

# Mastering Embedded System Online Diploma

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First Term (Final Project 1)

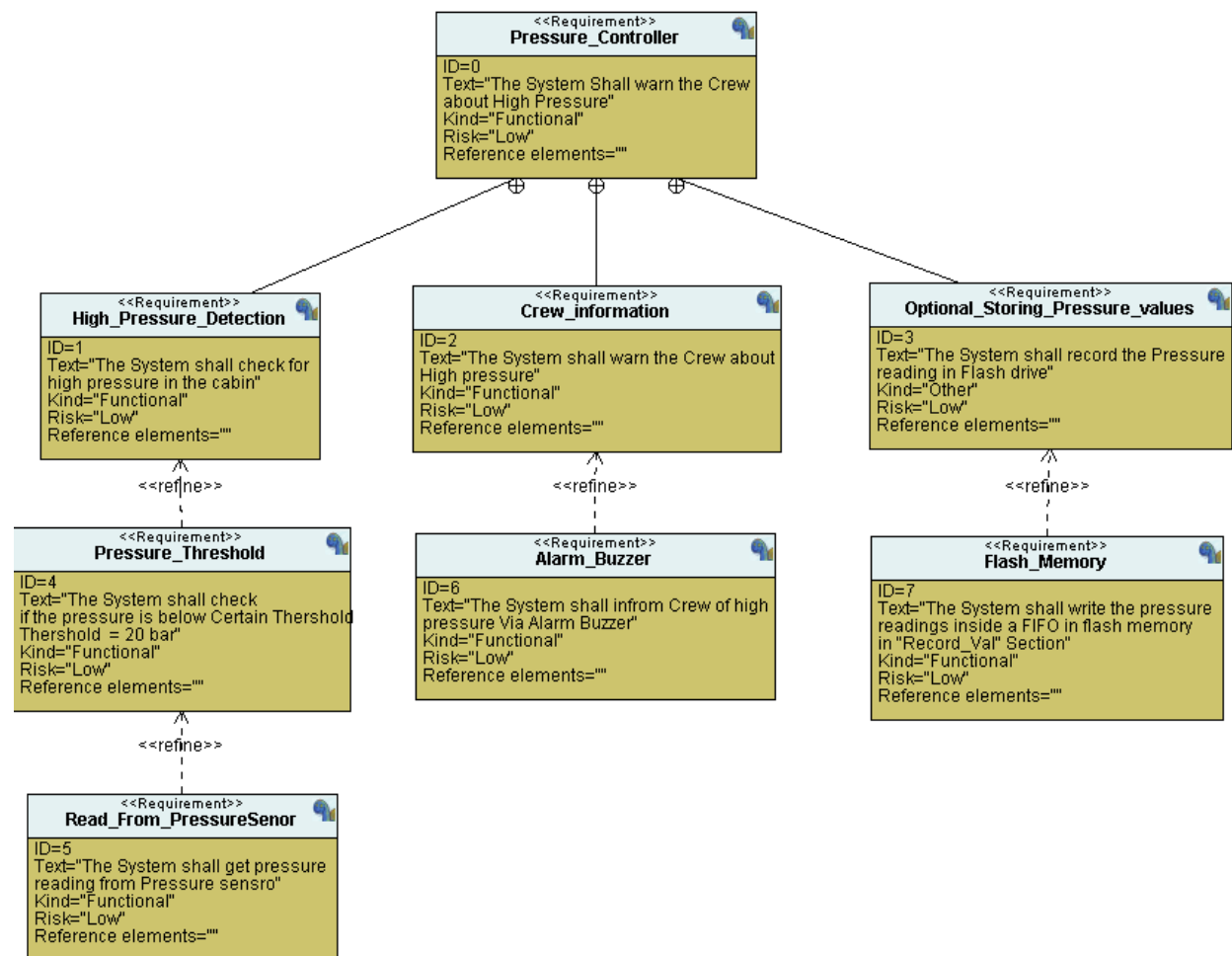
Eng. Mina Fathy Labib Hakim

My Profile:

## Specification from Client:

- A pressure controller informs the crew of a cabin with an alarm when the pressure exceeds 20 bars in the cabin.
- The alarm duration equals 60 seconds.

