Pressure Controller

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Course title

Mastering Embedded System

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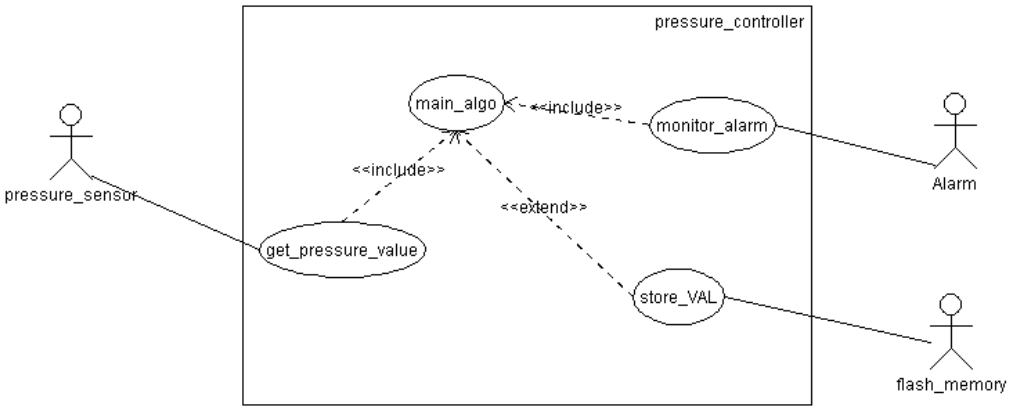
INSTRUCTIONS

In this project we aim to have a system where it detects pressure inside an aircraft using pressure sensor. And if pressure exceeds the required threshold, the system will give an alarm to the crew to inform them of the malfunction

