

# Mastering Embedded System Online Diploma

<http://www.learn-in-depth.com>

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## First Term (Final Project 1) Project Report

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**Report for:** LEARN-IN-DEPTH DEPLOMA (K.S)

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### 3) Introduction

#### a) Case Study

A pressure controller informs the crew of a cabin with an alarm when the pressure exceeds 20 bars in the cabin.

#### b) Assumptions

There are drivers, IRQ, Hal to be defined later.

Pressure to start alarm is greater than 20 bar.

Controller setup and shutdown procedures are not modeled.

The controller maintenance is not modeled.

Pressure sensor will never fail.

ALARM LED will never fail.

The controller never faces power cut.

Storing in flash is not implemented, it can be implemented later.

Processor will check the driver of Pressure sensor each 1sec to save time of processor.

#### c) Lifecycle method

##### **Waterfall model**

As the project is not very large, we can use the waterfall model.

We can end each stage without returning to it again.

We can develop each module separately until finishing it, without looping on code.



## 4) Requirements Diagram

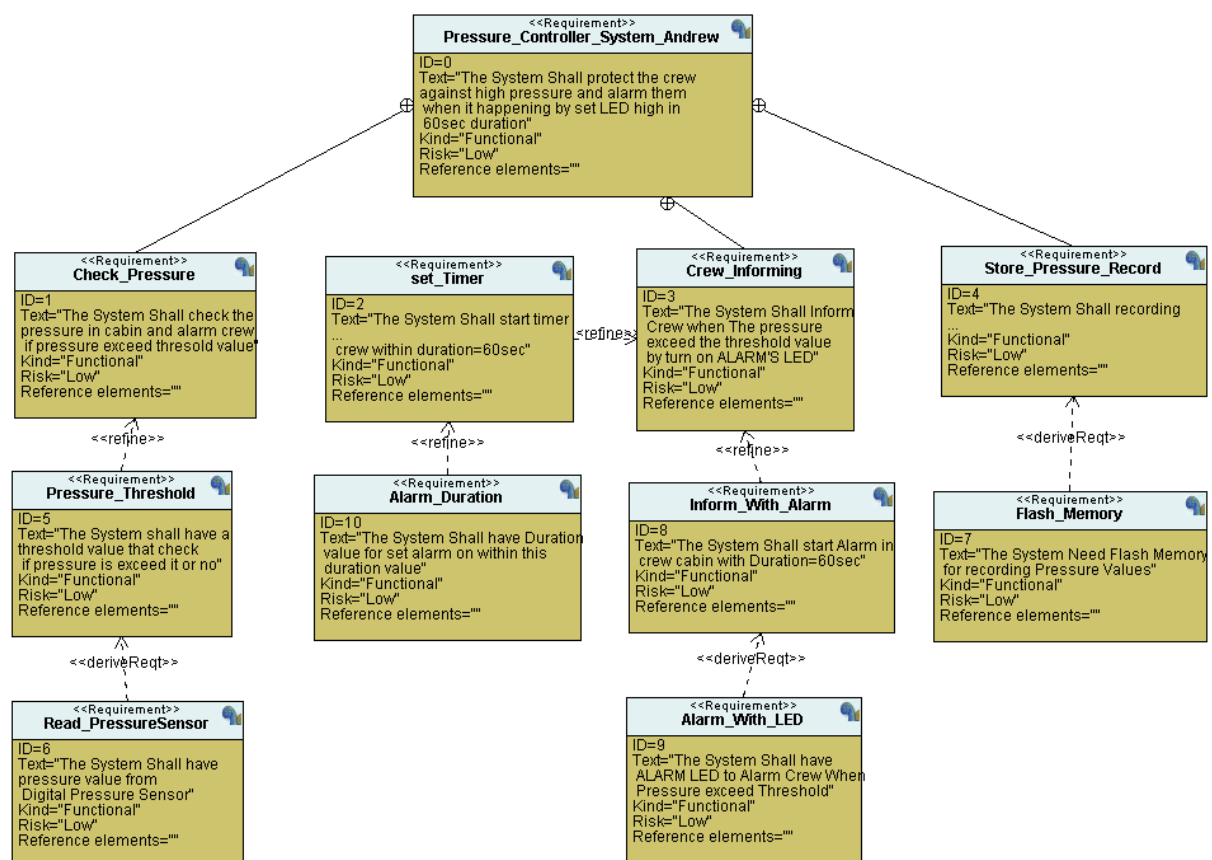


Figure 1: Requirement Diagram



## 5) System Analysis

### a) Use Case Diagram

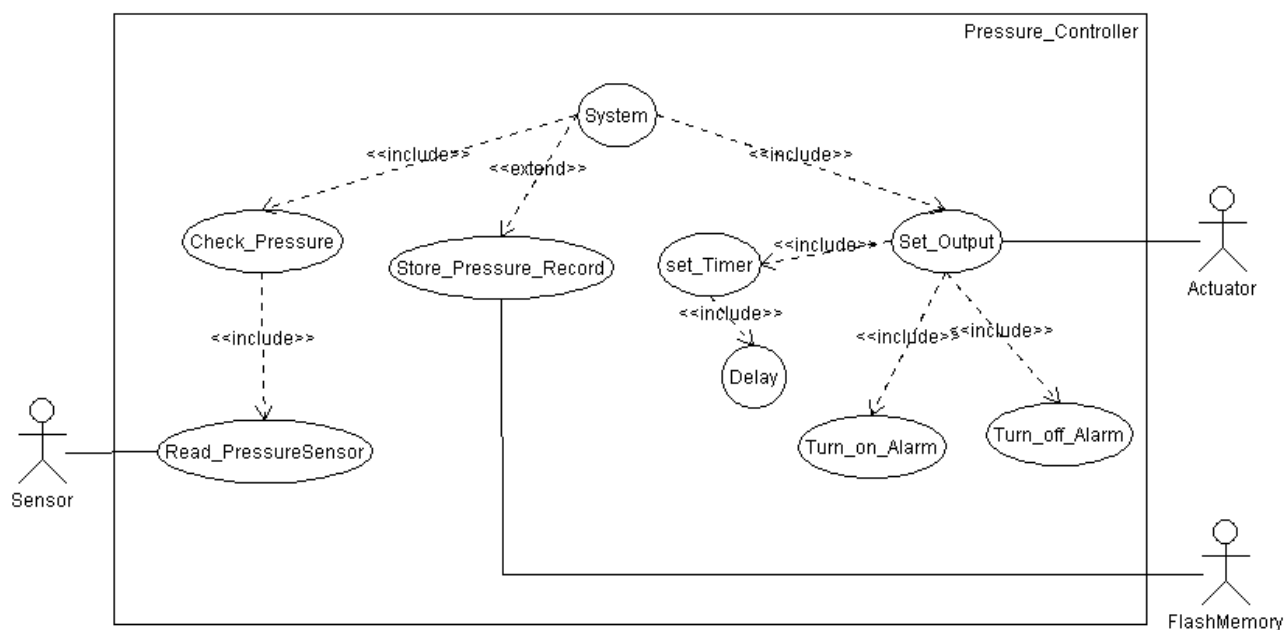


Figure 2: UseCase Diagram



