PRESSURE DETECTION PROJECT

First Project - First Term
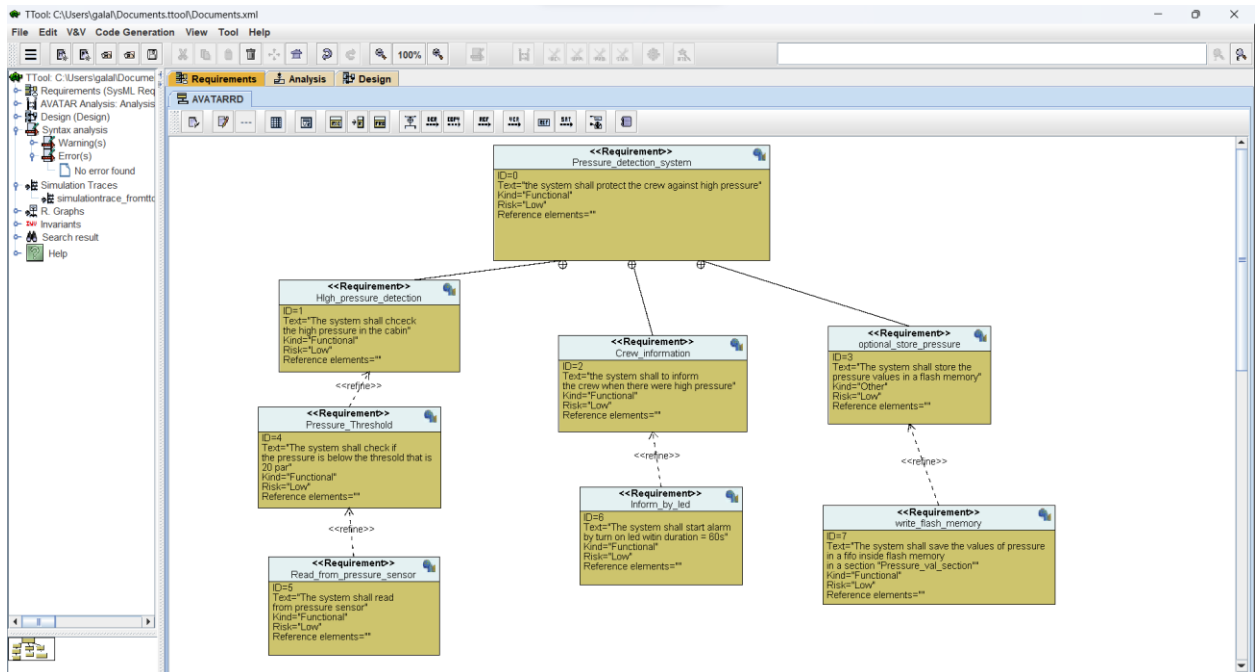
BY: Eng. **Galal Nasser**