THE PROCESS

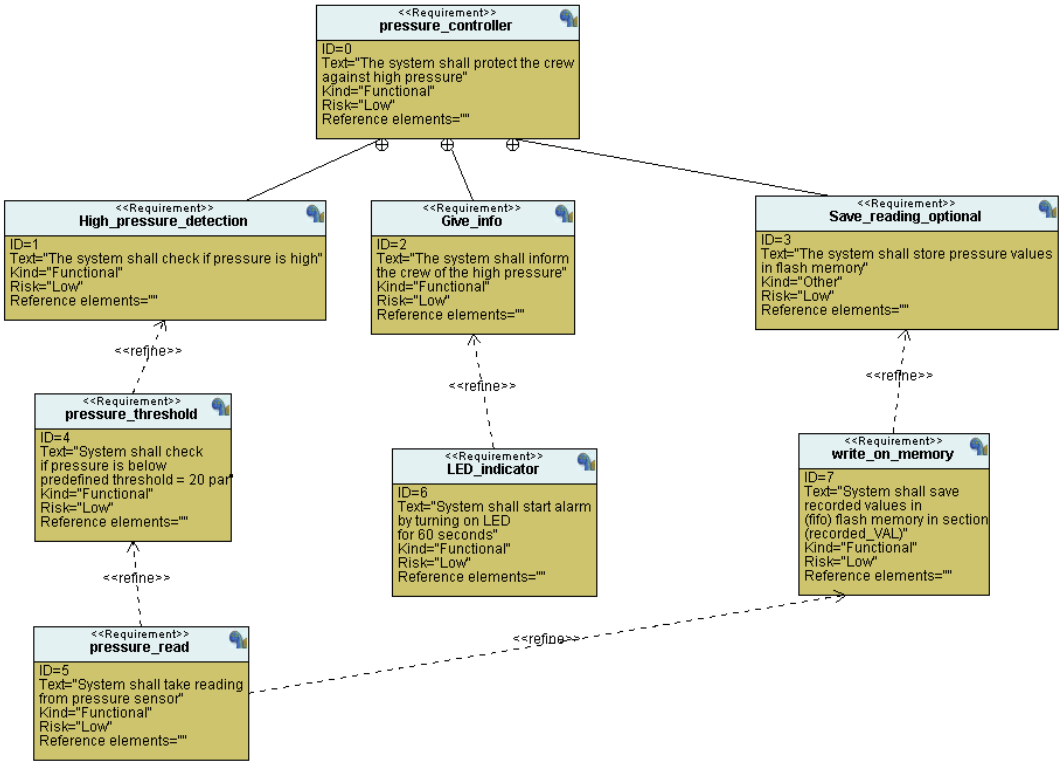
Case study

After contact with the client, it is understandable that the client expects the delivery of a software using these specifications:
1 – Pressure controller informs the crew with an alarm when pressure exceeds 20 bars in the cabin
2 – the alarm duration is 60 seconds
3 – keep track of the measured values



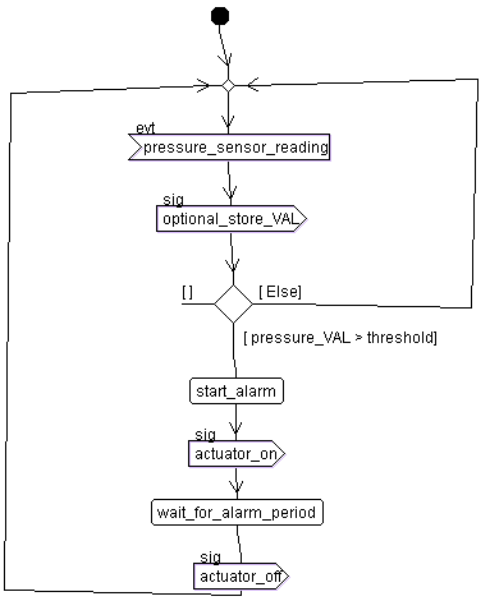
Requirement

After reviewing the specifications required we divide the project into a few requirements:

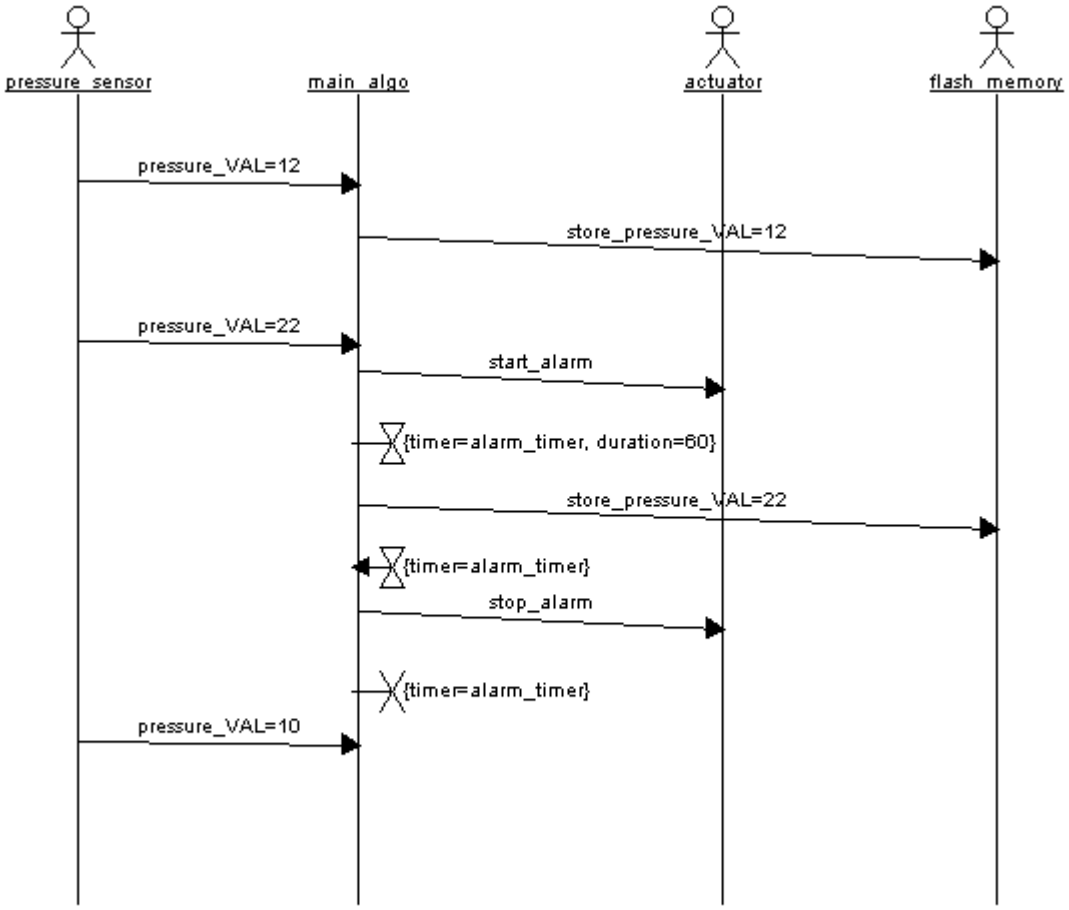


System analysis

- Activity Diagram:

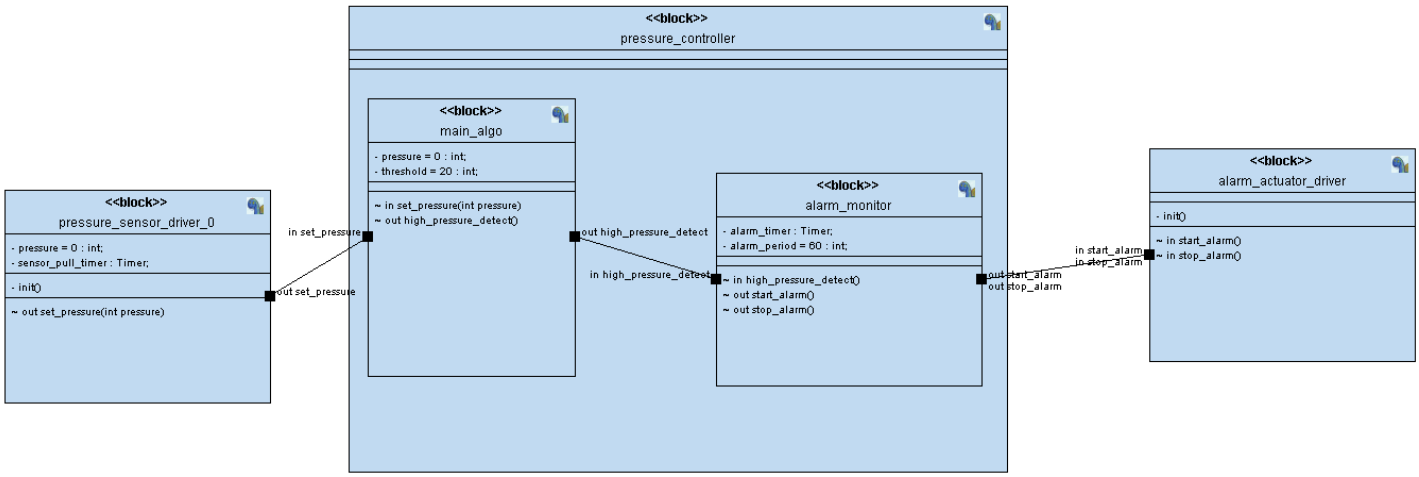


- Sequence Diagram:



System Design

- Now we start designing the system and how to implement its code.
    - Block Diagram:



- State machines of each module:

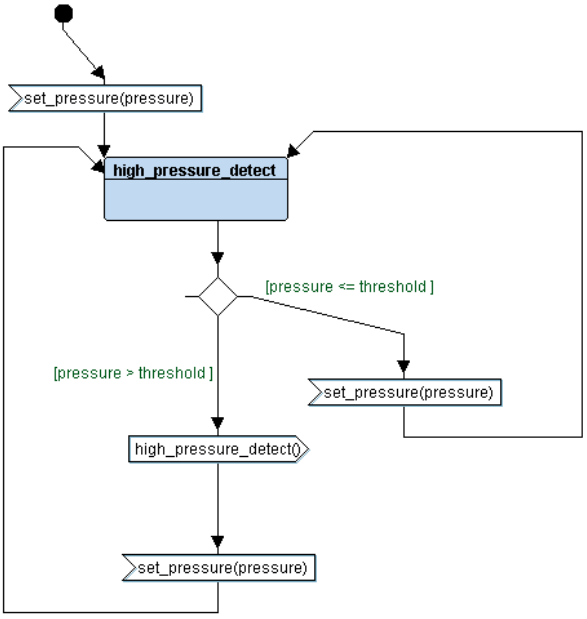


Figure 4. Main Algorithm

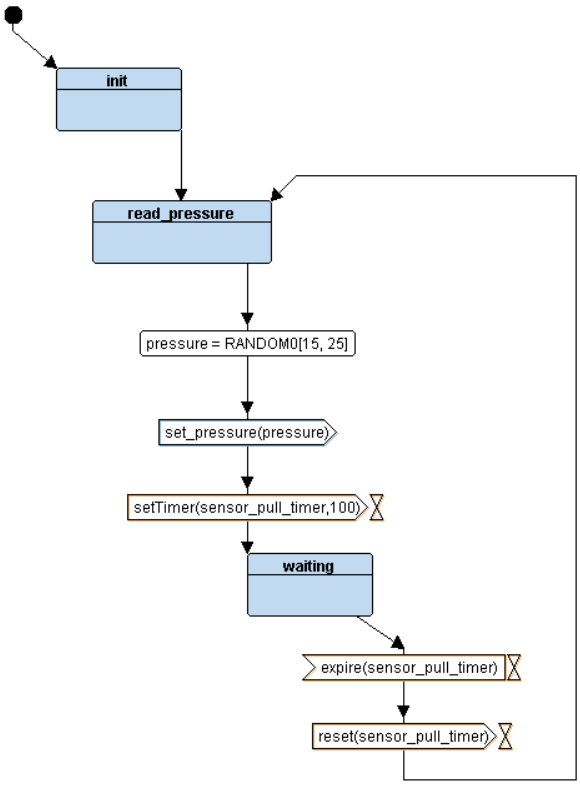


Figure 3.Pressure Sensor

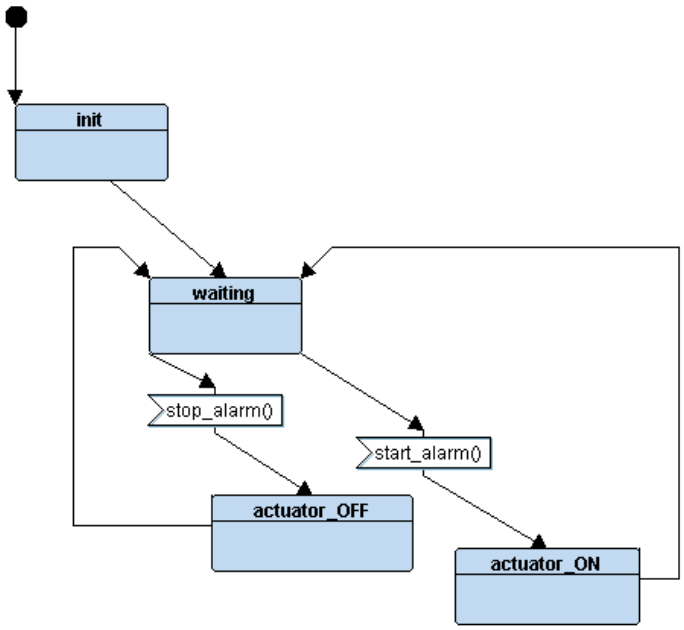


Figure 2.Alarm Actuator

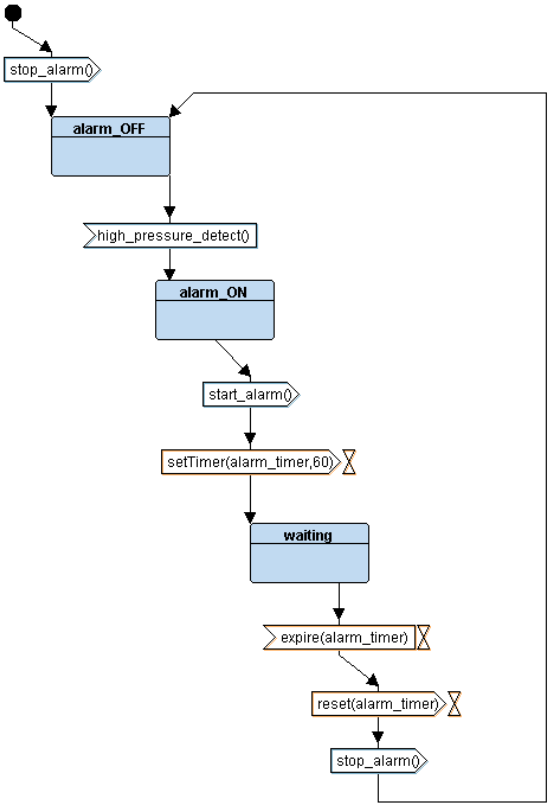