## b) Activity Diagram

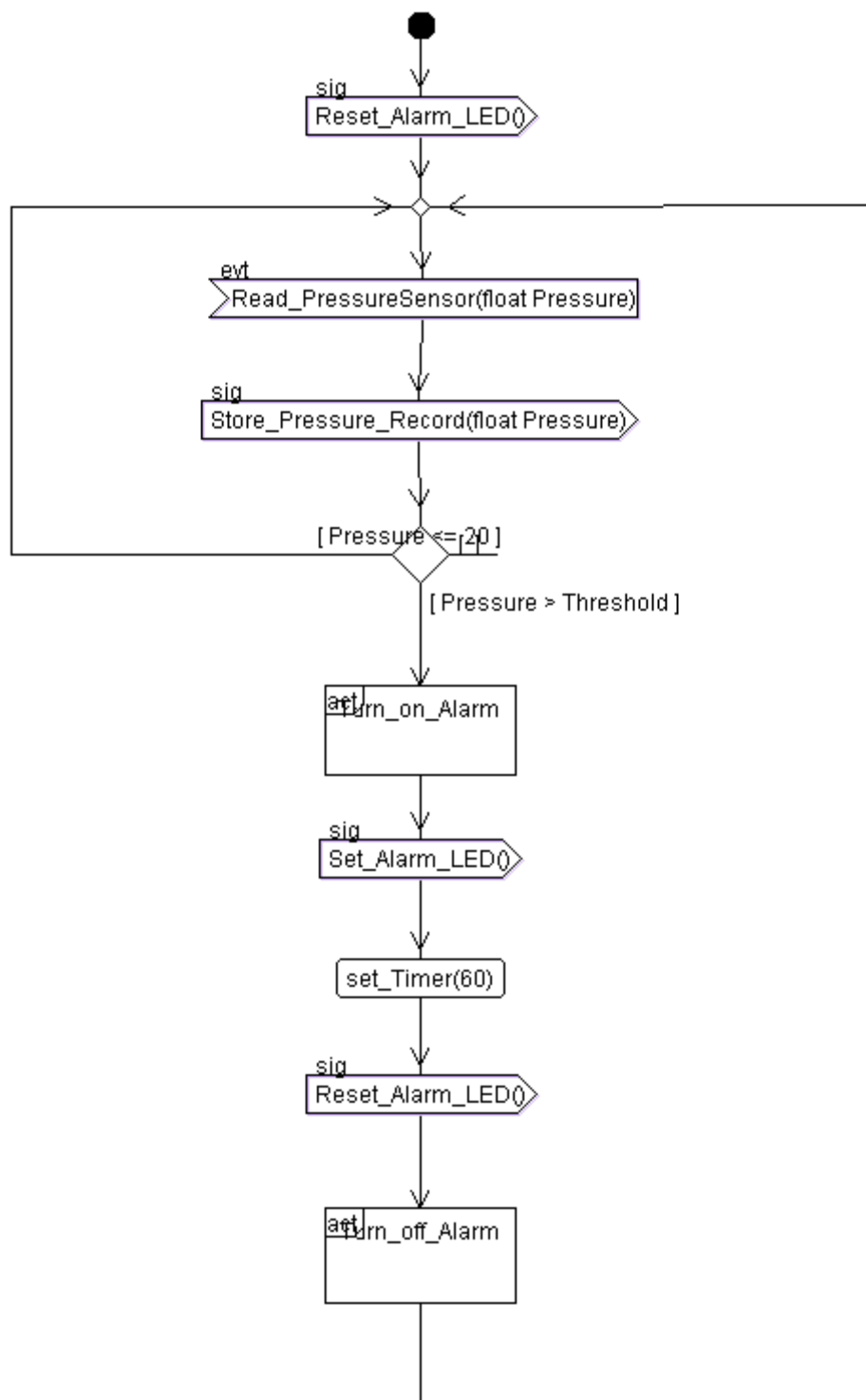


Figure 3: Activity Diagram



### c) Sequence Diagram

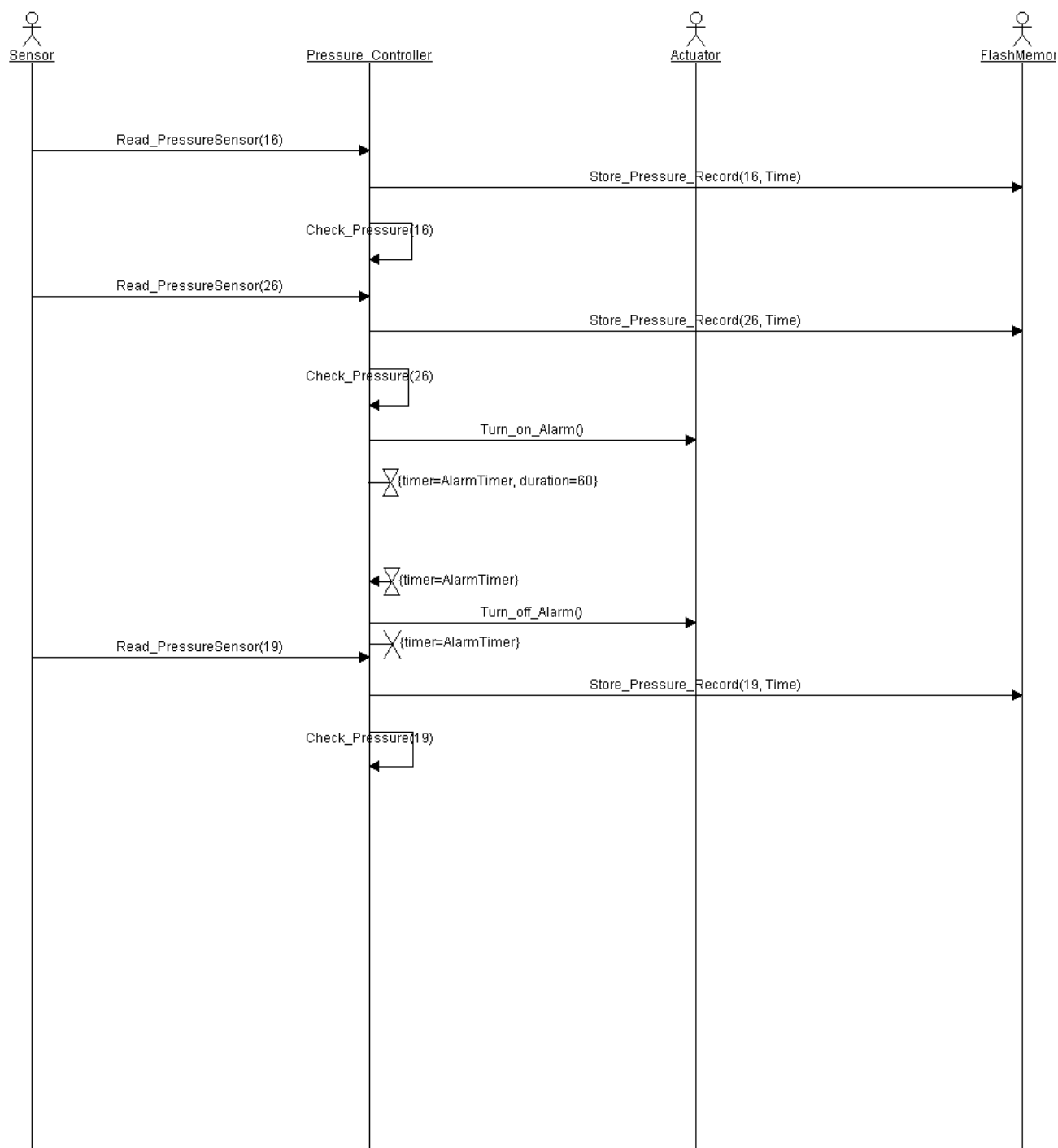


Figure 4: Sequence Diagram





## 6) System Design

### a) Block Diagram

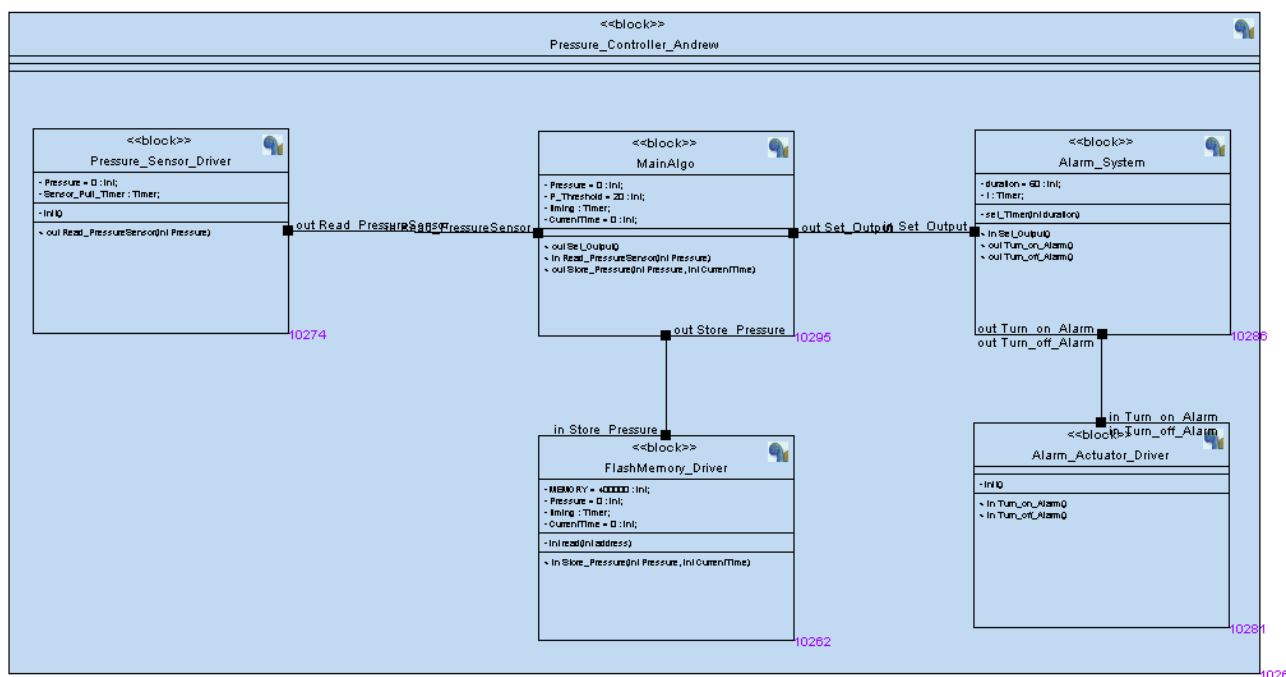


Figure 5: Block Diagram