## Requirements Diagram:

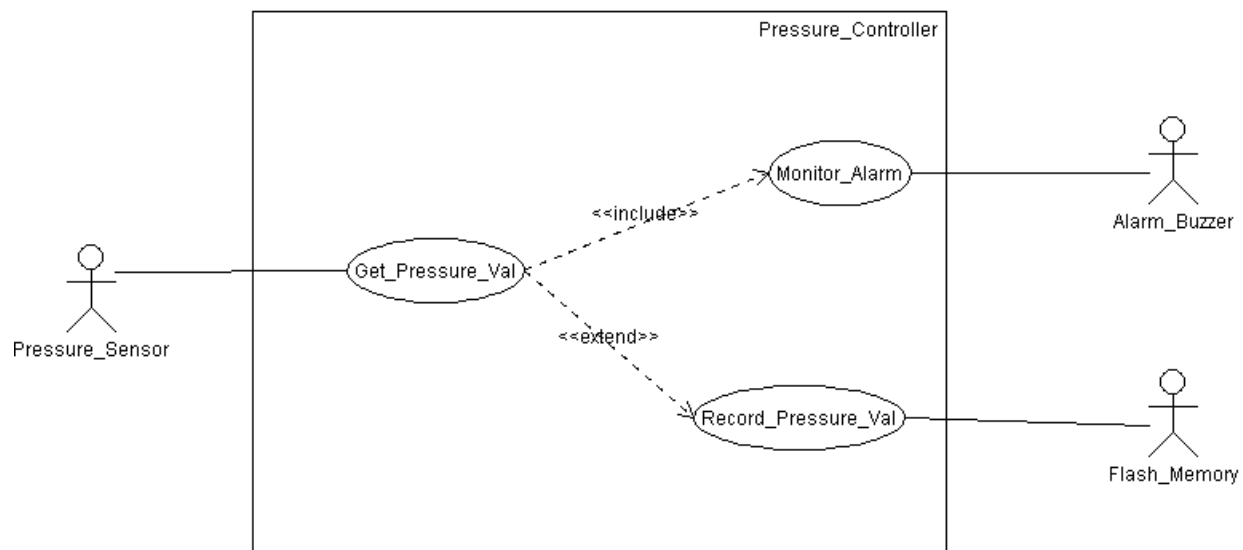


## *Space exploration/Partitioning:*

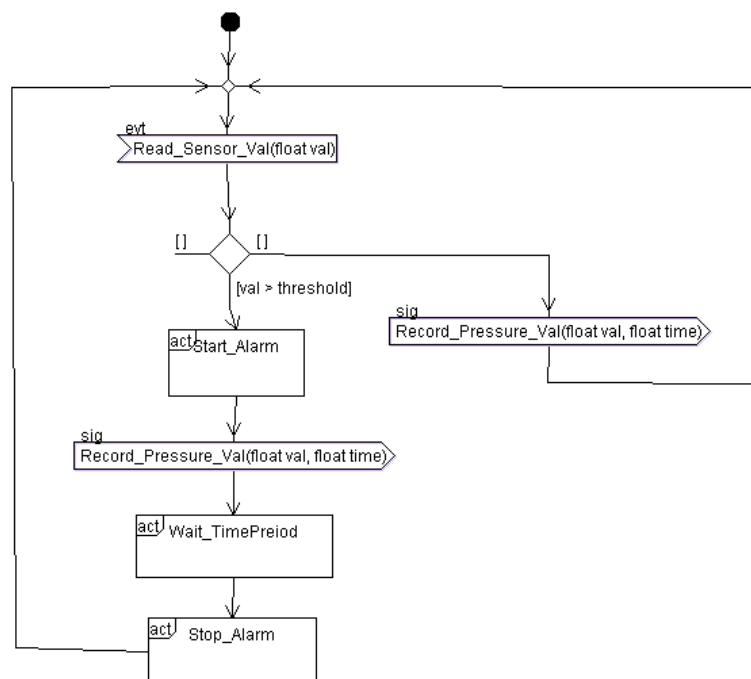
The project is quiet simple it doesn't require more than one ECU and STM32 was found suitable for this project.

