

Learn-In-Depth  
First Term Project  
High Pressure detection  
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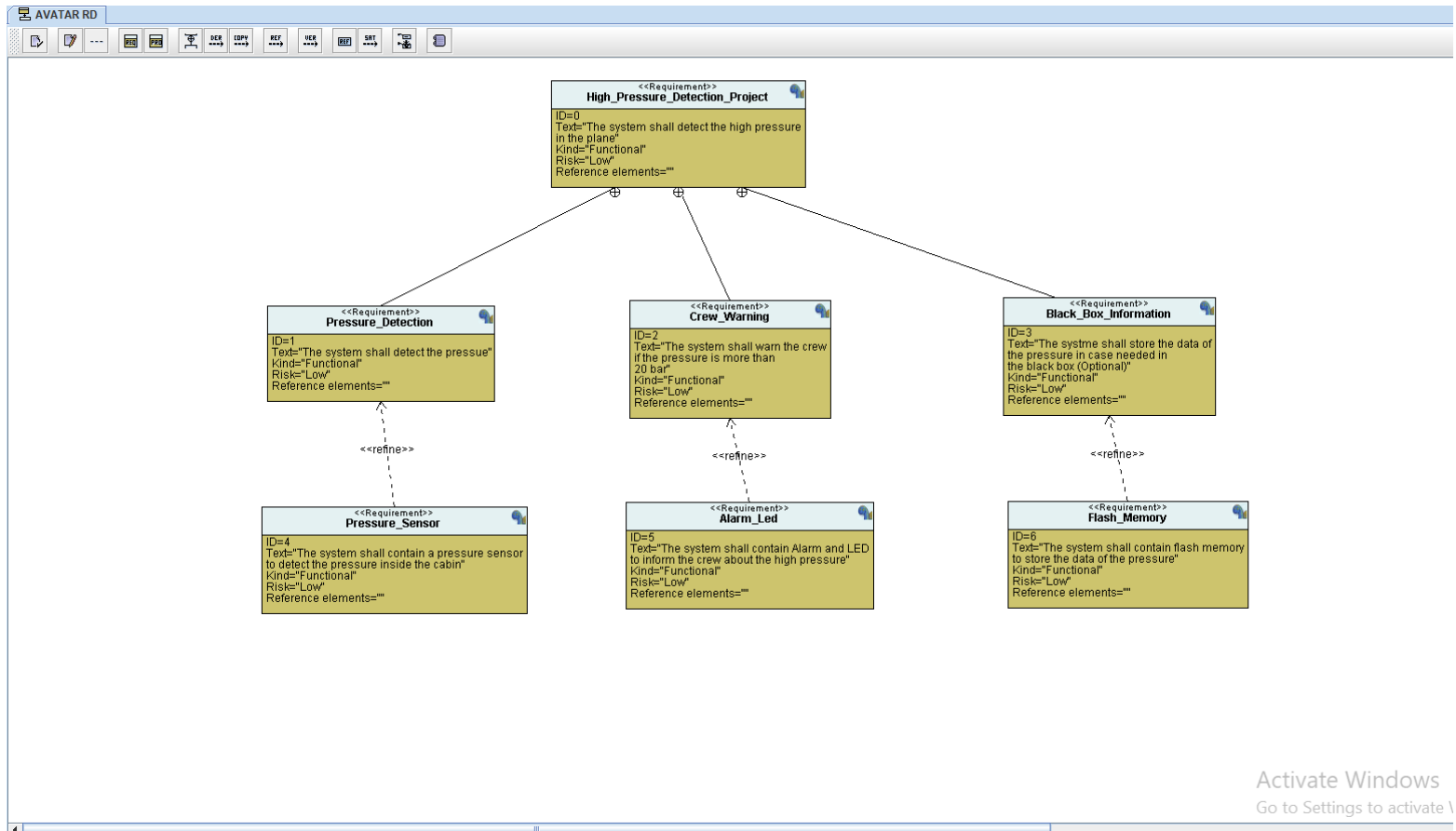
## Case study

The client needs a system that detect and inform the crew of the plane if the pressure inside the cabin increases more than 20 bar, it also stores the data of the pressure in a flash ROM (Optional)

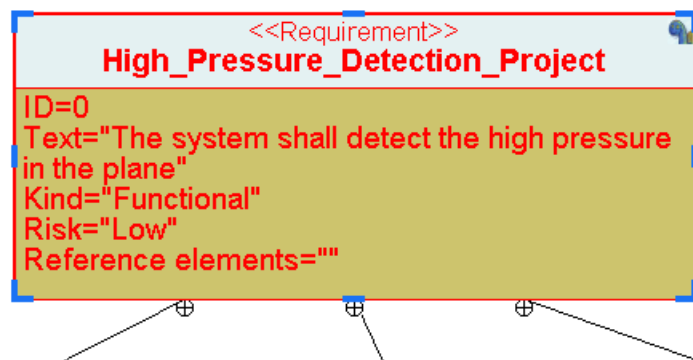
## Method

Waterfall model is used as every phase is finished first before going to next phase

