Mastering Embedded System
Online Diploma

Pressure Detect System
(Project 1)

Eng. Kareem Abdelkader Mohamed

https://github.com/Kareem-Elshokary/Master_Embedded_systems

https://www.linkedin.com/in/kareem-abdel-kader-204351258/

1- Introduction

Our project was designed to detect the high pressure that exceeding a threshold value and alert the crew in the cabin by an alarm with a duration of 60 seconds. The project was worked through what was studied (C language, C Embedded, System Design). The following content shows how the project was worked on.

2- Case Study and Requirements

A client expects to deliver a software to the following, 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.

Basic assumptions to avoid any further conflicts:

- The controller setup and shutdown procedures are not modeled.
- The pressure sensor never fails.
- The alarm actuator never fails.

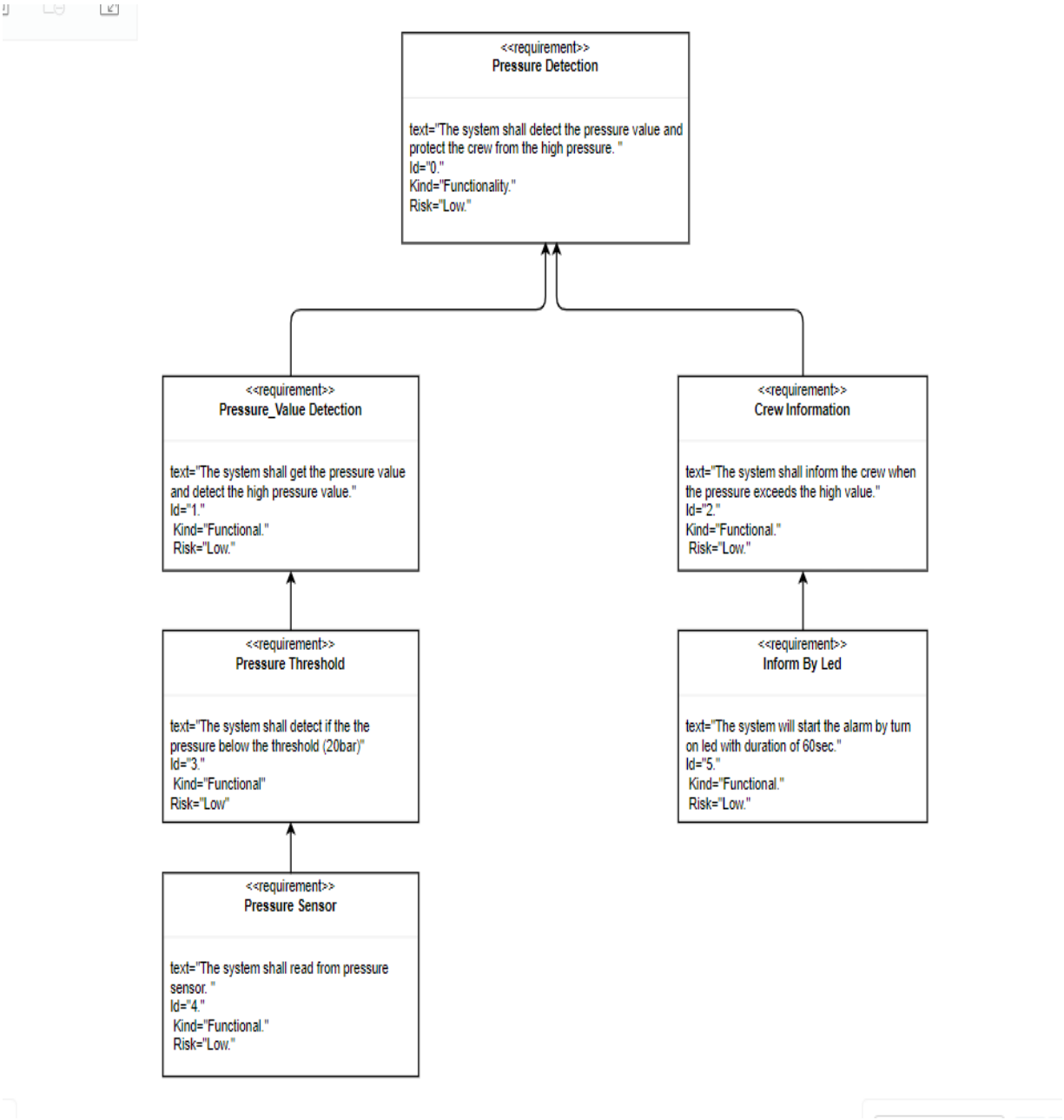

Fig-1 Requirements diagram

3- Method

The Software Development Life Cycle (SDCL) that was used to implement this project is the V-model. It is based on the association of a testing phase for each corresponding development stage. Development of each step is directly associated with the testing phase.