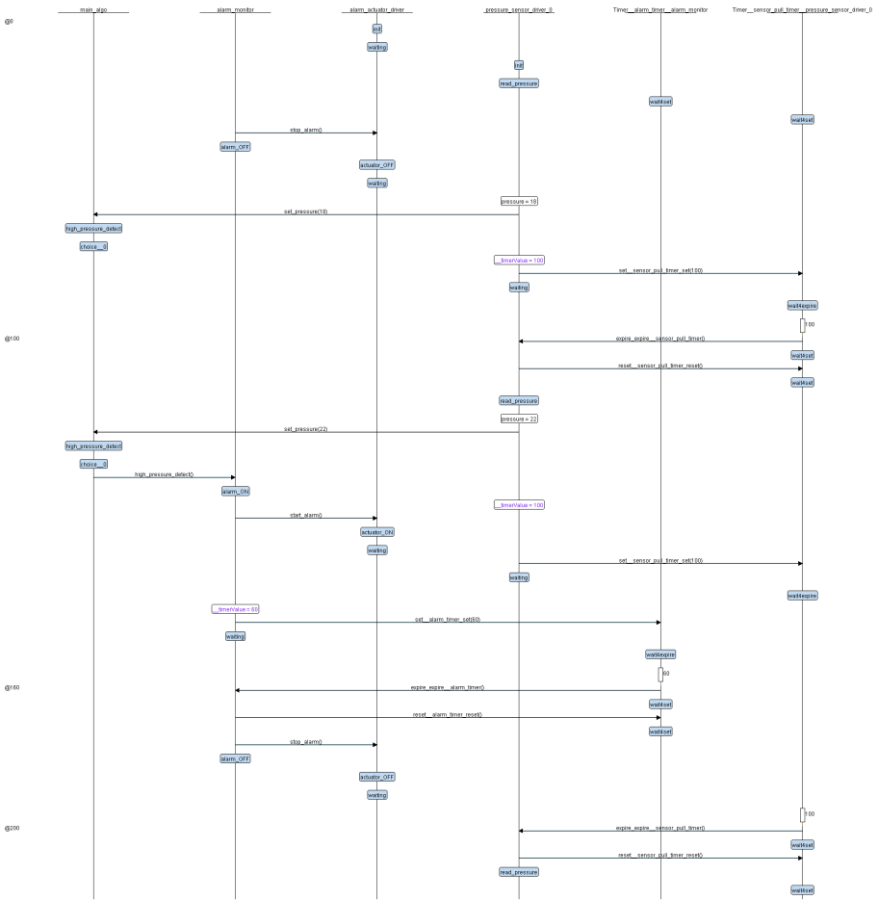


Figure 1.Alarm Monitor

- Simulation of TTool sequence:



Software implementation

- implement .c and .h codes.
- Also implement makefile, startup & linker script.