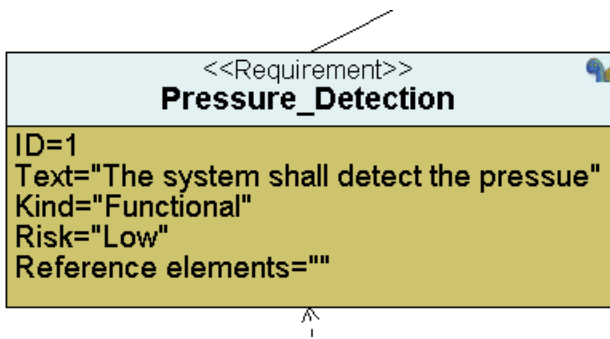
# Requirements



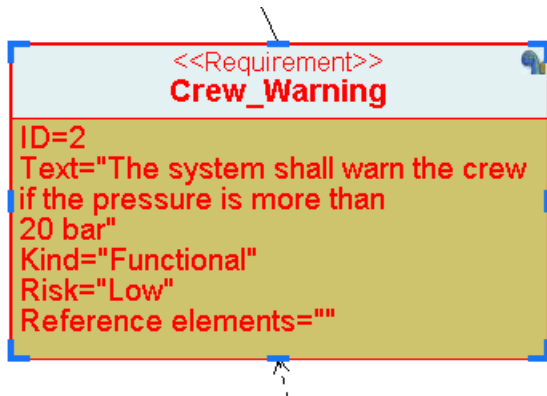
## Requirement Id: 0



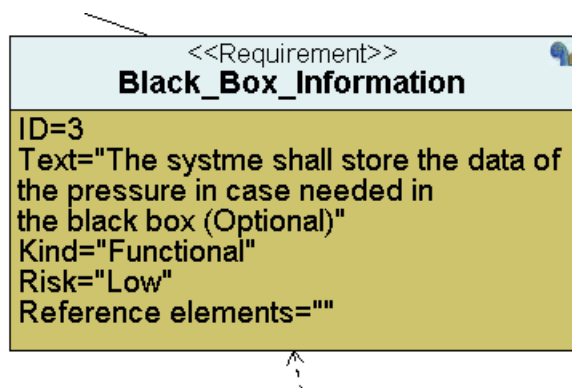
### Requirement Id: 1



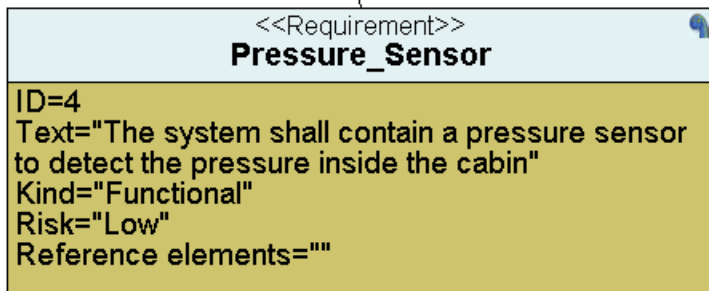
