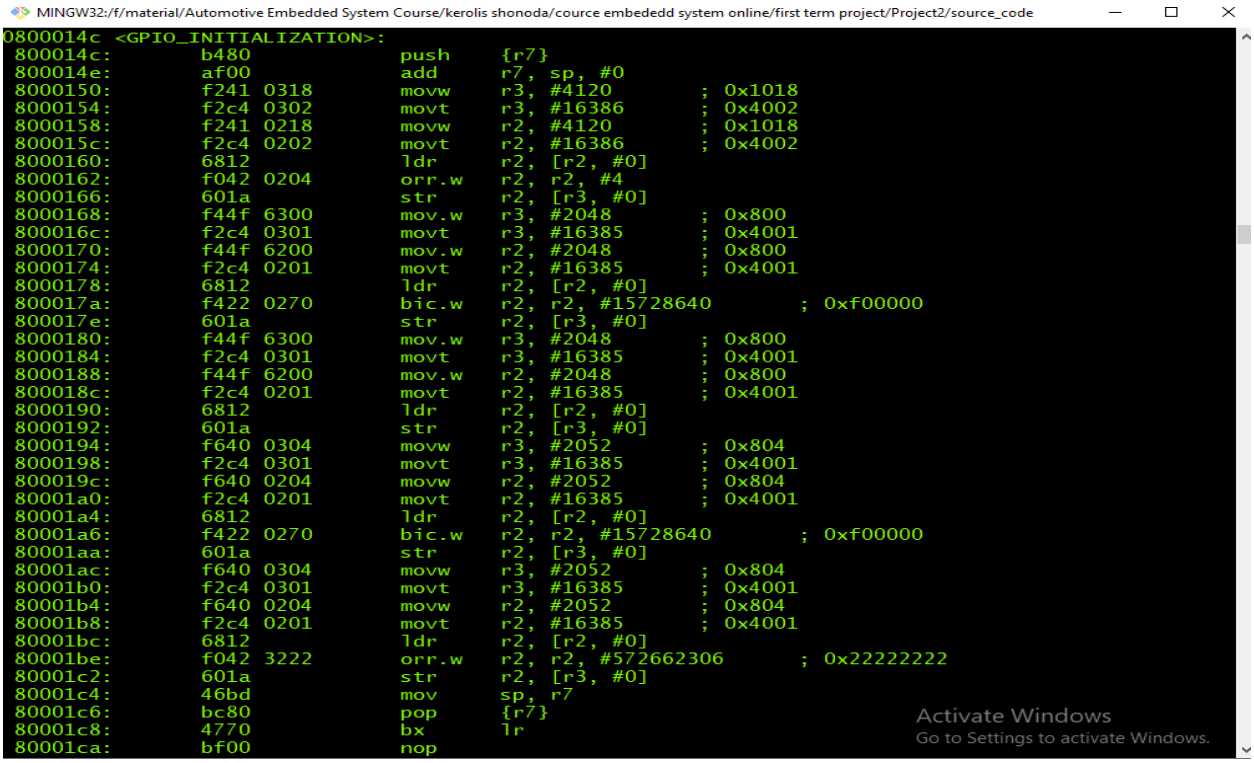
```
amagd@DESKTOP-C174UHM MINGW32 /f/material/Automotive Embedded System Course/kerolis shon
oda/cource embededd system online/first term project/Project2/source_code
$ arm-none-eabi-objdump.exe -h driver.o

driver.o:     file format elf32-littlearm

Sections:
Idx Name          Size      VMA       LMA       File off  Algn
  0 .text         000000a4  00000000  00000000  00000034  2**2
                  CONTENTS, ALLOC, LOAD, READONLY, CODE
  1 .data         00000000  00000000  00000000  000000d8  2**0
                  CONTENTS, ALLOC, LOAD, DATA
  2 .bss          00000000  00000000  00000000  000000d8  2**0
                  ALLOC
  3 .debug_info   000000c3  00000000  00000000  000000d8  2**0
                  CONTENTS, RELOC, READONLY, DEBUGGING
  4 .debug_abbrev 00000076  00000000  00000000  0000019b  2**0
                  CONTENTS, READONLY, DEBUGGING
  5 .debug_loc    00000064  00000000  00000000  00000211  2**0
                  CONTENTS, READONLY, DEBUGGING
  6 .debug_aranges 00000020  00000000  00000000  00000275  2**0
                  CONTENTS, RELOC, READONLY, DEBUGGING
  7 .debug_line   00000090  00000000  00000000  00000295  2**0
                  CONTENTS, RELOC, READONLY, DEBUGGING
  8 .debug_str    00000155  00000000  00000000  00000325  2**0
                  CONTENTS, READONLY, DEBUGGING
  9 .comment      00000012  00000000  00000000  0000047a  2**0
                  CONTENTS, READONLY
 10 .ARM.attributes 00000033  00000000  00000000  0000048c  2**0
                  CONTENTS, READONLY
 11 .debug_frame  00000044  00000000  00000000  000004c0  2**2
                  CONTENTS, RELOC, READONLY, DEBUGGING
```

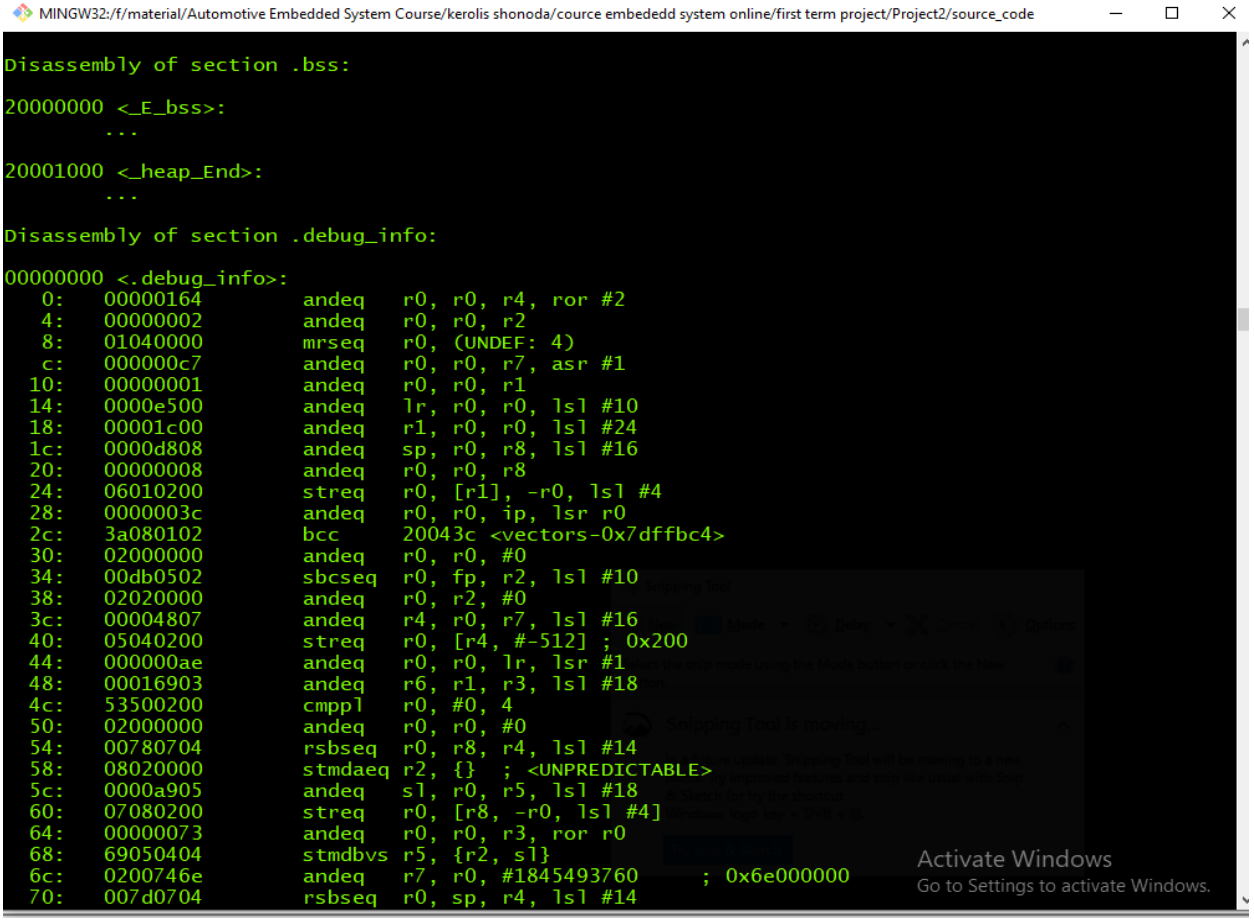
MINGW32:/f/material/Automotive Embedded System Course/kerolis shonoda/cource embededd system online/first term project/Project2/source_code

```