Github: https://github.com/galal10

Learn-in-depth : https://www.learn-in-depth.com/online-diploma/galalnasser5%40gmail.com
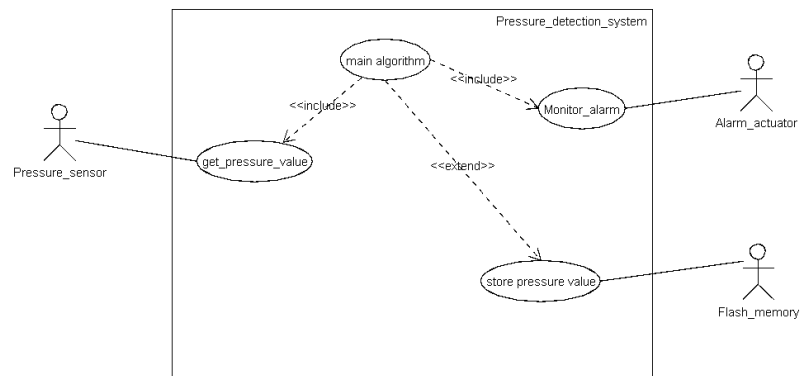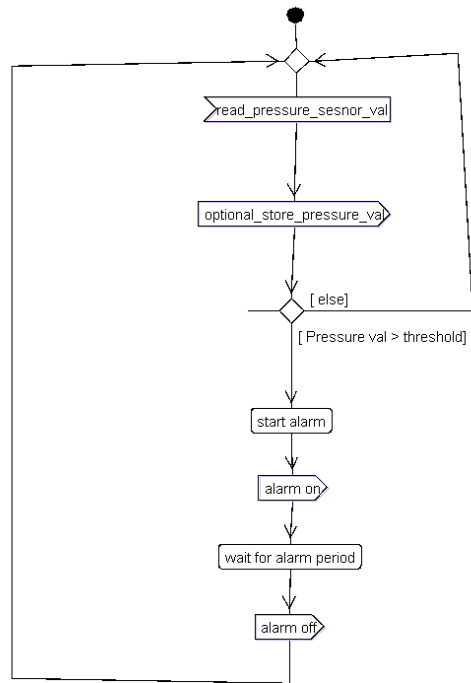
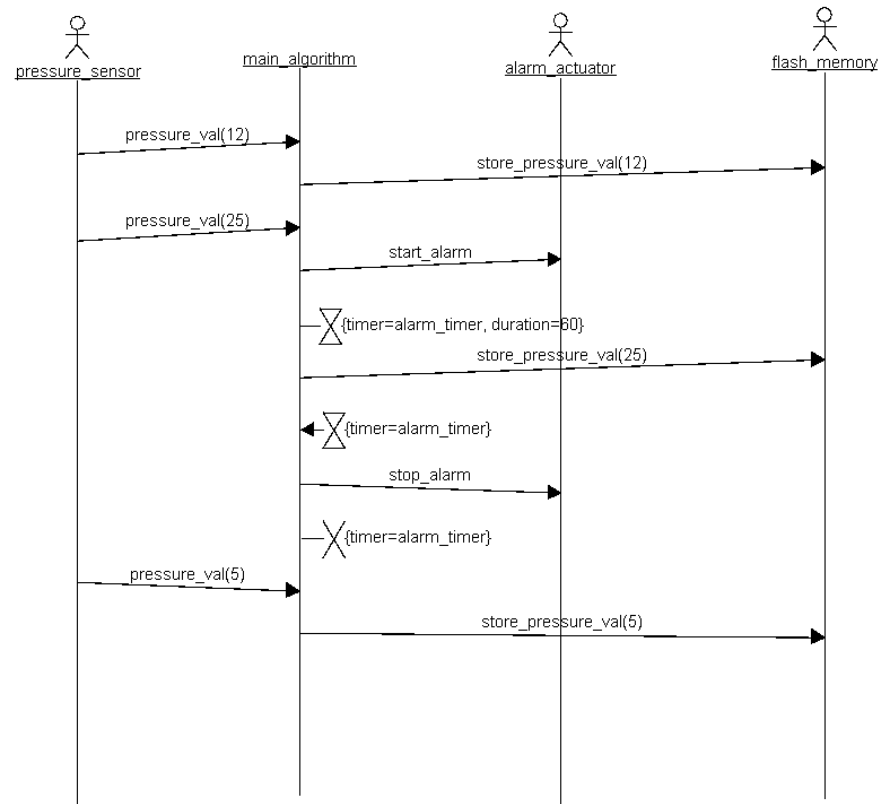## ❖ System Architecture & Design