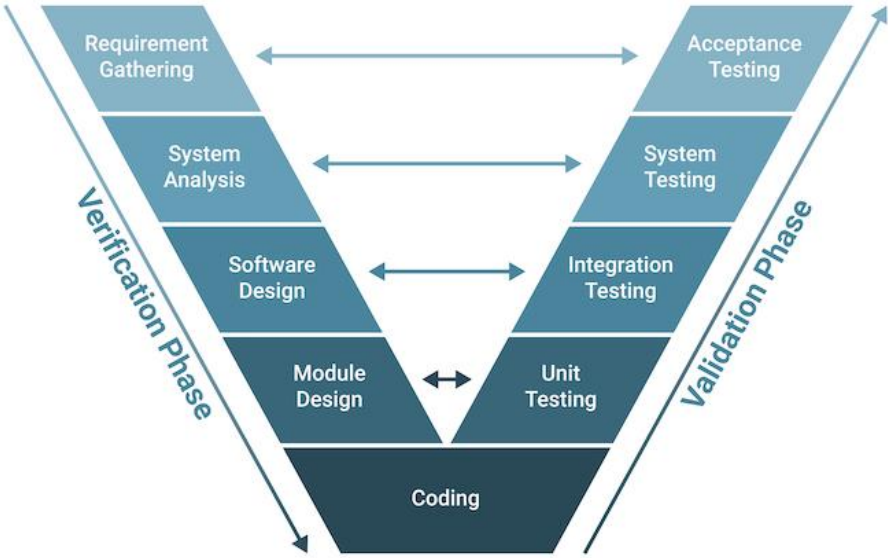

Fig-2 V-model

4- System Analysis

The system analysis will be shown by UML diagrams. UML stands for Unified Modeling Language. It's a rich language to model software solutions, application structures, system behavior and business processes.

4.1 Use Case Diagram

Use case diagrams give a graphic overview of the actors involved in a system, different functions needed by those actors and how these different functions interact.

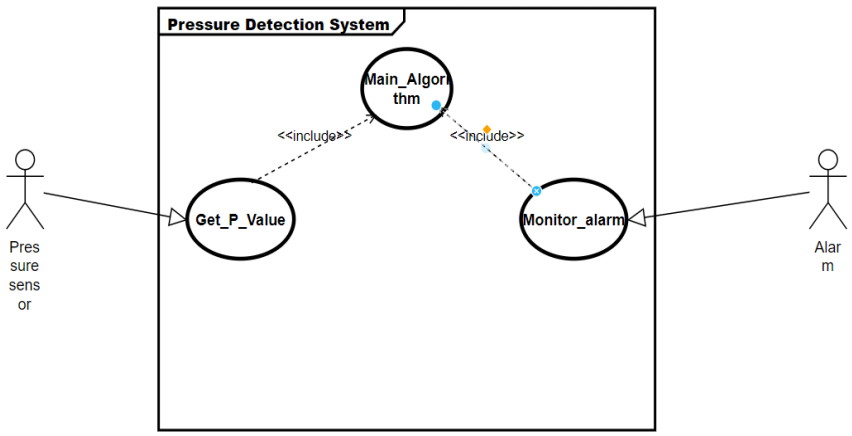

Fig-3 Use Case Diagram

4.2 Activity Diagram

Activity diagrams represent workflows in a graphical way. They can be used to describe the business workflow or the operational workflow of any component in a system. Sometimes activity diagrams are used as an alternative to State machine diagrams.