amagd@DESKTOP-C174UHM MINGW32 /f/material/Automotive Embedded System Course/kerolis shon
oda/cource embededd system online/first term project/Project2/source_code
$ arm-none-eabi-objdump.exe -D Pressure_Detection.elf

Pressure_Detection.elf:     file format elf32-littlearm


Disassembly of section .text:

08000000 <vectors>:
 8000000:       20002000        andcs   r2, r0, r0
 8000004:       08000029        stmdaeq r0, {r0, r3, r5}
 8000008:       0800001d        stmdaeq r0, {r0, r2, r3, r4}
 800000c:       0800001d        stmdaeq r0, {r0, r2, r3, r4}
 8000010:       0800001d        stmdaeq r0, {r0, r2, r3, r4}
 8000014:       0800001d        stmdaeq r0, {r0, r2, r3, r4}
 8000018:       0800001d        stmdaeq r0, {r0, r2, r3, r4}

0800001c <Default_Handler>:
 800001c:       b580            push    {r7, lr}
 800001e:       af00            add     r7, sp, #0
 8000020:       f000 f802       bl      8000028 <Reset_Handler>
 8000024:       bd80            pop     {r7, pc}
 8000026:       bf00            nop

08000028 <Reset_Handler>:
 8000028:       b580            push    {r7, lr}
 800002a:       b086            sub     sp, #24
 800002c:       af00            add     r7, sp, #0
 800002e:       f240 0200       movw    r2, #0
 8000032:       f2c2 0200       movt    r2, #8192       ; 0x2000
 8000036:       f240 0300       movw    r3, #0
 800003a:       f2c2 0300       movt    r3, #8192       ; 0x2000
 800003e:       1ad3            subs    r3, r2, r3
 8000040:       60bb            str     r3, [r7, #8]
 8000042:       f240 2314       movw    r3, #532        ; 0x214
 8000046:       f6c0 0300       movt    r3, #2048       ; 0x800
 800004a:       613b            str     r3, [r7, #16]
 800004c:       f240 0300       movw    r3, #0
 8000050:       f2c2 0300       movt    r3, #8192       ; 0x2000
 8000054:       60fb            str     r3, [r7, #12]
```


MINGW32:/f/material/Automotive Embedded System Course/kerolis shonoda/cource embededd system online/first term project/Project2/source_code