➢ Requirements
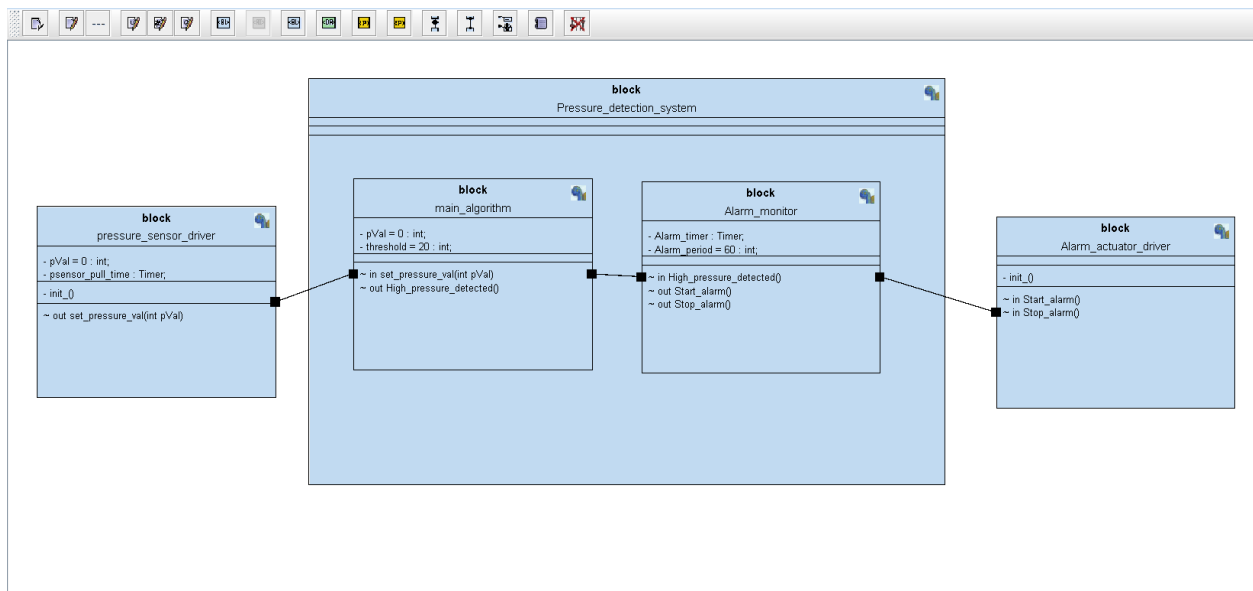
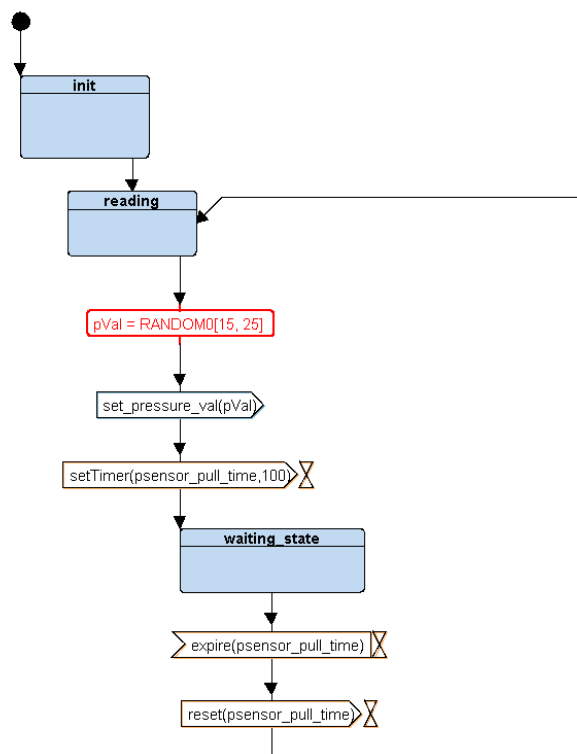- **System Analysis**