### Requirement Id: 2



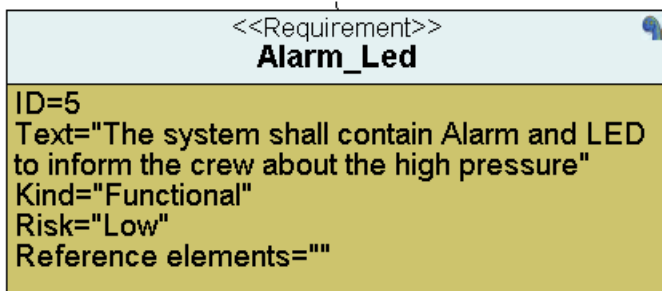
### Requirement Id: 3



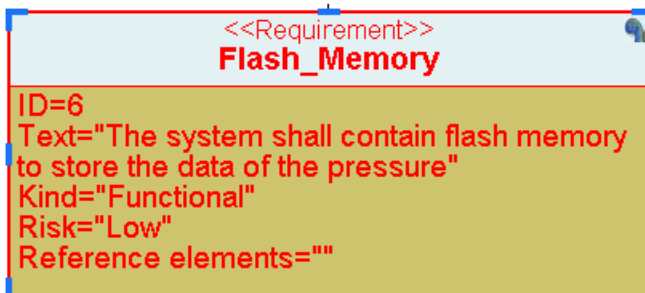
### Requirement Id: 4



### Requirement Id: 5



### Requirement Id: 6

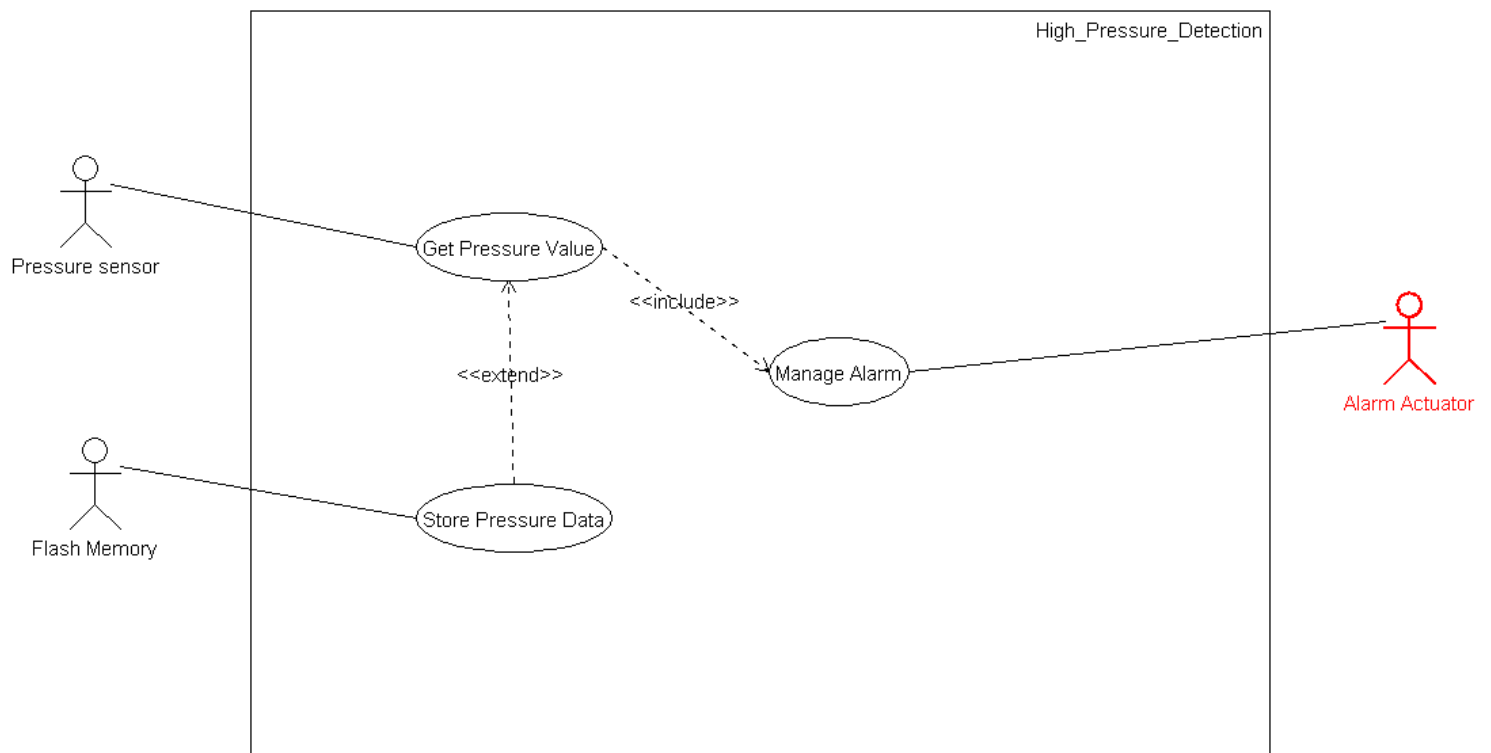