```
080000d8 <getPressureVal>:
 80000d8:       b480            push    {r7}
 80000da:       af00            add     r7, sp, #0
 80000dc:       f640 0308       movw    r3, #2056       ; 0x808
 80000e0:       f2c4 0301       movt    r3, #16385      ; 0x4001
 80000e4:       681b            ldr     r3, [r3, #0]
 80000e6:       b2db            uxtb    r3, r3
 80000e8:       4618            mov     r0, r3
 80000ea:       46bd            mov     sp, r7
 80000ec:       bc80            pop     {r7}
 80000ee:       4770            bx      lr

080000f0 <main>:
 80000f0:       b580            push    {r7, lr}
 80000f2:       b082            sub     sp, #8
 80000f4:       af00            add     r7, sp, #0
 80000f6:       f000 f829       bl      800014c <GPIO_INITIALIZATION>
 80000fa:       f7ff ffed       bl      80000d8 <getPressureVal>
 80000fe:       6078            str     r0, [r7, #4]
 8000100:       687b            ldr     r3, [r7, #4]
 8000102:       2b14            cmp     r3, #20
 8000104:       dd0c            ble.n   8000120 <main+0x30>
 8000106:       f000 f861       bl      80001cc <Set_Alarm_On>
 800010a:       f04f 00c8       mov.w   r0, #200        ; 0xc8
 800010e:       f000 f80b       bl      8000128 <Delay>
 8000112:       f000 f86d       bl      80001f0 <Set_Alarm_Off>
 8000116:       f04f 00c8       mov.w   r0, #200        ; 0xc8
 800011a:       f000 f805       bl      8000128 <Delay>
 800011e:       e7ec            b.n     80000fa <main+0xa>
 8000120:       f000 f866       bl      80001f0 <Set_Alarm_Off>
 8000124:       e7e9            b.n     80000fa <main+0xa>
 8000126:       bf00            nop

08000128 <Delay>:
 8000128:       b480            push    {r7}
 800012a:       b083            sub     sp, #12
 800012c:       af00            add     r7, sp, #0
 800012e:       6078            str     r0, [r7, #4]