- **Use case Diagram**
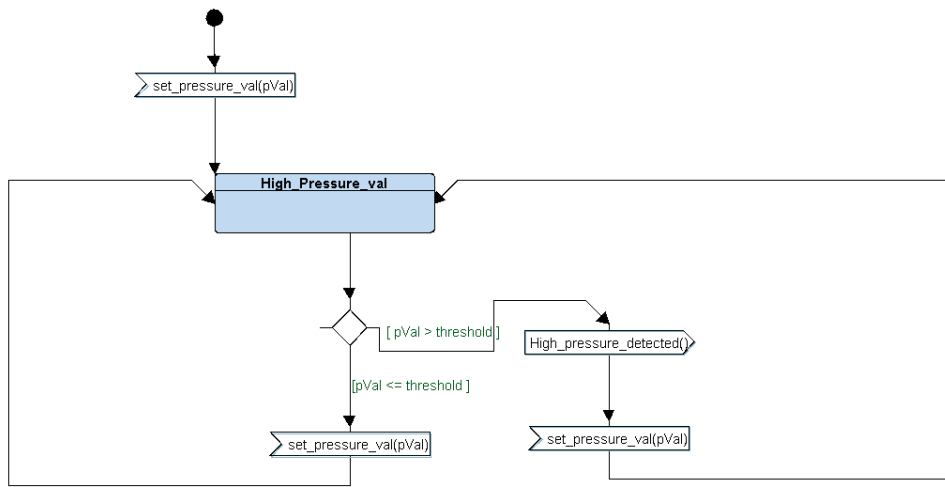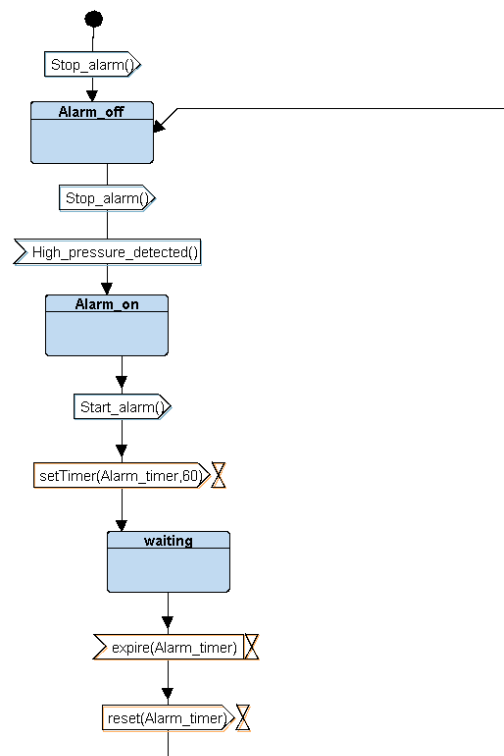
- **Activity Diagram**

- **Sequence Diagram**

- **System Design**

pressure_sensor :

main_algorithm :

alarm_monitor :

alarm_actuator :