# Space exploration\Partitioning

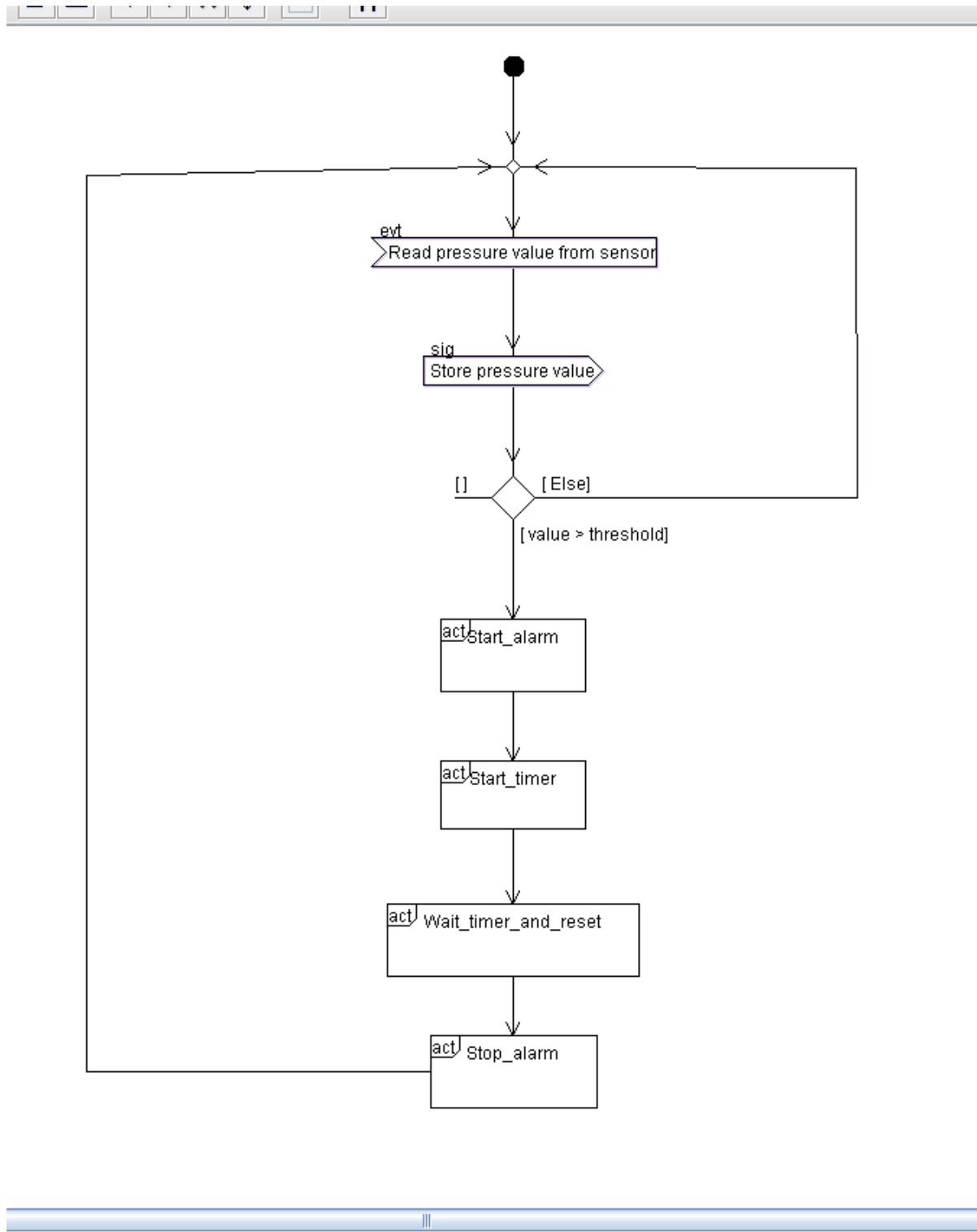
STM32F103C6 is used

## System Analysis

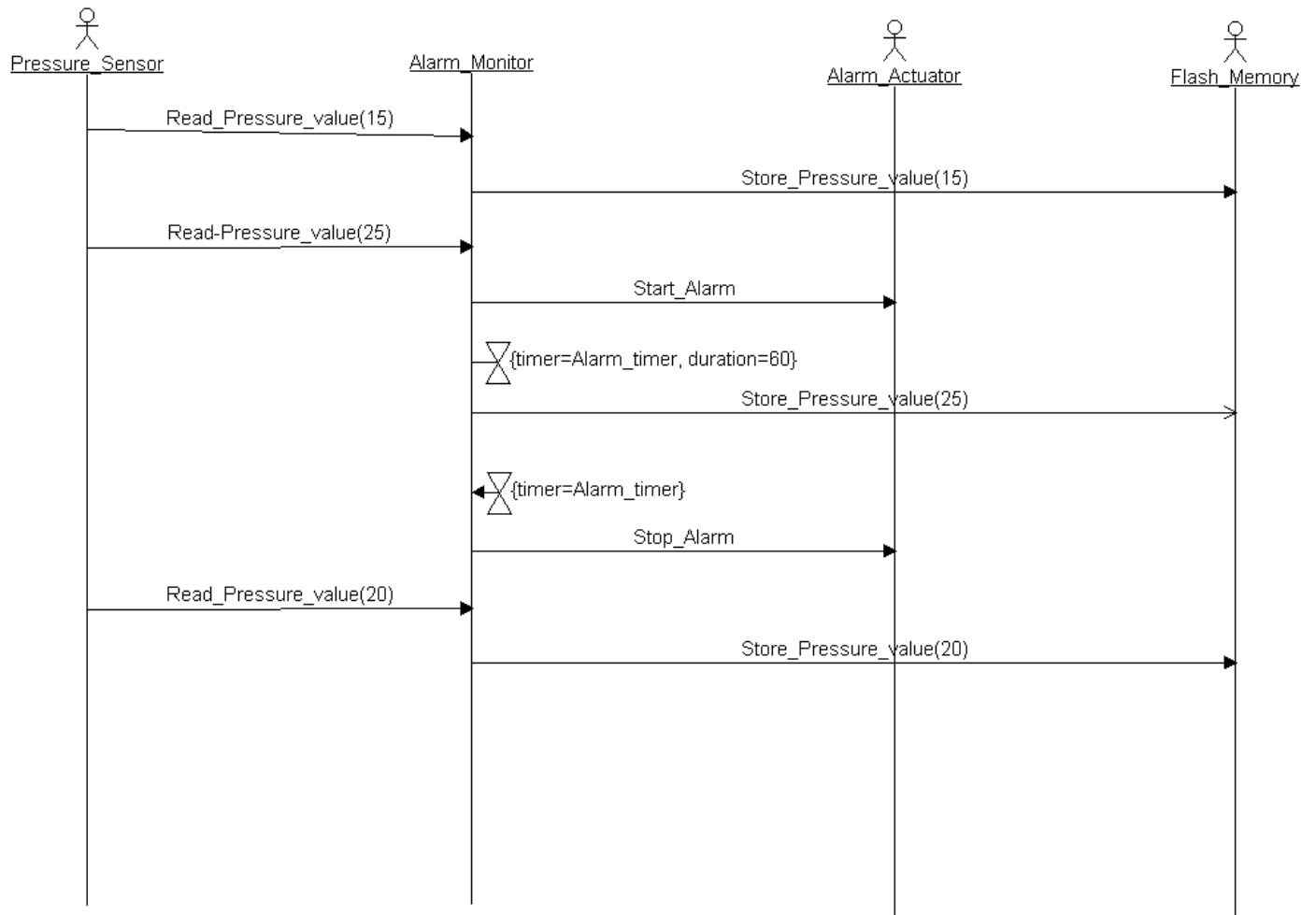
### 1. Use case diagram



## 2. Activity diagram



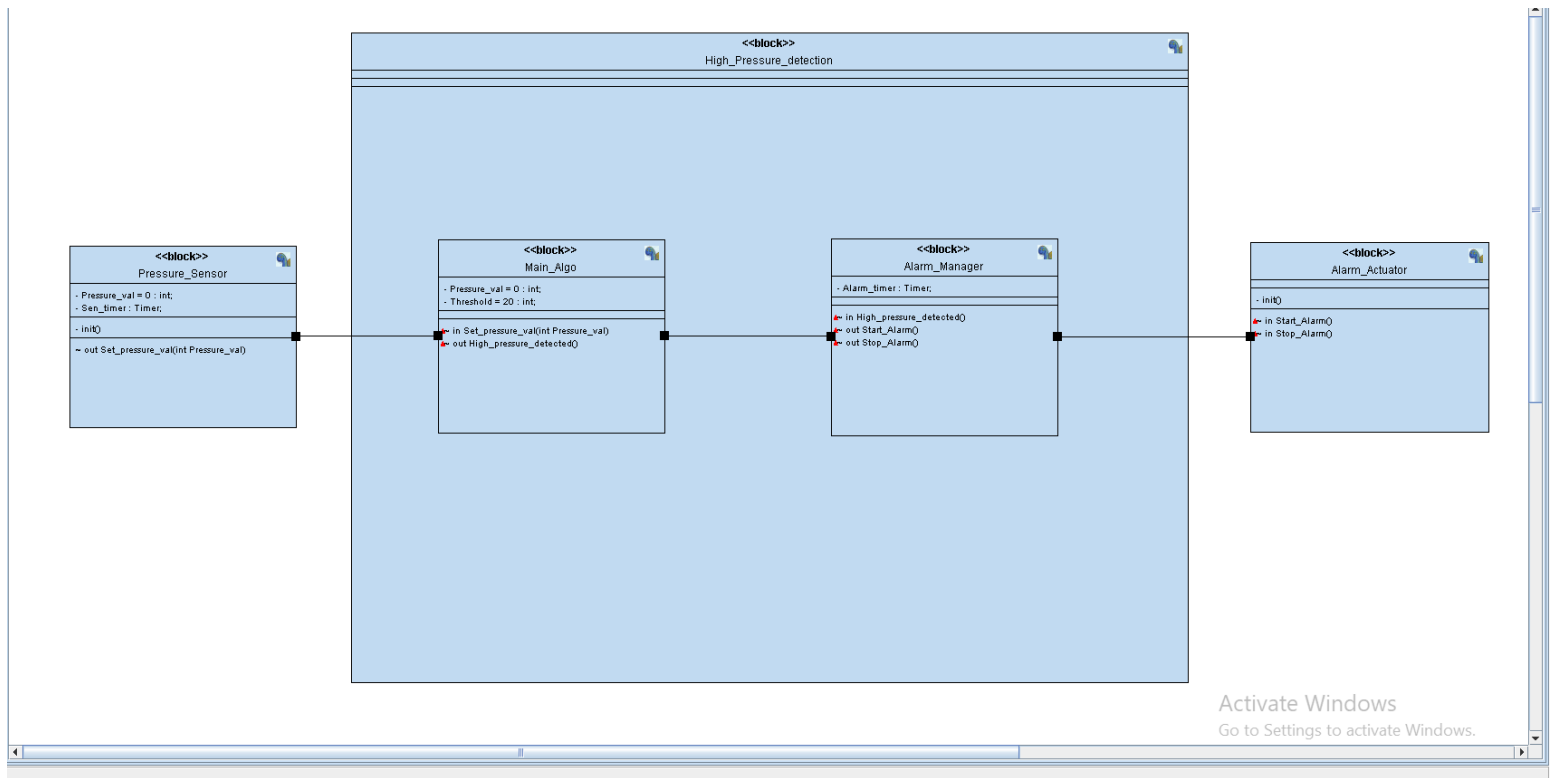