 8000130:       e003            b.n     800013a <Delay+0x12>
 8000132:       687b            ldr     r3, [r7, #4]
 8000134:       f103 33ff       add.w   r3, r3, #4294967295
```


MINGW32:/f/material/Automotive Embedded System Course/kerolis shonoda/cource embededd system online/first term project/Project2/source_code
0800014c <GPIO_INITIALIZATION>:
800014c: b480 push {r7}
800014e: af00 add r7, sp, #0
8000150: f241 0318 movw r3, #4120 ; 0x1018
8000154: f2c4 0302 movt r3, #16386 ; 0x4002
8000158: f241 0218 movw r2, #4120 ; 0x1018
800015c: f2c4 0202 movt r2, #16386 ; 0x4002
8000160: 6812 ldr r2, [r2, #0]
8000162: f042 0204 orr.w r2, r2, #4
8000166: 601a str r2, [r3, #0]
8000168: f44f 6300 mov.w r3, #2048 ; 0x800
800016c: f2c4 0301 movt r3, #16385 ; 0x4001
8000170: f44f 6200 mov.w r2, #2048 ; 0x800
8000174: f2c4 0201 movt r2, #16385 ; 0x4001
8000178: 6812 ldr r2, [r2, #0]
800017a: f422 0270 bic.w r2, r2, #15728640 ; 0xf00000
800017e: 601a str r2, [r3, #0]
8000180: f44f 6300 mov.w r3, #2048 ; 0x800
8000184: f2c4 0301 movt r3, #16385 ; 0x4001
8000188: f44f 6200 mov.w r2, #2048 ; 0x800
800018c: f2c4 0201 movt r2, #16385 ; 0x4001
8000190: 6812 ldr r2, [r2, #0]
8000192: 601a str r2, [r3, #0]
8000194: f640 0304 movw r3, #2052 ; 0x804
8000198: f2c4 0301 movt r3, #16385 ; 0x4001
800019c: f640 0204 movw r2, #2052 ; 0x804
80001a0: f2c4 0201 movt r2, #16385 ; 0x4001
80001a4: 6812 ldr r2, [r2, #0]
80001a6: f422 0270 bic.w r2, r2, #15728640 ; 0xf00000
80001aa: 601a str r2, [r3, #0]
80001ac: f640 0304 movw r3, #2052 ; 0x804
80001b0: f2c4 0301 movt r3, #16385 ; 0x4001
80001b4: f640 0204 movw r2, #2052 ; 0x804
80001b8: f2c4 0201 movt r2, #16385 ; 0x4001
80001bc: 6812 ldr r2, [r2, #0]
80001be: f042 3222 orr.w r2, r2, #572662306 ; 0x22222222
80001c2: 601a str r2, [r3, #0]
80001c4: 46bd mov sp, r7
80001c6: bc80 pop {r7}
80001c8: 4770 bx lr
80001ca: bf00 nop
Activate Windows
Go to Settings to activate Windows.