- **Header sections of files**

```
galal@galal MINGW32 /e/Github_diploma/embedded_System_Online_Diploma/unit5/High Pressure Detection proje
$ 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         0000003c  00000000  00000000  00000034  2**2
                  CONTENTS, ALLOC, LOAD, RELOC, READONLY, CODE
  1 .data         00000000  00000000  00000000  00000070  2**0
                  CONTENTS, ALLOC, LOAD, DATA
  2 .bss          00000000  00000000  00000000  00000070  2**0
                  ALLOC
  3 .debug_info   000009c6  00000000  00000000  00000070  2**0
                  CONTENTS, RELOC, READONLY, DEBUGGING
  4 .debug_abbrev 000001a0  00000000  00000000  00000a36  2**0
                  CONTENTS, READONLY, DEBUGGING
  5 .debug_loc    00000058  00000000  00000000  00000bd6  2**0
                  CONTENTS, READONLY, DEBUGGING
  6 .debug_aranges 00000020 00000000  00000000  00000c2e  2**0
                  CONTENTS, RELOC, READONLY, DEBUGGING
  7 .debug_line   0000013f  00000000  00000000  00000c4e  2**0
                  CONTENTS, RELOC, READONLY, DEBUGGING
  8 .debug_str    0000056b  00000000  00000000  00000d8d  2**0
                  CONTENTS, READONLY, DEBUGGING
  9 .comment      0000007f  00000000  00000000  000012f8  2**0
                  CONTENTS, READONLY
 10 .debug_frame  00000048  00000000  00000000  00001378  2**2
                  CONTENTS, RELOC, READONLY, DEBUGGING
 11 .ARM.attributes 00000033 00000000 00000000  000013c0  2**0
                  CONTENTS, READONLY
```

```
galal@galal MINGW32 /e/Github_diploma/embedded_System_Online_Diploma/unit5/High Pressure Detectio
$ 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         00000030  00000000  00000000  00000034  2**2
                  CONTENTS, ALLOC, LOAD, RELOC, READONLY, CODE
  1 .data         00000000  00000000  00000000  00000064  2**0
                  CONTENTS, ALLOC, LOAD, DATA
  2 .bss          00000000  00000000  00000000  00000064  2**0
                  ALLOC
  3 .debug_info   000009b6  00000000  00000000  00000064  2**0
                  CONTENTS, RELOC, READONLY, DEBUGGING
  4 .debug_abbrev 00000197  00000000  00000000  00000a1a  2**0
                  CONTENTS, READONLY, DEBUGGING
  5 .debug_loc    0000002c  00000000  00000000  00000bb1  2**0
                  CONTENTS, READONLY, DEBUGGING
  6 .debug_aranges 00000020 00000000  00000000  00000bdd  2**0
                  CONTENTS, RELOC, READONLY, DEBUGGING
  7 .debug_line   00000154  00000000  00000000  00000bfd  2**0
                  CONTENTS, RELOC, READONLY, DEBUGGING
  8 .debug_str    0000055b  00000000  00000000  00000d51  2**0
                  CONTENTS, READONLY, DEBUGGING
  9 .comment      0000007f  00000000  00000000  000012ac  2**0
                  CONTENTS, READONLY
 10 .debug_frame  0000002c  00000000  00000000  0000132c  2**2
                  CONTENTS, RELOC, READONLY, DEBUGGING
 11 .ARM.attributes 00000033 00000000 00000000  00001358  2**0
                  CONTENTS, READONLY
```

```
galal@galal MINGW32 /e/Github_diploma/embedded_System_Online_Diploma/unit5/High Pressure Detec
$ arm-none-eabi-objdump.exe -h pressure_detected_project.elf

pressure_detected_project.elf:      file format elf32-littlearm

Sections:
Idx Name          Size      VMA       LMA       File off  Algn
  0 .text         00000230  08000000  08000000  00010000  2**2
                  CONTENTS, ALLOC, LOAD, READONLY, CODE
  1 .data         00000000  20000000  08000230  00020000  2**0
                  CONTENTS, ALLOC, LOAD, DATA
  2 .bss          0000000c  20000000  08000230  00020000  2**2
                  ALLOC
  3 .debug_info   000028ee  00000000  00000000  00020000  2**0
                  CONTENTS, READONLY, DEBUGGING
  4 .debug_abbrev 0000079a  00000000  00000000  000228ee  2**0
                  CONTENTS, READONLY, DEBUGGING
  5 .debug_loc    00000298  00000000  00000000  00023088  2**0
                  CONTENTS, READONLY, DEBUGGING
  6 .debug_aranges 000000a0  00000000  00000000  00023320  2**0
                  CONTENTS, READONLY, DEBUGGING
  7 .debug_line   0000062b  00000000  00000000  000233c0  2**0
                  CONTENTS, READONLY, DEBUGGING
  8 .debug_str    0000063f  00000000  00000000  000239eb  2**0
                  CONTENTS, READONLY, DEBUGGING
  9 .comment      0000007e  00000000  00000000  0002402a  2**0
                  CONTENTS, READONLY
 10 .ARM.attributes 00000033  00000000  00000000  000240a8  2**0
                  CONTENTS, READONLY
 11 .debug_frame  000001ac  00000000  00000000  000240dc  2**2
                  CONTENTS, READONLY, DEBUGGING
```

- **Symbols table of files**

```
galal@galal MINGW32 /e/Github_diploma/embedded_System_Online_Diploma/unit5/High Pressure Detection pro
$ arm-none-eabi-nm.exe main_algorithm.o
         U getPressureVal
00000038 T High_pressure_detected
00000004 C P_main_ptr
00000000 b P_val
         U Start_alarm
00000000 T waiting

galal@galal MINGW32 /e/Github_diploma/embedded_System_Online_Diploma/unit5/High Pressure Detection pro
$ arm-none-eabi-nm.exe driver.o
00000000 T Delay
00000020 T getPressureVal
00000074 T GPIO_INITIALIZATION
00000038 T Set_Alarm_actuator

galal@galal MINGW32 /e/Github_diploma/embedded_System_Online_Diploma/unit5/High Pressure Detection pro
$ arm-none-eabi-nm.exe Alarm_monitor.o
00000004 C alarmPtr
         U Delay
         U Set_Alarm_actuator
00000000 T Start_alarm
0000002c T Stop_alarm

galal@galal MINGW32 /e/Github_diploma/embedded_System_Online_Diploma/unit5/High Pressure Detection pro
$ arm-none-eabi-nm.exe main.o
         U Delay
         U GPIO_INITIALIZATION
00000000 T main
         U P_main_ptr
         U Set_Alarm_actuator
         U waiting
```

```
MINGW32:/e/Github_diploma/embedded_System_Online_Diploma/unit5/High Pressure Detection proje

galal@galal MINGW32 /e/Github_diploma/embedded_System_Online_Diploma/unit5/High
$ arm-none-eabi-nm.exe pressure_detected_project.elf
2000000c B _E_bss
20000000 D _E_DATA
08000230 T _E_text
20000000 B _S_bss
20000000 D _S_DATA
2000100c B _stack_top
20000004 B alarmPtr
080001a0 W Bus_Handler
080001a0 T Default_Handler
08000058 T Delay
08000078 T getPressureVal
080000cc T GPIO_INITIALIZATION
080001a0 W H_fault_Handler
08000184 T High_pressure_detected
0800011c T main
080001a0 W MM_fault_Handler
080001a0 W NMI_Handler
20000008 B P_main_ptr
20000000 b P_val
080001ac T Reset_Handler
08000090 T Set_Alarm_actuator
0800001c T Start_alarm
08000048 T Stop_alarm
080001a0 W Usage_fault_Handler
08000000 T vectors
0800014c T waiting
```