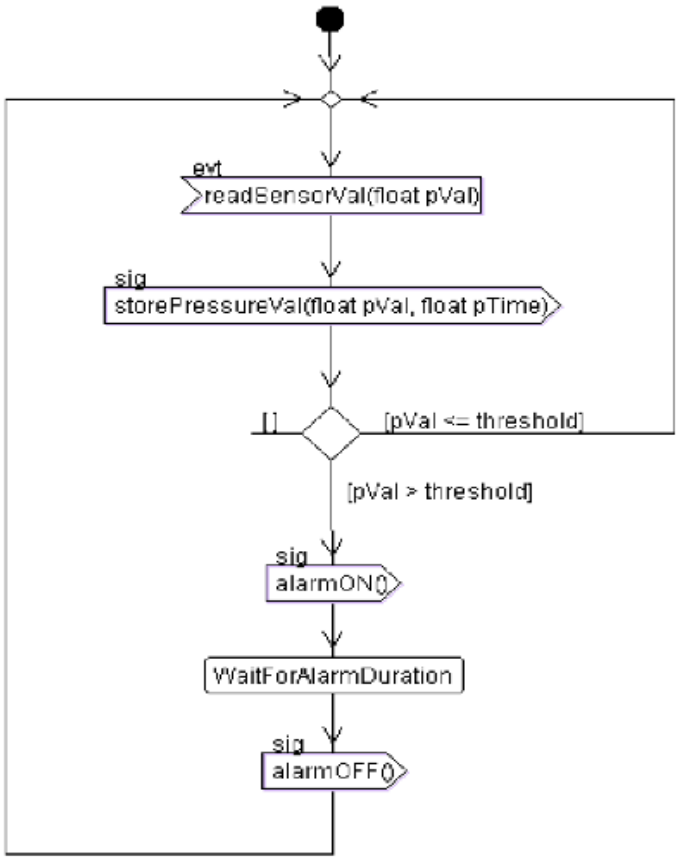

Fig-4 Activity Diagram

4.3 Sequence Diagram

Sequence diagrams in UML show how objects interact with each other and the order those interactions occur. It's important to note that they show the interactions for a particular scenario.

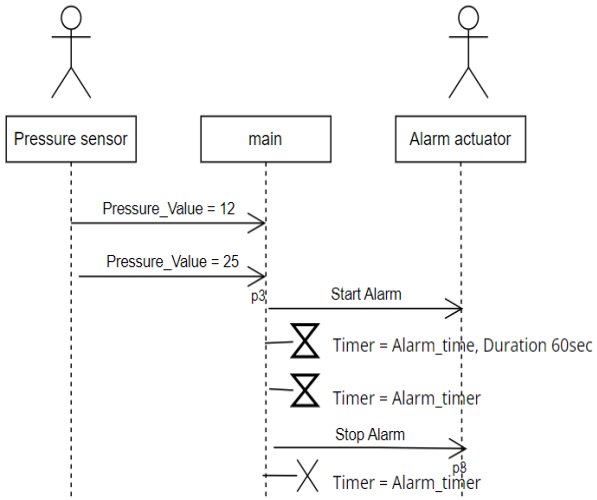

Fig-5 Sequence Diagram

5- System Design

a process of creating an architecture for different components, interfaces, and modules of the system and providing corresponding data helpful in implementing such elements in systems.