MINGW32:/f/material/Automotive Embedded System Course/kerolis shonoda/cource embededd system online/first term project/Project2/source_code
Disassembly of section .bss:
20000000 <_E_bss>:
...
20001000 <_heap_End>:
...
Disassembly of section .debug_info:
00000000 <.debug_info>:
0: 00000164 andeq r0, r0, r4, ror #2
4: 00000002 andeq r0, r0, r2
8: 01040000 mrseq r0, (UNDEF: 4)
c: 000000c7 andeq r0, r0, r7, asr #1
10: 00000001 andeq r0, r0, r1
14: 0000e500 andeq lr, r0, r0, lsl #10
18: 00001c00 andeq r1, r0, r0, lsl #24
1c: 0000d808 andeq sp, r0, r8, lsl #16
20: 00000008 andeq r0, r0, r8
24: 06010200 streq r0, [r1], -r0, lsl #4
28: 0000003c andeq r0, r0, ip, lsr r0
2c: 3a080102 bcc 20043c <vectors-0x7dffbc4>
30: 02000000 andeq r0, r0, #0
34: 00db0502 sbcseq r0, fp, r2, lsl #10
38: 02020000 andeq r0, r2, #0
3c: 00004807 andeq r4, r0, r7, lsl #16
40: 05040200 streq r0, [r4, #-512] ; 0x200
44: 000000ae andeq r0, r0, lr, lsr #1
48: 00016903 andeq r6, r1, r3, lsl #18
4c: 53500200 cmppl r0, #0, 4
50: 02000000 andeq r0, r0, #0
54: 00780704 rsbseq r0, r8, r4, lsl #14
58: 08020000 stmdaeq r2, {} ; <UNPREDICTABLE>
5c: 0000a905 andeq sl, r0, r5, lsl #18
60: 07080200 streq r0, [r8, -r0, lsl #4]
64: 00000073 andeq r0, r0, r3, ror r0
68: 69050404 stmdbvs r5, {r2, sl}
6c: 0200746e andeq r7, r0, #1845493760 ; 0x6e000000
70: 007d0704 rsbseq r0, sp, r4, lsl #14
Activate Windows
Go to Settings to activate Windows.

```
amagd@DESKTOP-C174UHM MINGW32 /f/material/Automotive Embedded System Course/kerolis shon
oda/cource embededd system online/first term project/Project2/source_code
$ arm-none-eabi-objdump.exe -h main.o

main.o:     file format elf32-littlearm

Sections:
Idx Name          Size      VMA       LMA       File off  Algn
  0 .text         00000038  00000000  00000000  00000034  2**2
                  CONTENTS, ALLOC, LOAD, RELOC, READONLY, CODE
  1 .data         00000000  00000000  00000000  0000006c  2**0
                  CONTENTS, ALLOC, LOAD, DATA
  2 .bss          00000000  00000000  00000000  0000006c  2**0
                  ALLOC
  3 .debug_info   00000085  00000000  00000000  0000006c  2**0
                  CONTENTS, RELOC, READONLY, DEBUGGING
  4 .debug_abbrev 0000007a  00000000  00000000  000000f1  2**0
                  CONTENTS, READONLY, DEBUGGING
  5 .debug_loc    00000038  00000000  00000000  0000016b  2**0
                  CONTENTS, READONLY, DEBUGGING
  6 .debug_aranges 00000020  00000000  00000000  000001a3  2**0
                  CONTENTS, RELOC, READONLY, DEBUGGING
  7 .debug_line   00000040  00000000  00000000  000001c3  2**0
                  CONTENTS, RELOC, READONLY, DEBUGGING
  8 .debug_str    000000c3  00000000  00000000  00000203  2**0
                  CONTENTS, READONLY, DEBUGGING
  9 .comment      00000012  00000000  00000000  000002c6  2**0
                  CONTENTS, READONLY
 10 .ARM.attributes 00000033  00000000  00000000  000002d8  2**0
                  CONTENTS, READONLY
 11 .debug_frame  00000030  00000000  00000000  0000030c  2**2
                  CONTENTS, RELOC, READONLY, DEBUGGING
```

```
amagd@DESKTOP-C174UHM MINGW32 /f/material/Automotive Embedded System Course/kerolis shon
oda/cource embededd system online/first term project/Project2/source_code