## *System Analysis:*

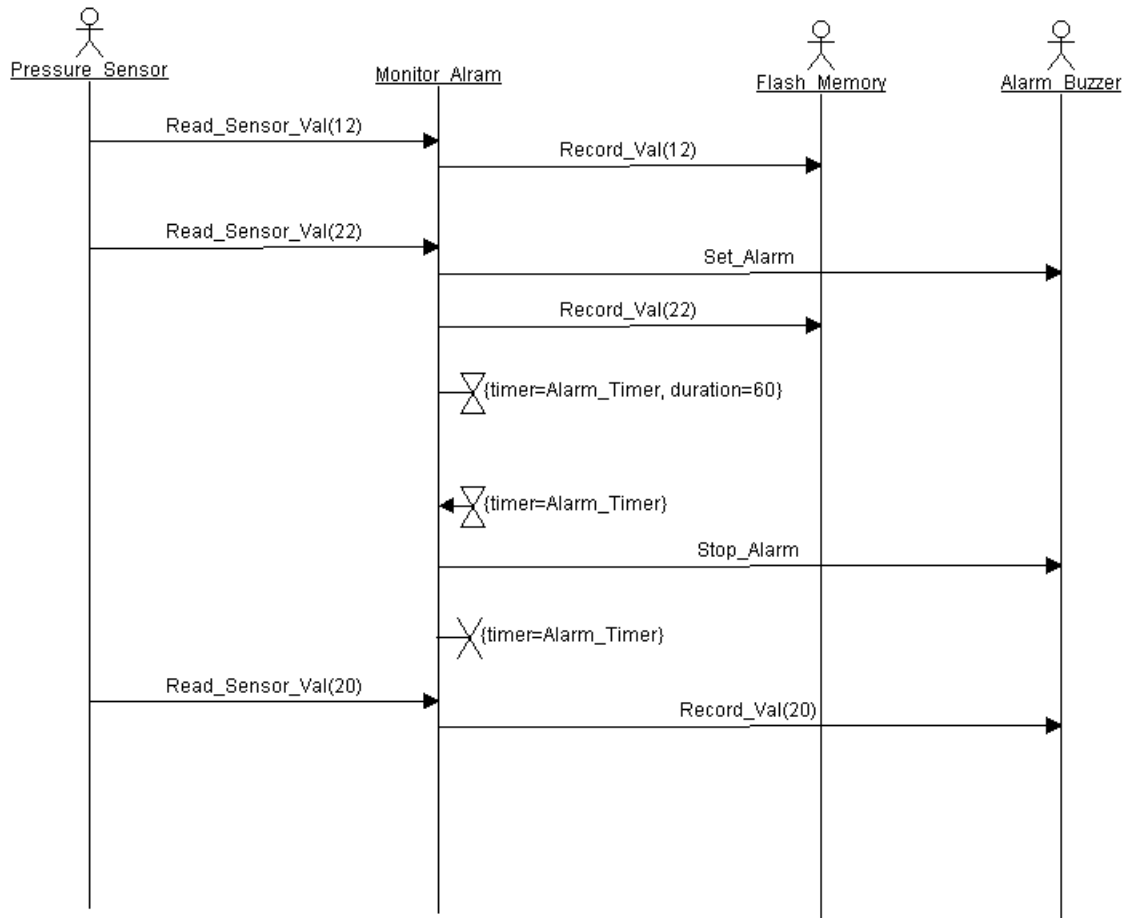
### 1. Use Case Diagram:



### 2. Activity Diagram:

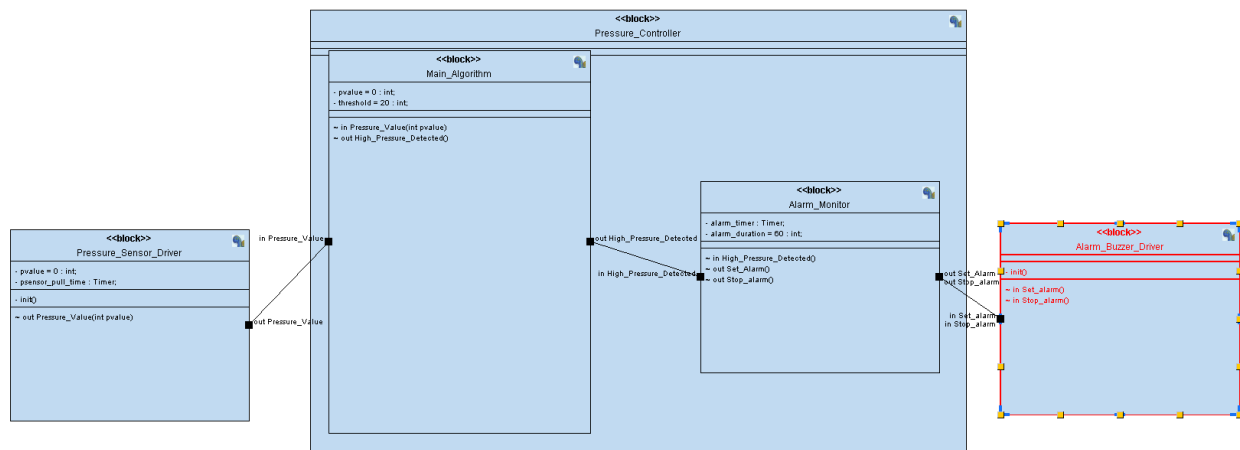


### 3. Sequence Diagram:

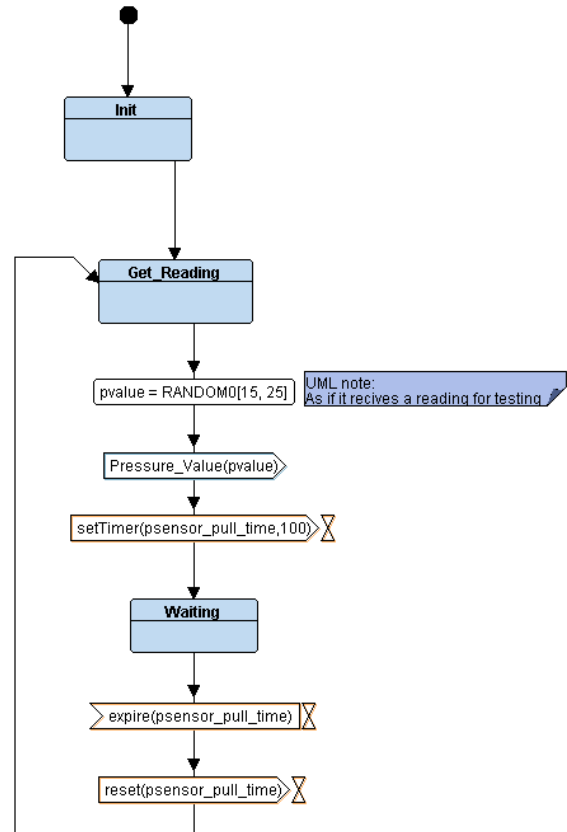


### System Design:

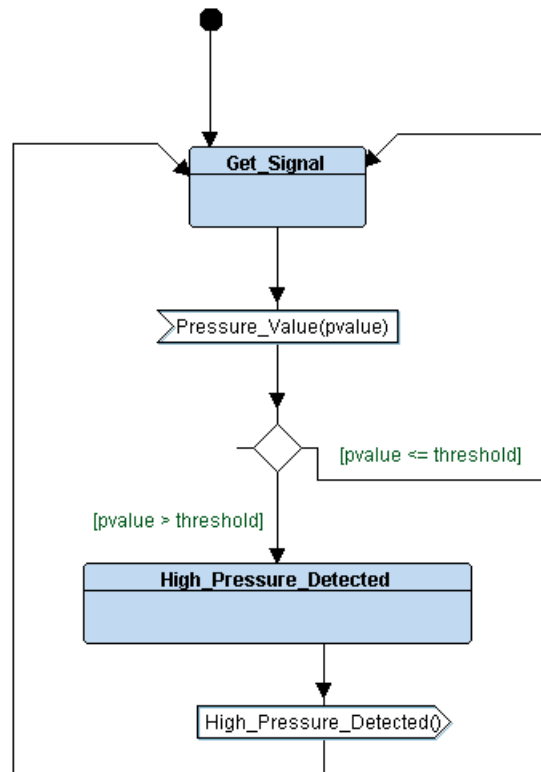
#### 1. Block Diagram:



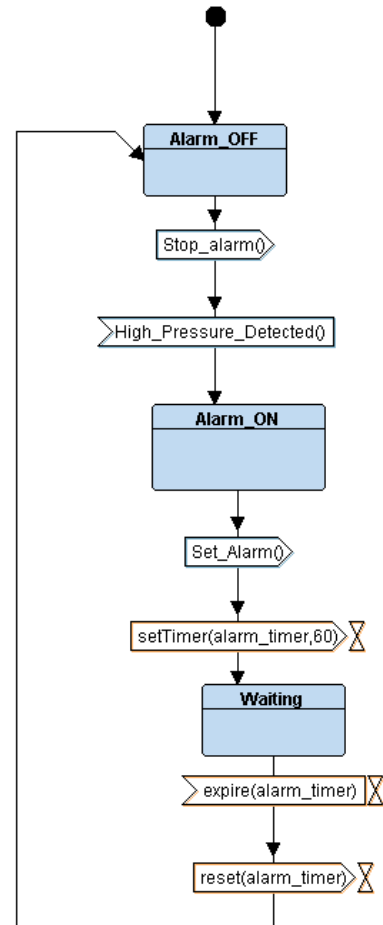
## 2. Pressure Sensor Driver Logic:



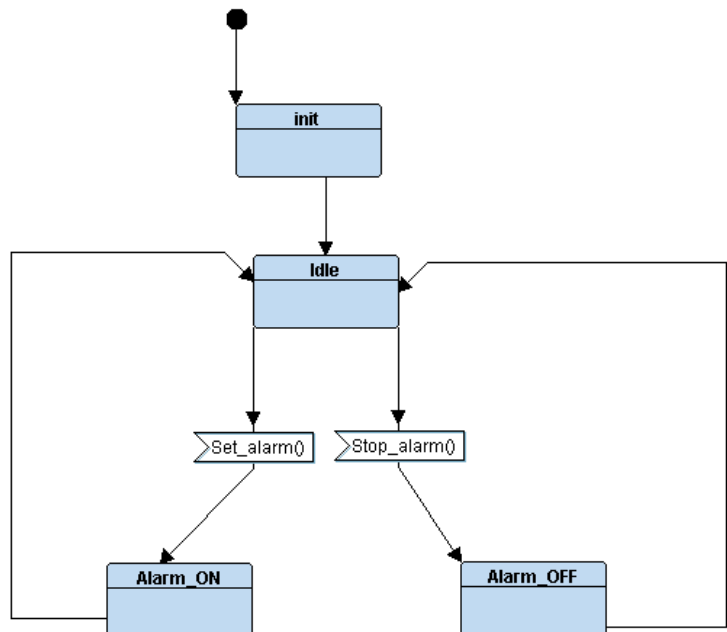
## 3. Main Algorithm Logic:



#### 4. Alarm Monitor Logic:

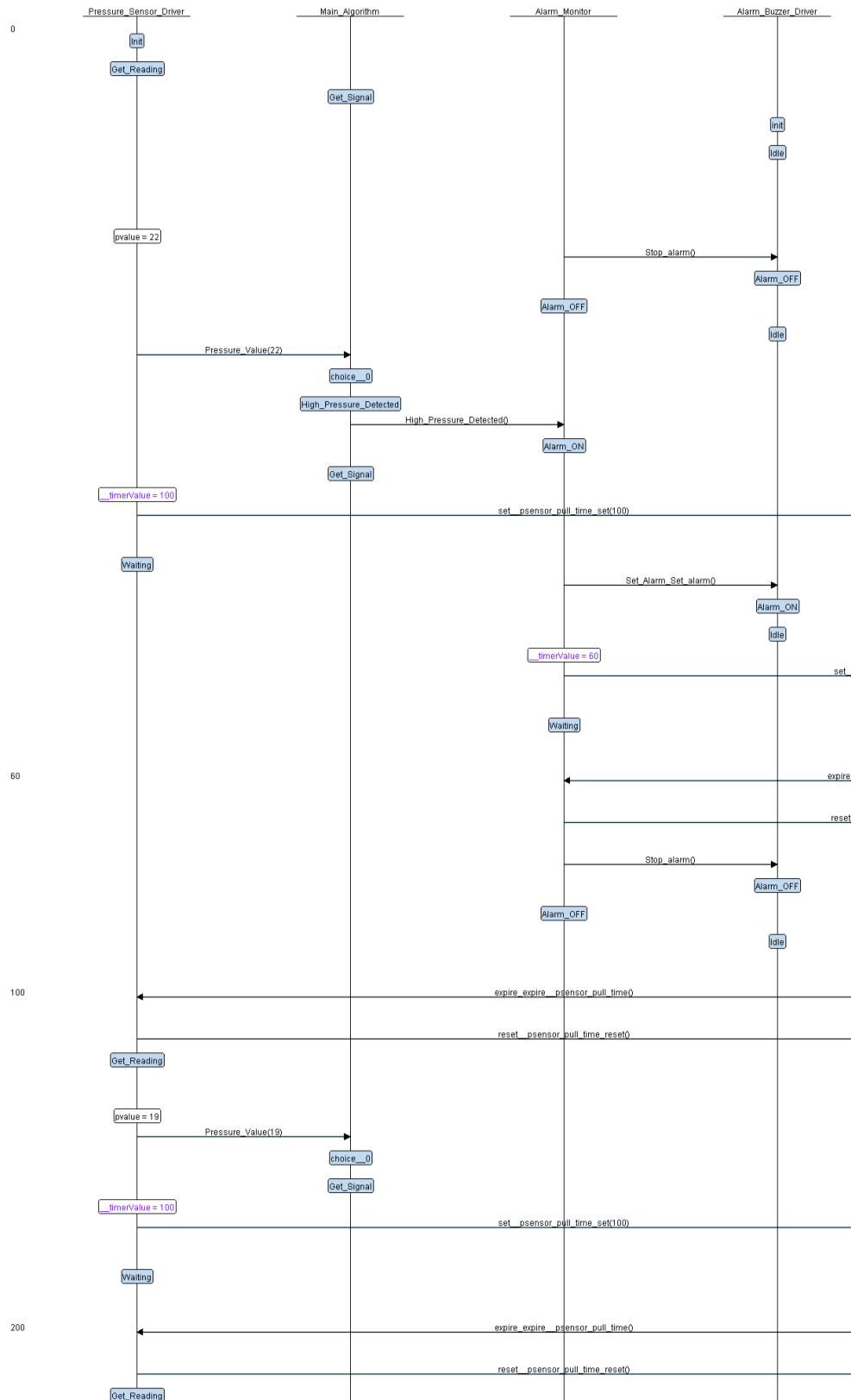


#### 5. Alarm Driver Logic:



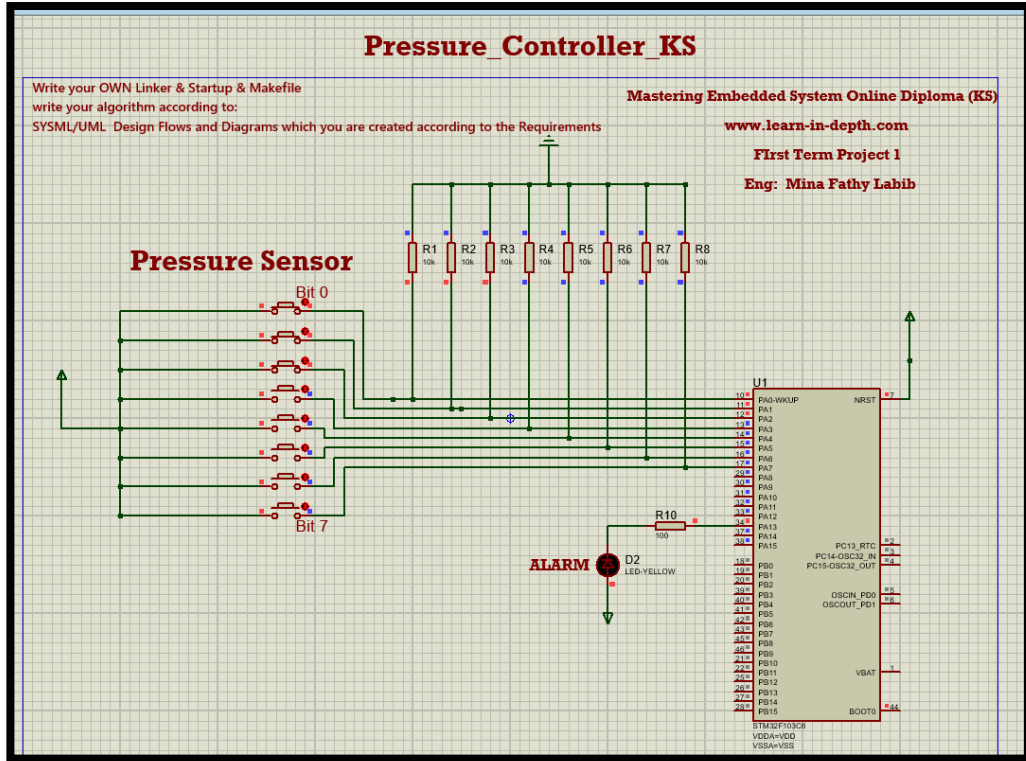
## Simulation:

### 1. TTool Simulation:

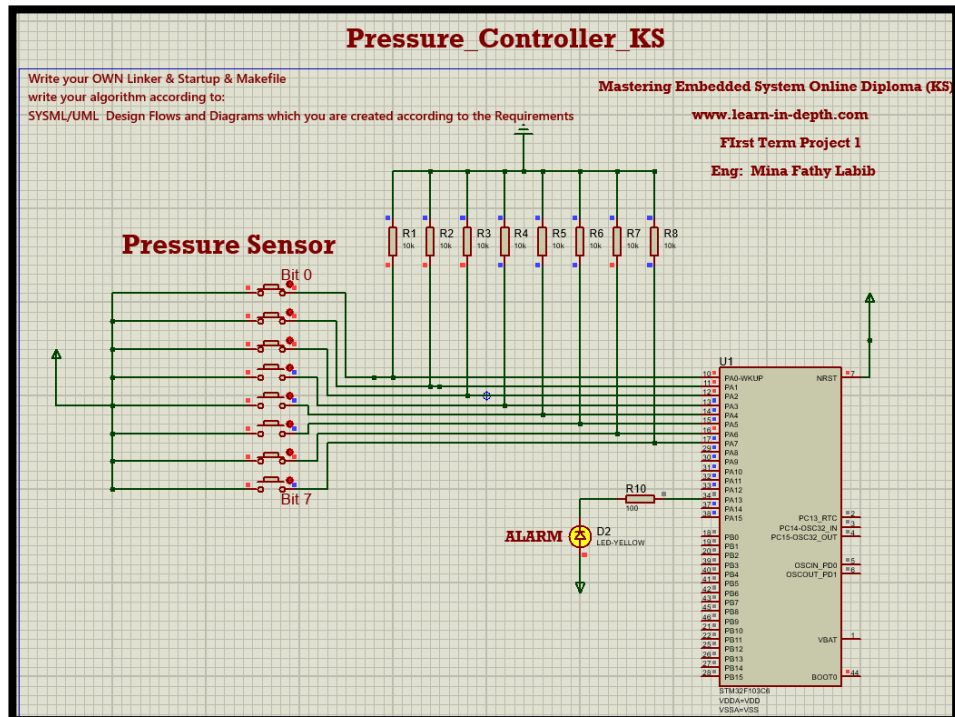


## 2. Proteus Simulations:

- Alarm OFF (Pressure = 7 bar)



• A





## Executable Symbol Table:

```
$ arm-none-eabi-nm.exe Pressure-Controller.elf
20000008 B _E_bss
20000004 D _E_DATA
08000408 T _E_text
20000004 B _S_bss
20000000 D _S_DATA
20001008 B _stack_top
2000100c B AM_state
20001008 B AM_state_id
08000348 W Bus_fault_Handler
08000348 T Default_Handler
080000c8 T Delay
080000ec T getPressureVal
08000154 T GPIO_INITIALIZATION
08000348 W H_fault_Handler
08000040 T High_pressure_detected
20000004 B MA_pressure
20001014 B MA_state
20001010 B MA_state_id
20000000 D MA_threshold
080001d4 T main
08000348 W MM_fault_Handler
08000348 W NMI_Handler
20001018 B PS_state
20001011 B PS_state_id
08000354 T Reset_Handler
08000104 T Set_Alarm_actuator
08000298 T Set_Pressure_Value
0800001c T ST_AM_alarm_off
0800005c T ST_AM_alarm_on
08000094 T ST_AM_waiting
08000240 T ST_MA_GetSignal
080002b8 T ST_MA_High_Pressure
080002e4 T ST_PS_GetingReading
08000318 T ST_PS_Waiting
08000348 W Usage_fault_Handler
08000000 T vectors
```

- larm ON (Pressure = 71 bar > 20 bar)