Proteus Simulation

- After compiling and generating an elf file we put it on proteus simulation
    - We can see in first simulation the pressure value is less than 20 so the LED is OFF

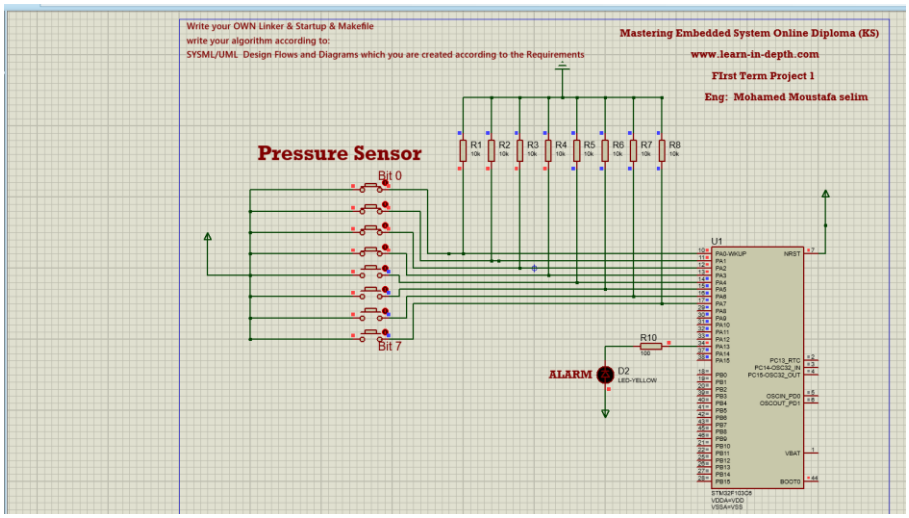


Figure 5.LOW pressure

- And in the second simulation the pressure value is more than 20 so the LED is ON for a time period then turns off and take another reading.

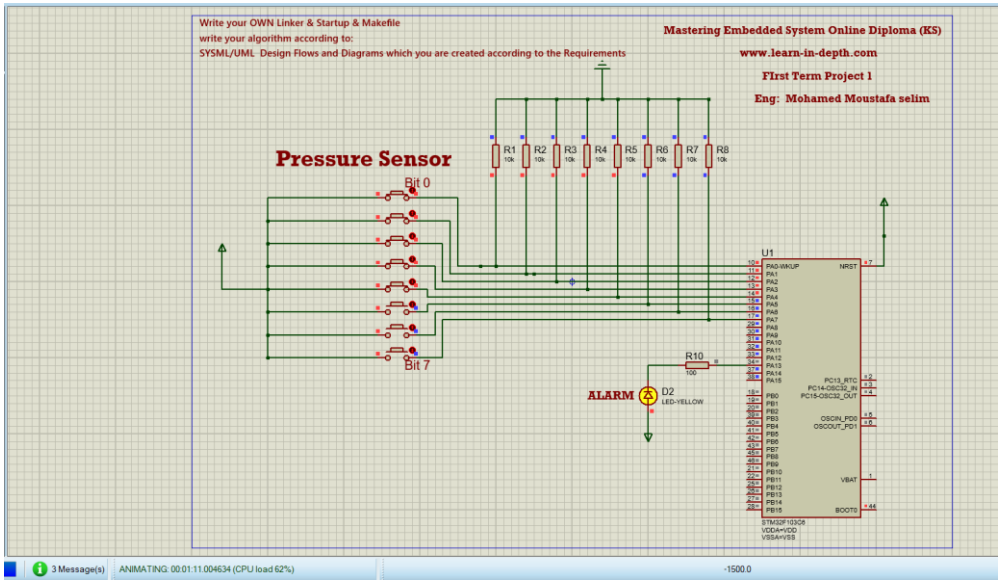


Figure 6.HIGH pressure

SW Analysis

- Mapfile is generated along with symbols table and sections table in src folder.