- **Proteus**

  o **Alarm ON : when pressure value is above 20 par**
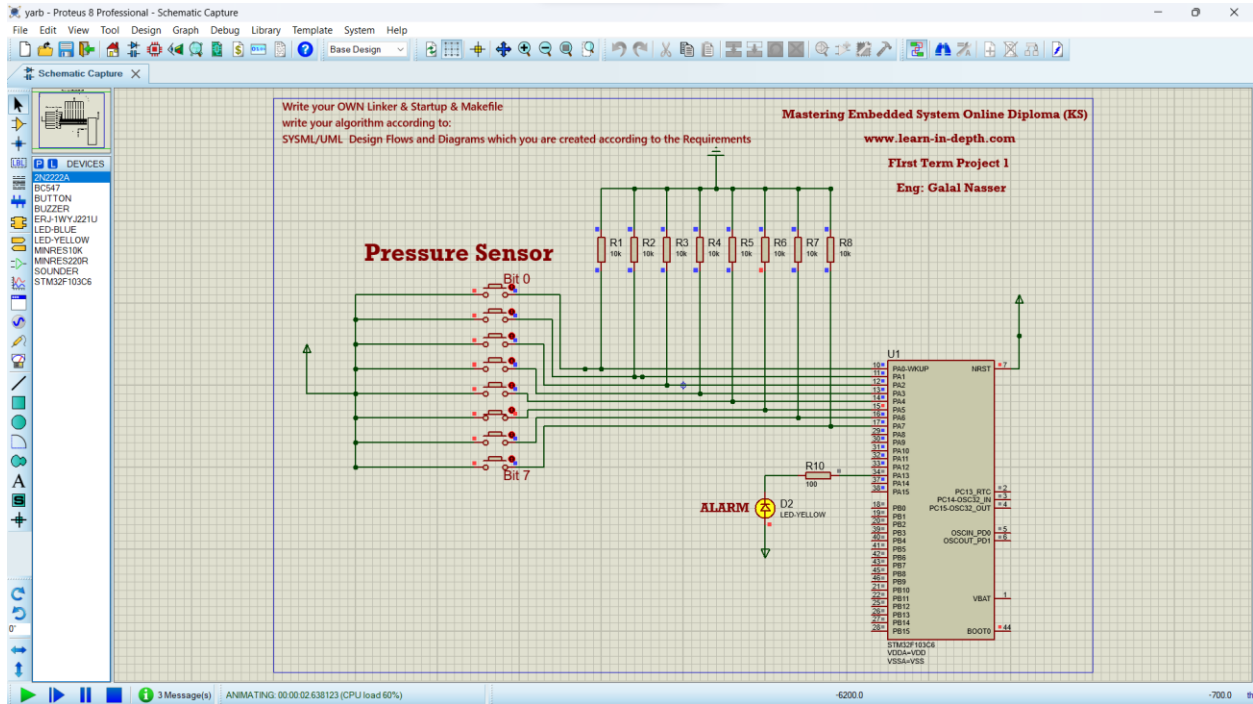
○ **Alarm OFF : when pressure value is under 20 par**