$ arm-none-eabi-objdump.exe -h pressure_sensor.o

pressure_sensor.o:     file format elf32-littlearm

Sections:
Idx Name          Size      VMA       LMA       File off  Algn
  0 .text         00000018  00000000  00000000  00000034  2**2
                  CONTENTS, ALLOC, LOAD, READONLY, CODE
  1 .data         00000000  00000000  00000000  0000004c  2**0
                  CONTENTS, ALLOC, LOAD, DATA
  2 .bss          00000000  00000000  00000000  0000004c  2**0
                  ALLOC
  3 .debug_info   0000009e  00000000  00000000  0000004c  2**0
                  CONTENTS, RELOC, READONLY, DEBUGGING
  4 .debug_abbrev 0000004f  00000000  00000000  000000ea  2**0
                  CONTENTS, READONLY, DEBUGGING
  5 .debug_loc    0000002c  00000000  00000000  00000139  2**0
                  CONTENTS, READONLY, DEBUGGING
  6 .debug_aranges 00000020  00000000  00000000  00000165  2**0
                  CONTENTS, RELOC, READONLY, DEBUGGING
  7 .debug_line   00000086  00000000  00000000  00000185  2**0
                  CONTENTS, RELOC, READONLY, DEBUGGING
  8 .debug_str    0000014c  00000000  00000000  0000020b  2**0
                  CONTENTS, READONLY, DEBUGGING
  9 .comment      00000012  00000000  00000000  00000357  2**0
                  CONTENTS, READONLY
 10 .ARM.attributes 00000033  00000000  00000000  00000369  2**0
                  CONTENTS, READONLY
 11 .debug_frame  00000028  00000000  00000000  0000039c  2**2
                  CONTENTS, RELOC, READONLY, DEBUGGING
```

```
amagd@DESKTOP-C174UHM MINGW32 /f/material/Automotive Embedded System Course/kerolis shon
oda/cource embededd system online/first term project/Project2/source_code
$ arm-none-eabi-objdump.exe -h startup.o

startup.o:     file format elf32-littlearm

Sections:
Idx Name          Size      VMA       LMA       File off  Algn
  0 .text         000000bc  00000000  00000000  00000034  2**2
                  CONTENTS, ALLOC, LOAD, RELOC, READONLY, CODE
  1 .data         00000000  00000000  00000000  000000f0  2**0
                  CONTENTS, ALLOC, LOAD, DATA
  2 .bss          00000000  00000000  00000000  000000f0  2**0
                  ALLOC
  3 .vector       0000001c  00000000  00000000  000000f0  2**2
                  CONTENTS, ALLOC, LOAD, RELOC, DATA
  4 .debug_info   00000168  00000000  00000000  0000010c  2**0
                  CONTENTS, RELOC, READONLY, DEBUGGING
  5 .debug_abbrev 000000c2  00000000  00000000  00000274  2**0
                  CONTENTS, READONLY, DEBUGGING
  6 .debug_loc    00000064  00000000  00000000  00000336  2**0
                  CONTENTS, READONLY, DEBUGGING
  7 .debug_aranges 00000020  00000000  00000000  0000039a  2**0
                  CONTENTS, RELOC, READONLY, DEBUGGING
  8 .debug_line   000000ae  00000000  00000000  000003ba  2**0
                  CONTENTS, RELOC, READONLY, DEBUGGING
  9 .debug_str    000001a6  00000000  00000000  00000468  2**0
                  CONTENTS, READONLY, DEBUGGING
 10 .comment      00000012  00000000  00000000  0000060e  2**0
                  CONTENTS, READONLY
 11 .ARM.attributes 00000033  00000000  00000000  00000620  2**0
                  CONTENTS, READONLY
 12 .debug_frame  0000004c  00000000  00000000  00000654  2**2
                  CONTENTS, RELOC, READONLY, DEBUGGING
```