### 3. Sequence diagram



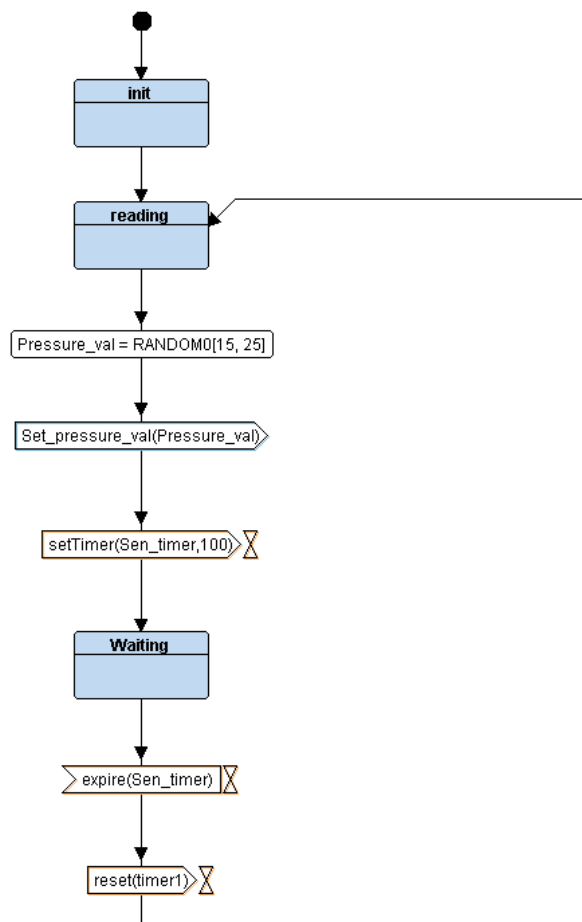
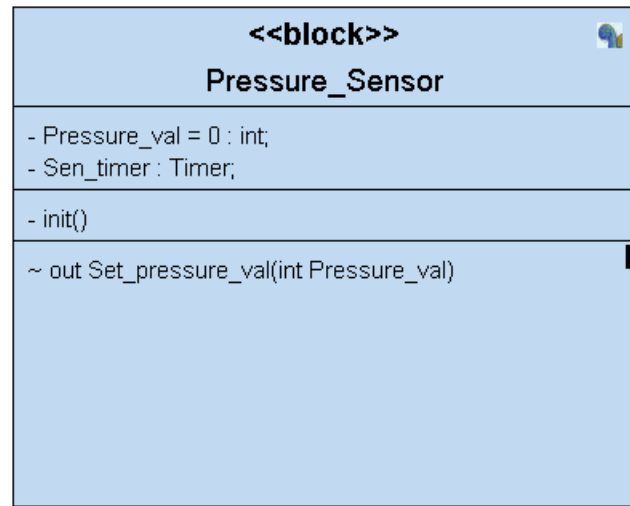


# System Design

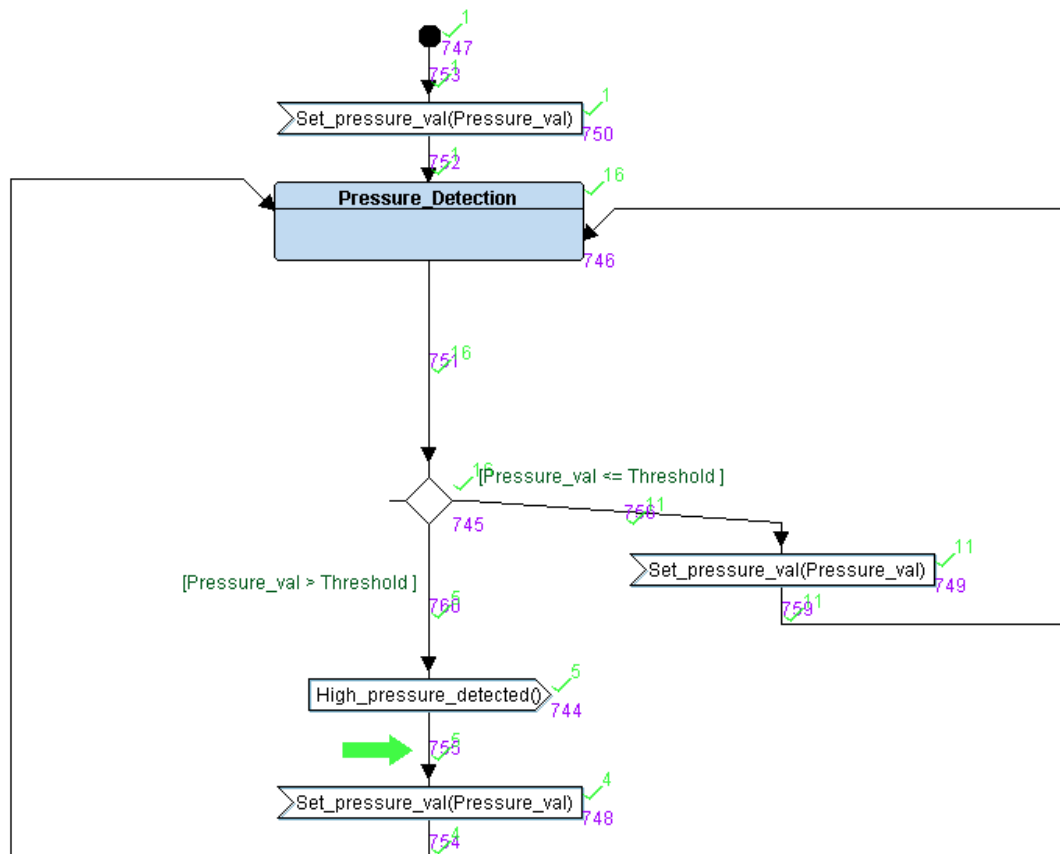
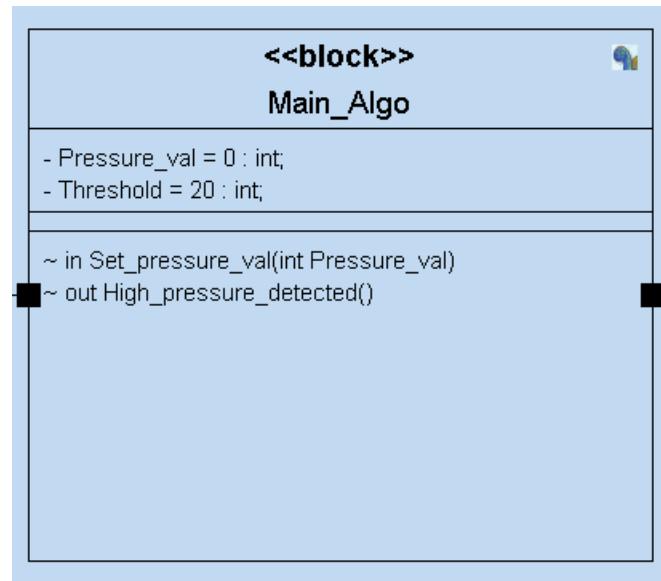
## - Block diagram