## b) State Machine Diagram

### 1. Pressure\_Sensor\_Driver

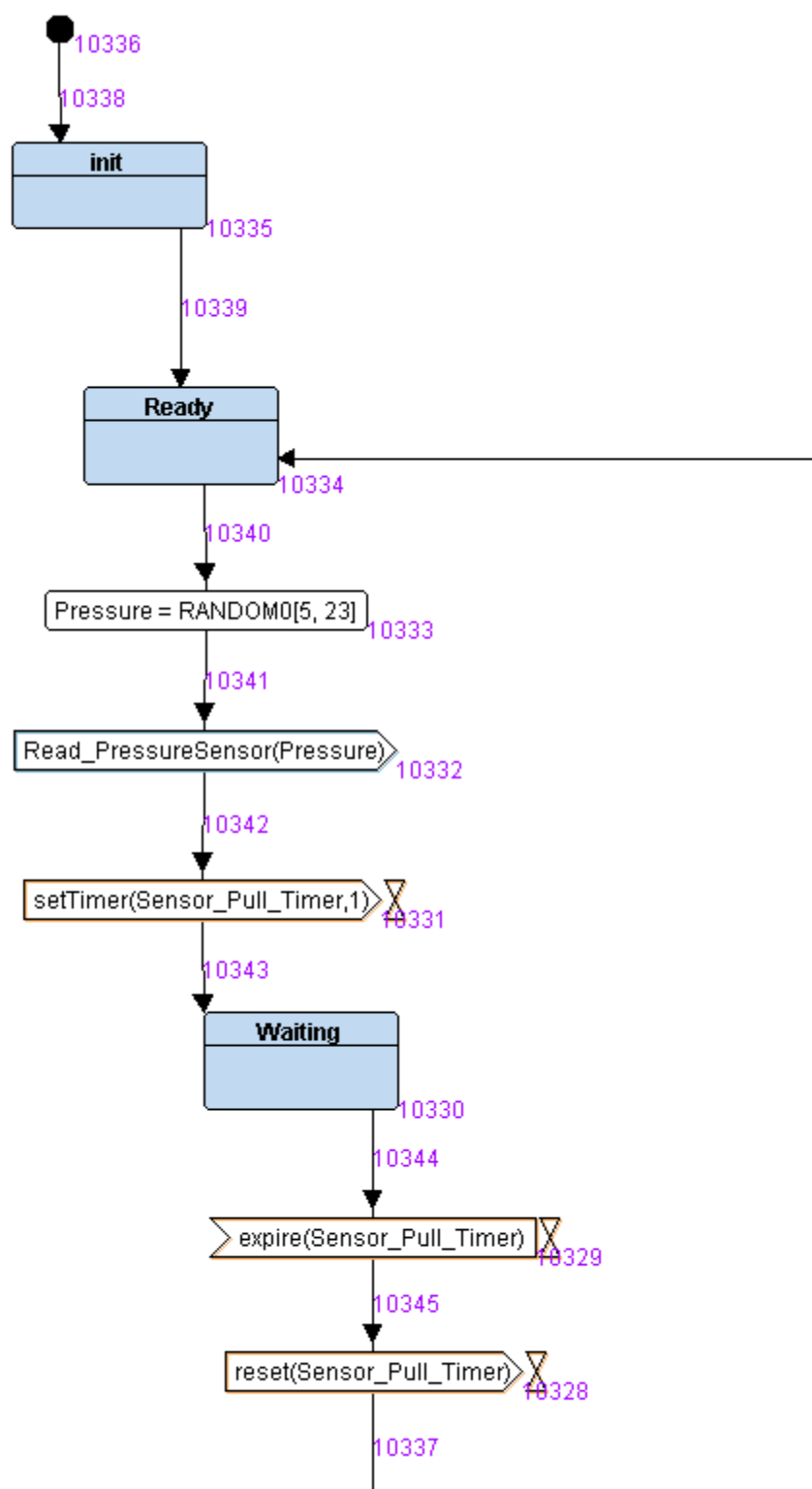


Figure 6: State Machine of Pressure Sensor Driver



## 2. FlashMemory\_Driver

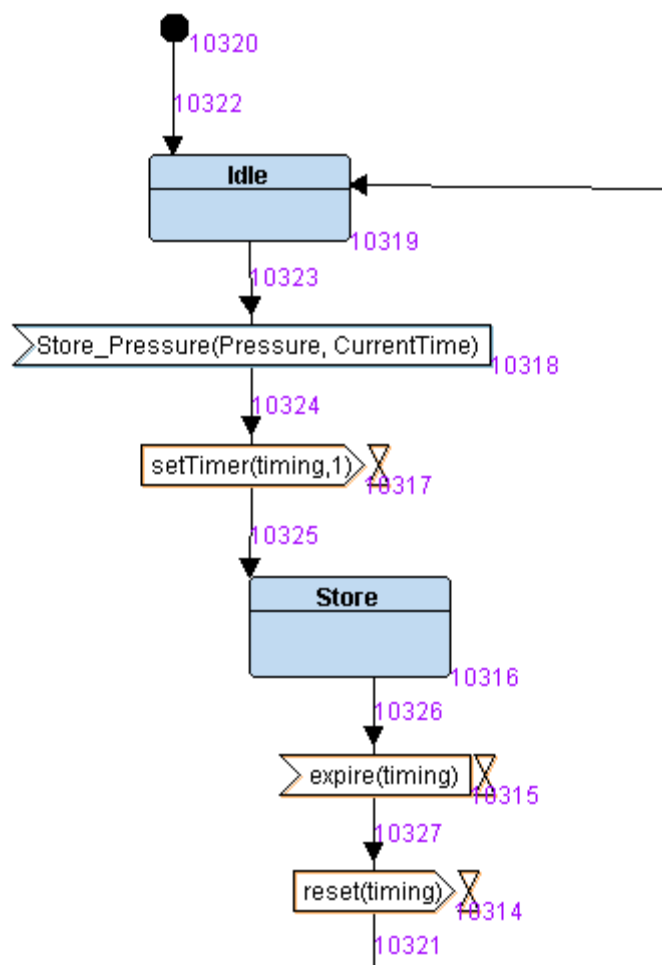


Figure 7: State Machine Diagram of Flash Memory Driver



### 3. Alarm\_System

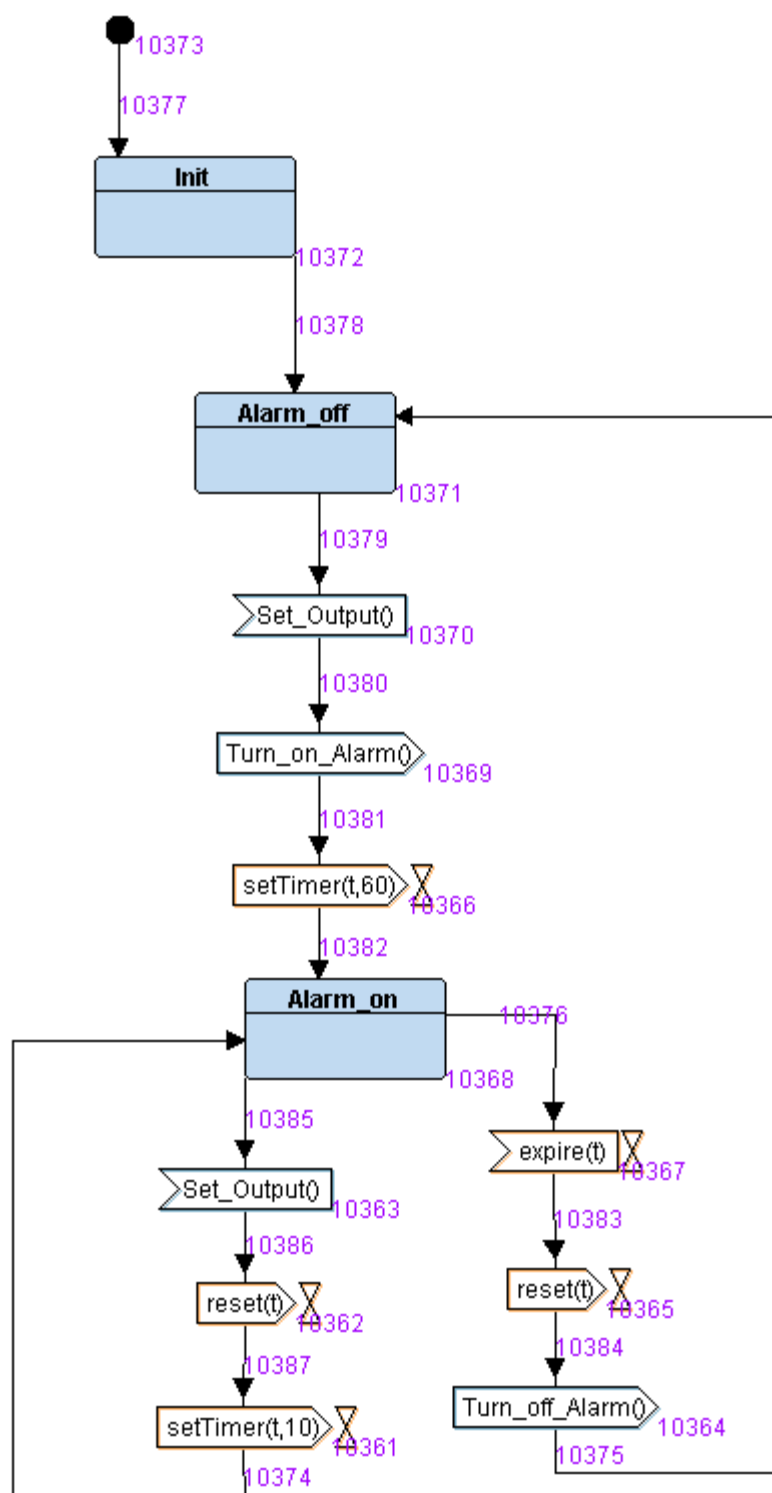


Figure 8: State Machine Diagram of Alarm System