5.1 Block Diagram

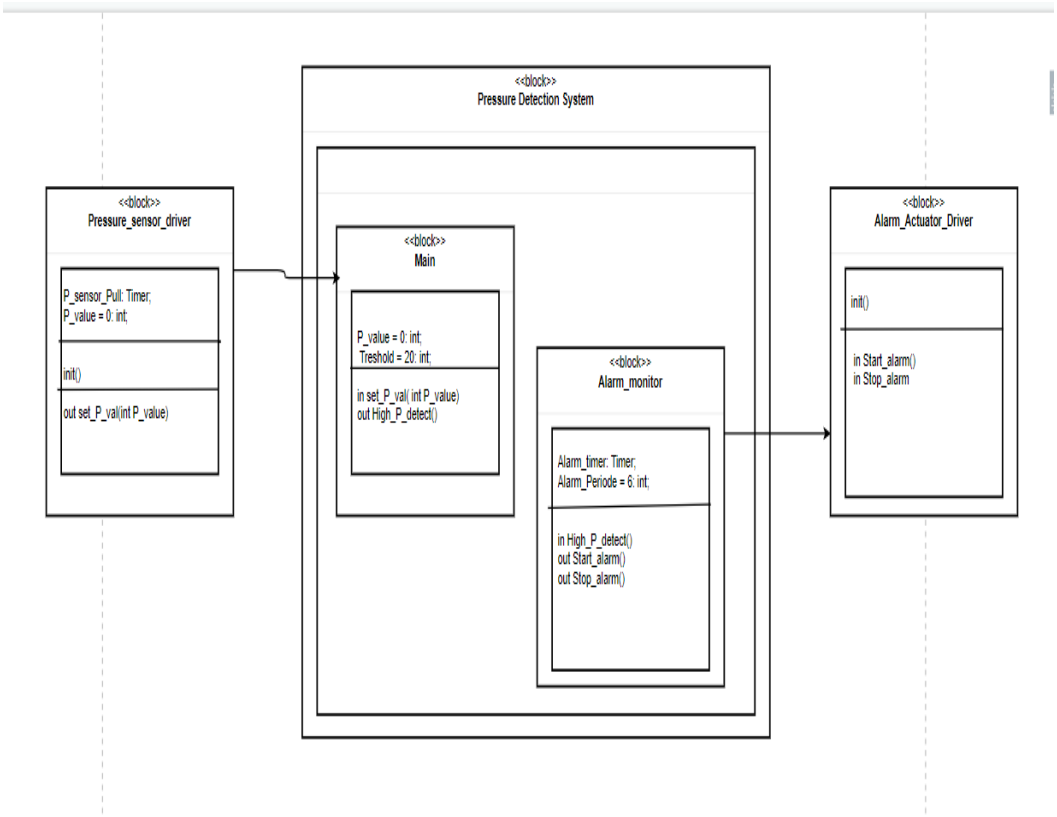

Fig-6 Block Diagram

6.2 State Machine Diagram

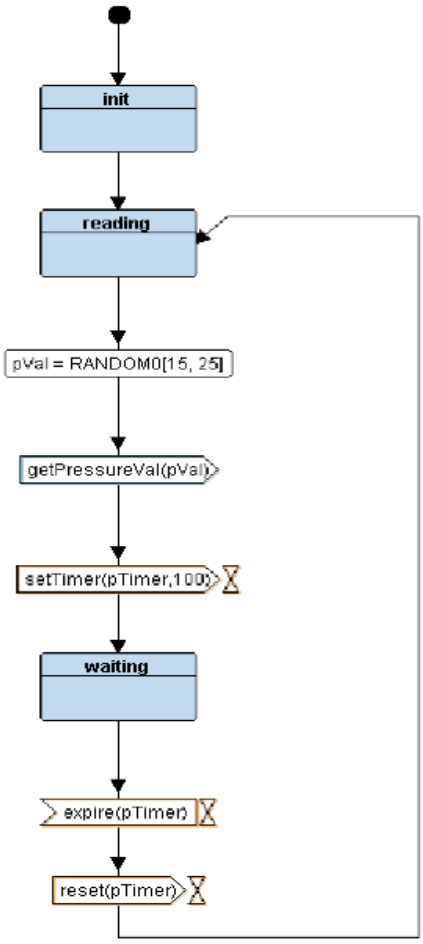

Fig-7 Pressure Sensor Driver State Machine

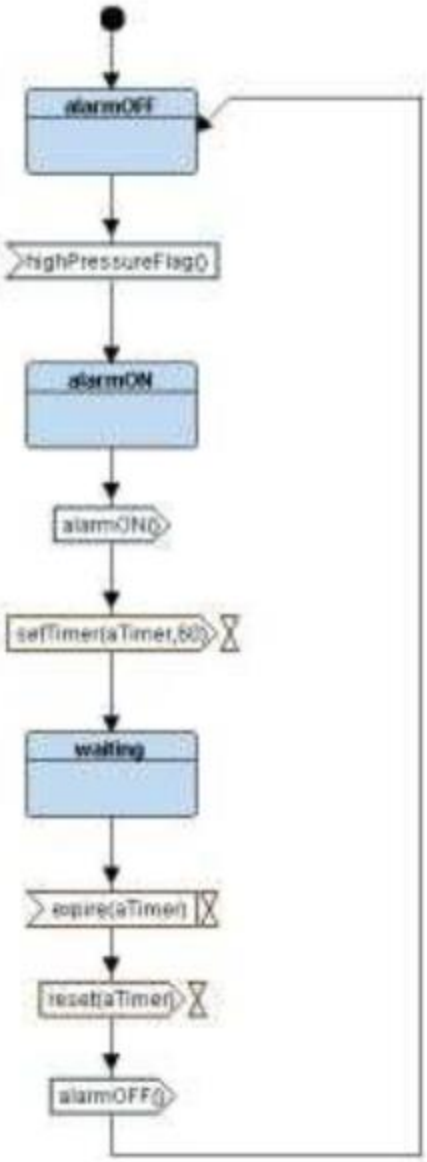

Fig-8 Alarm Driver State Machine