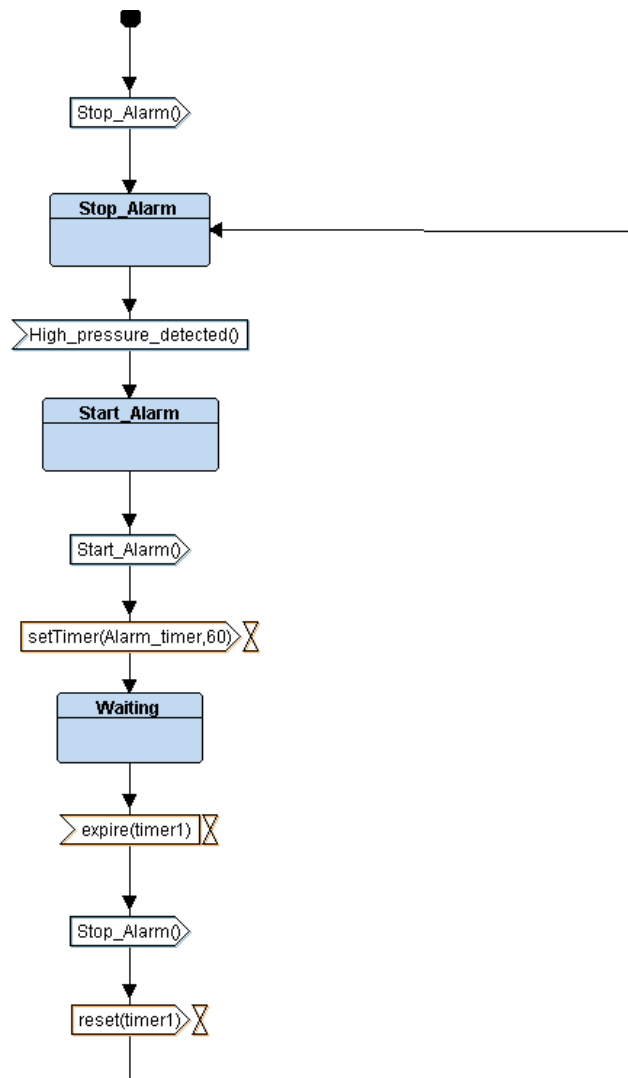
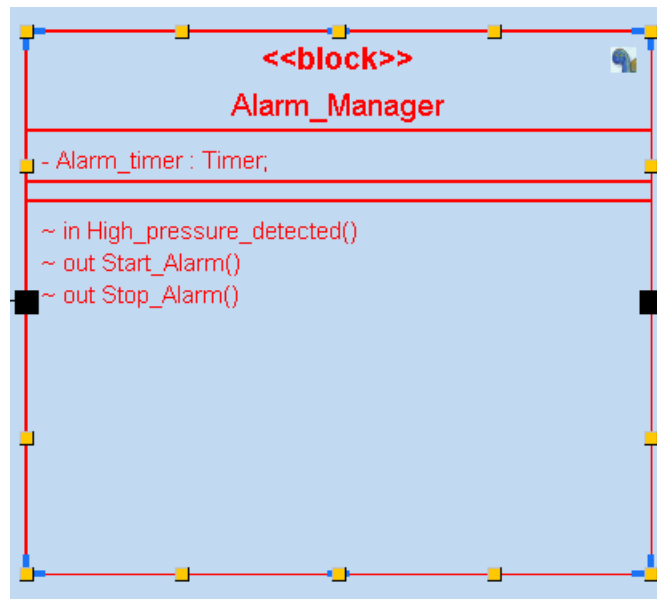
## 1. Pressure\_Sensor block



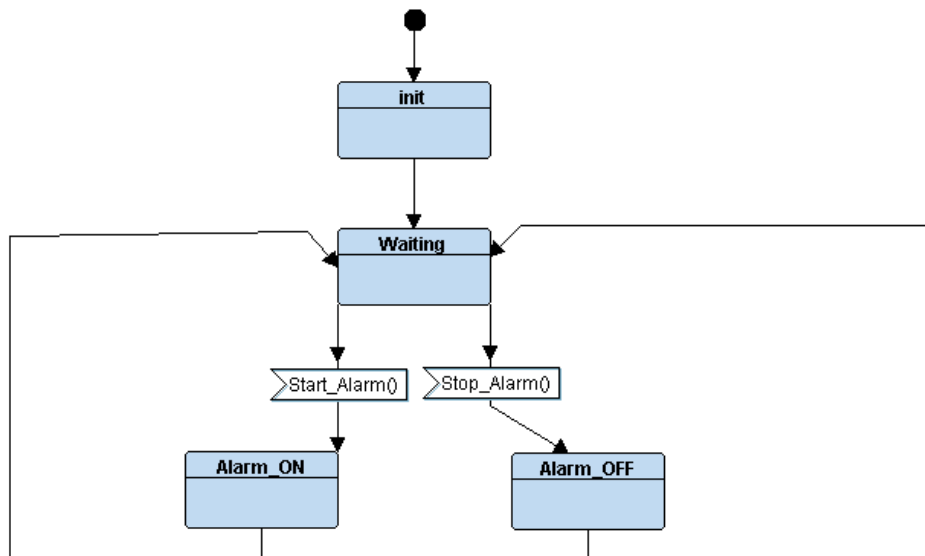
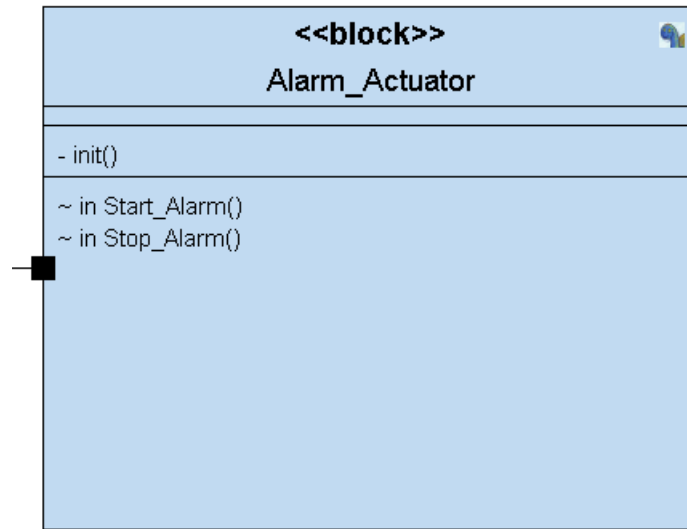
## 2. Main\_Algo block