#### 4. Alarm\_Actuatot\_Driver

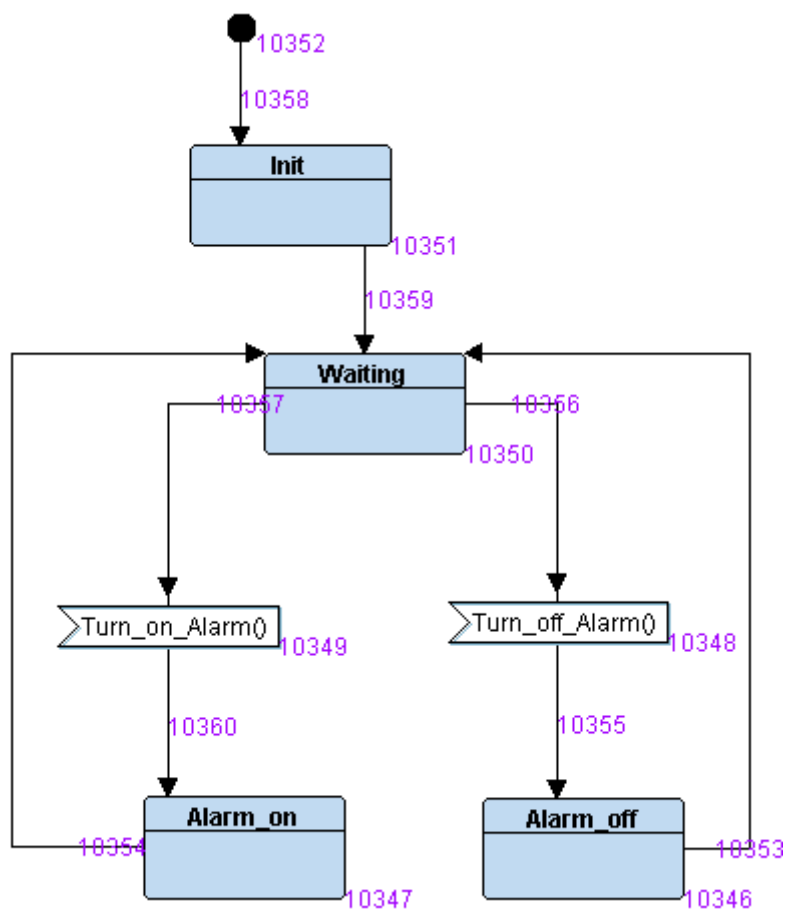


Figure 9: State Machine Diagram of Alarm Actuator Driver



## 5. MainAlgo

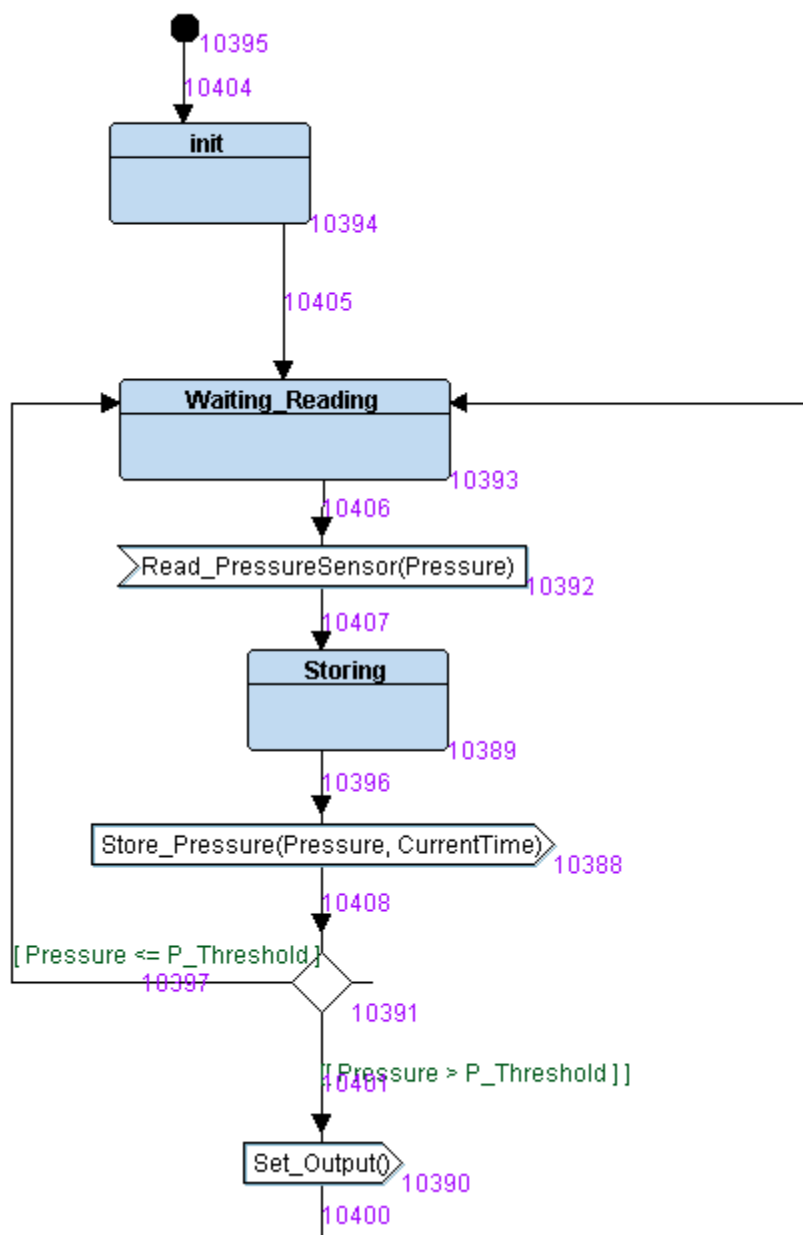


Figure 10: State Machine Diagram of MainAlgo



### c) Simulation

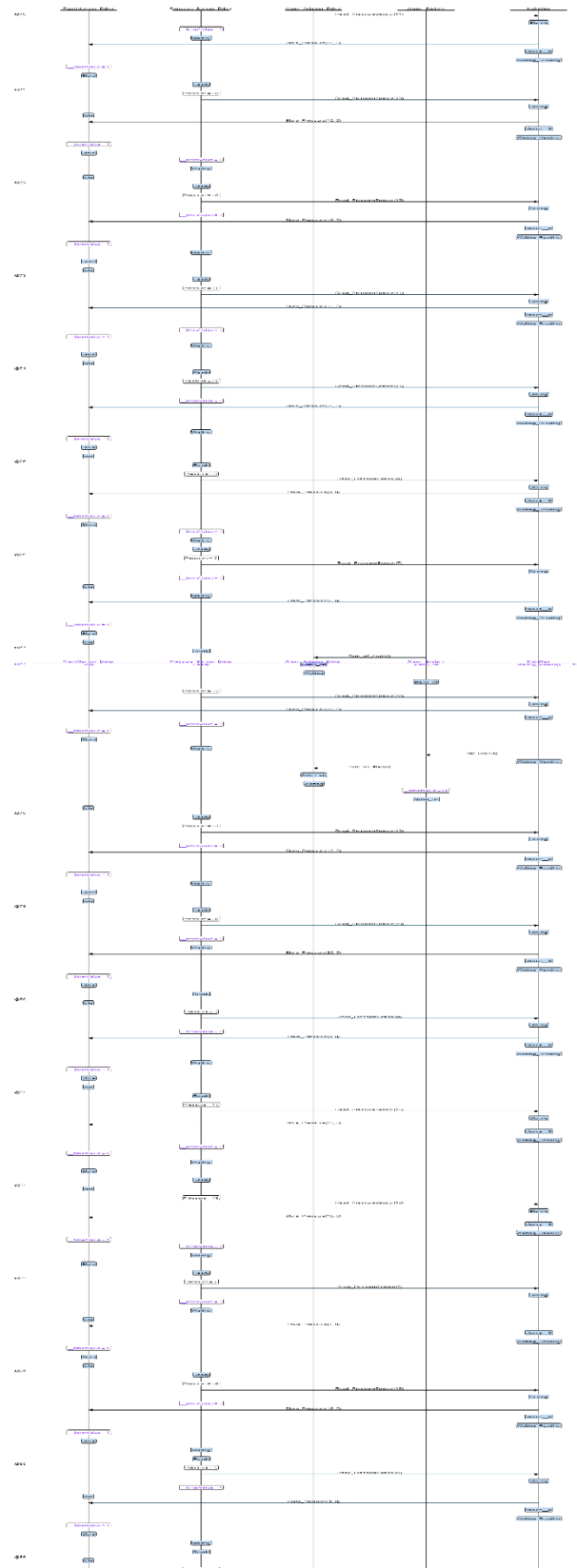


Figure 11: State Machine Diagram Simulation



## **7) Simulation Video**

[https://drive.google.com/drive/folders/1Db\\_jIYPU5bJAwfgAfm7tVnsOgRsEGH-p](https://drive.google.com/drive/folders/1Db_jIYPU5bJAwfgAfm7tVnsOgRsEGH-p)

## **8) Codes and files**

[Master-Embedded-System/First\\_Term\\_Projects/P1\(Pressure\\_Controller\) at FirstTerm\\_Project · Andrew-Adel/Master-Embedded-System \(github.com\)](#)