### 3. Alarm\_Manager block

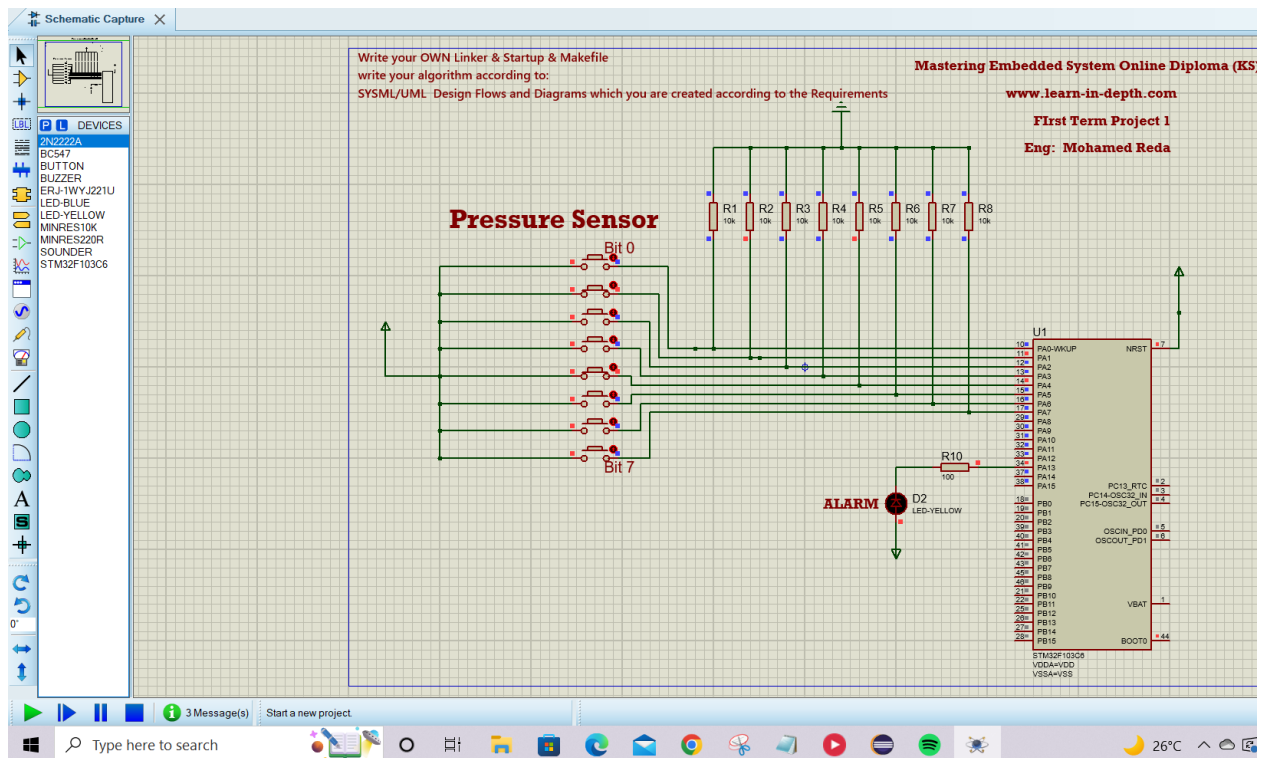


#### 4. Alarm\_Actuator block

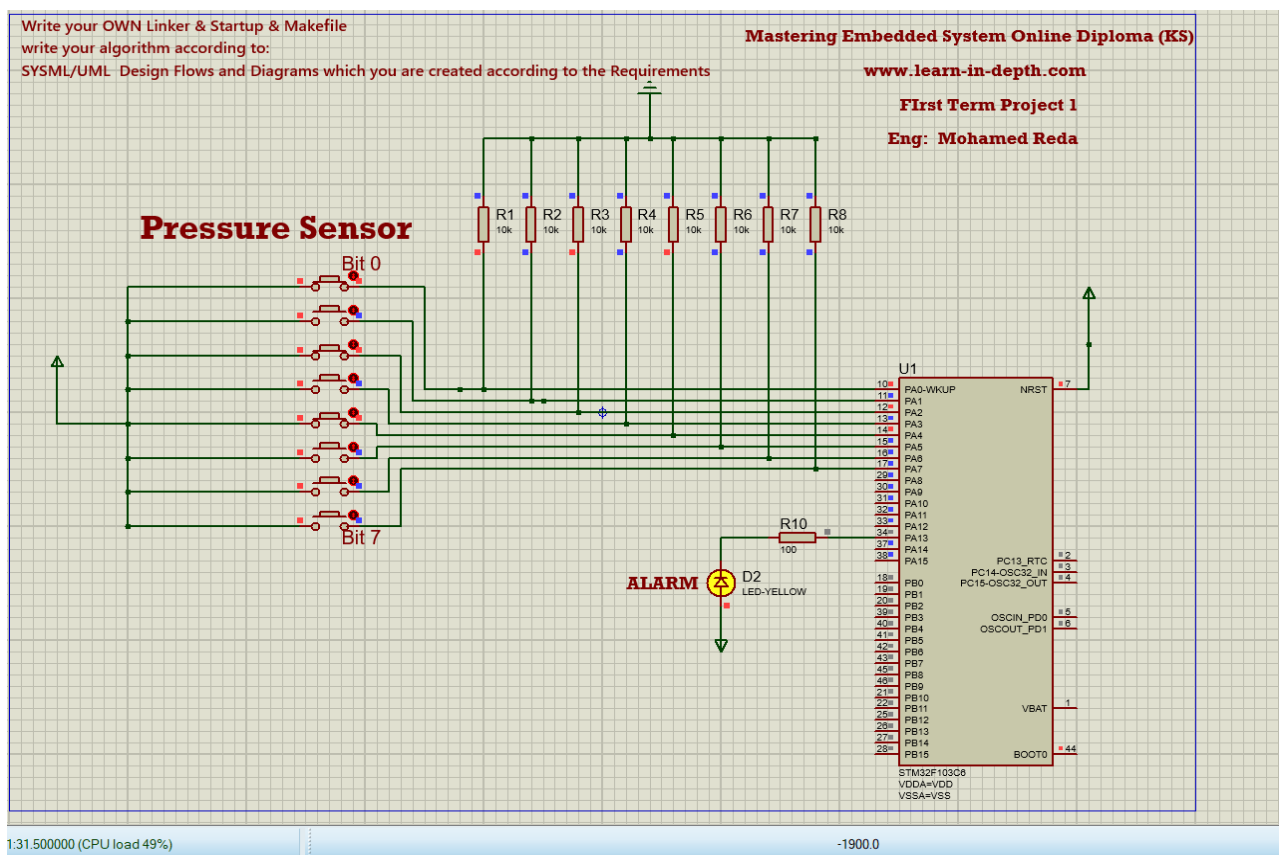


## Running

- When the input pressure is 18, the alarm is OFF.



- When the input pressure is 21, the alarm is ON.



## Build process using makefile

```
MINGW64:/d/Project_2/project
$ export PATH=../ARM/bin/:$PATH

redam@DESKTOP-MJK602K MINGW64 /d/Project_2/project
$ make
arm-none-eabi-gcc.exe -c -mcpu=cortex-m3 -gdwarf-2 -I . Alarm_Actuator.c -o Alarm_Actuator.o
arm-none-eabi-gcc.exe -c -mcpu=cortex-m3 -gdwarf-2 -I . Alarm_Manager.c -o Alarm_Manager.o
In file included from Alarm_Manager.h:10:0,
                 from Alarm_Manager.c:1:
Alarm_Manager.c: In function 'ST_Stop_Alarm':
State.h:12:29: warning: implicit declaration of function 'ST_Pressure_Detection'
; did you mean 'High_pressure_detect'? [-Wimplicit-function-declaration]
#define STATE(_statefunc_) ST_##_statefunc_
                        ^
Alarm_Manager.c:20:2: note: in expansion of macro 'STATE'
STATE(Pressure_Detection)();
^~~~~
arm-none-eabi-gcc.exe -c -mcpu=cortex-m3 -gdwarf-2 -I . driver.c -o driver.o
arm-none-eabi-gcc.exe -c -mcpu=cortex-m3 -gdwarf-2 -I . main.c -o main.o
arm-none-eabi-gcc.exe -c -mcpu=cortex-m3 -gdwarf-2 -I . Main_Algo.c -o Main_Algo.o
arm-none-eabi-gcc.exe -c -mcpu=cortex-m3 -gdwarf-2 -I . PS.c -o PS.o
arm-none-eabi-gcc.exe -c -mcpu=cortex-m3 -gdwarf-2 -I . startup.c -o startup.o
arm-none-eabi-ld.exe -T linker_script.ld -Map=map_file.map Alarm_Actuator.o Alarm_Manager.o driver.o main.o Main_Algo.o PS.o startup.o -o Project.elf
arm-none-eabi-objcopy.exe -O binary Project.elf Project.bin
-----Build is done-----

redam@DESKTOP-MJK602K MINGW64 /d/Project_2/project
$
```

## Sections

```
MINGW64:/d/Project_2/project

redam@DESKTOP-MJK602K MINGW64 /d/Project_2/project
$ arm-none-eabi-objdump.exe -h Project.elf

Project.elf:      file format elf32-littlearm

Sections:
Idx Name          Size      VMA       LMA       File off  Algn
 0 .text          000003f0  08000000  08000000  00010000  2**2
   CONTENTS, ALLOC, LOAD, READONLY, CODE
 1 .data          00000004  20000000  080003f0  00020000  2**2
   CONTENTS, ALLOC, LOAD, DATA
 2 .bss           00001014  20000004  080003f4  00030004  2**2
   ALLOC
 3 .comment        00000098  080003f4  080003f4  000203f4  2**2
   CONTENTS, ALLOC, LOAD, DATA
 4 .ARM.attributes 00000033  00000000  00000000  0002048c  2**0
   CONTENTS, READONLY
 5 .debug_info     00003ead  00000000  00000000  000204bf  2**0
   CONTENTS, READONLY, DEBUGGING
 6 .debug_abbrev   00000b8f  00000000  00000000  0002436c  2**0
   CONTENTS, READONLY, DEBUGGING
 7 .debug_loc      00000508  00000000  00000000  00024efb  2**0
   CONTENTS, READONLY, DEBUGGING
 8 .debug_aranges  000000e0  00000000  00000000  00025403  2**0
   CONTENTS, READONLY, DEBUGGING
 9 .debug_line     000006e7  00000000  00000000  000254e3  2**0
   CONTENTS, READONLY, DEBUGGING
10 .debug_str       00000715  00000000  00000000  00025bca  2**0
   CONTENTS, READONLY, DEBUGGING
11 .debug_frame    0000032c  00000000  00000000  000262e0  2**2
   CONTENTS, READONLY, DEBUGGING

redam@DESKTOP-MJK602K MINGW64 /d/Project_2/project
$
```