**Ain Shams University**

**Faculty of Engineering**

**Mechatronics Engineering Department**

**Mastering Embedded System Online Diploma** [**www.learn-in-depth.com**](http://www.learn-in-depth.com)

**First Term (Final Project 1)**

**“Pressure Detection System”**

**Eng. Omar Ahmed Dawood**

**My Profile: <** [oa0578222@gmail.com (learn-in-depth.com)](https://www.learn-in-depth.com/online-diploma/oa0578222%40gmail.com)**>**

Contents

[**1** **Introduction** 3](#_Toc126415928)

[1.1 Design Sequence 3](#_Toc126415929)

[**2** **Requirements of Client (Case Study)** 3](#_Toc126415930)

[**3** **Method** 4](#_Toc126415931)

[**4** **Requirements Diagram** 5](#_Toc126415932)

[**5** **Space Exploration** 5](#_Toc126415933)

[**6** **System Analysis** 6](#_Toc126415934)

[6.1 Use Case Diagram 6](#_Toc126415935)

[6.2 Activity Diagram 6](#_Toc126415936)

[6.3 Sequence Diagram 7](#_Toc126415937)

[**7** **System Design** 8](#_Toc126415938)

[7.1 All System 8](#_Toc126415939)

[7.2 Pressure Sensor Block 8](#_Toc126415940)

[7.3 Main Alg Block 9](#_Toc126415941)

[7.4 LED Indicator Block 9](#_Toc126415942)

[7.5 Alarm Monitoring Block 10](#_Toc126415943)

[**8** **System Design Simulation** 11](#_Toc126415944)

[8.1 Pressure Less than 20 11](#_Toc126415945)

[8.2 Pressure More than 20 11](#_Toc126415946)

[**9** **Implementation** 12](#_Toc126415947)

[9.1 Pressure Sensor 12](#_Toc126415948)

[9.2 Main Alg 12](#_Toc126415949)

[9.3 Alarm Monitoring 13](#_Toc126415950)

[9.4 LED Indicator 13](#_Toc126415951)

[9.5 Linker script file 14](#_Toc126415952)

[9.6 Startup file 15](#_Toc126415953)

[**10** **Simulation on proteus** 16](#_Toc126415954)

[10.1 Hardware 16](#_Toc126415955)

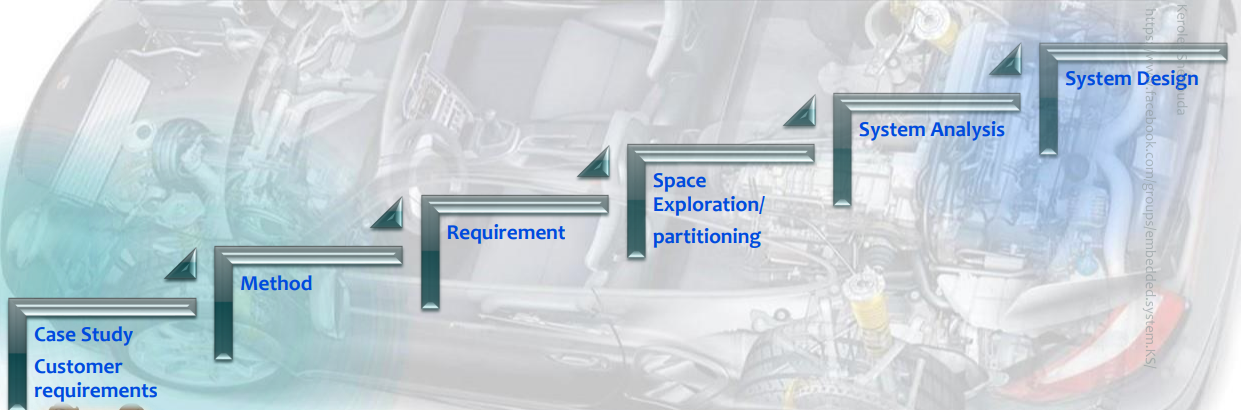
[10.2 Pressure less than 20 bar 16](#_Toc126415956)

[10.3 Pressure more than 20 bar 17](#_Toc126415957)

# **Introduction**

* in this project we will make Pressure Detection sensor that detect high pressure in the cabin of plane.
* Occur Alarm when Pressure exceeds on 20 bar.
* Alarm will continue for 60 seconds.
* We will Apply Design sequence to make this project.
* We will use stm32f103 microcontroller.

## Design Sequence



Design Sequence

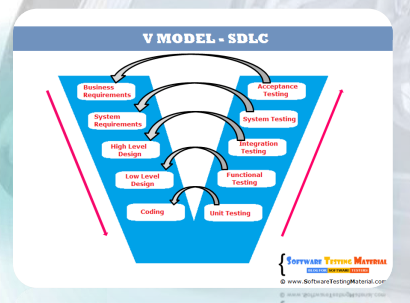
# **Requirements of Client (Case Study)**

A” client” expects you to deliver the software of the following system:

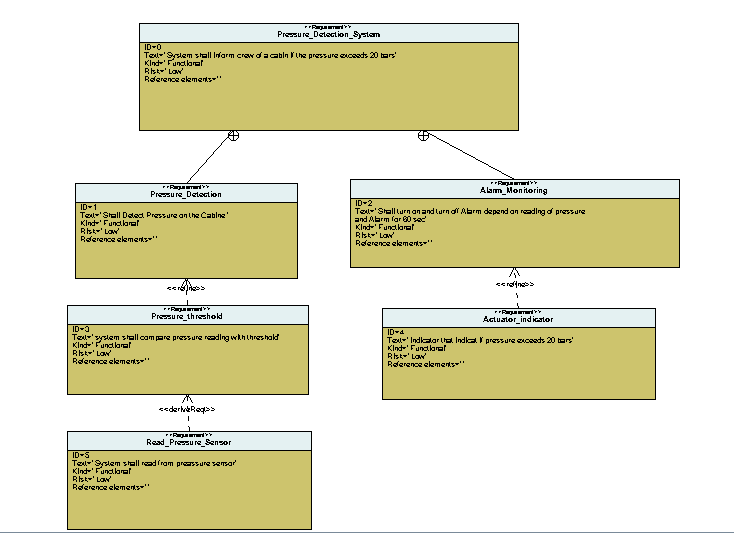
* Specification (from the client)
* A pressure controller informs the crew of a cabin with an alarm when the pressure exceeds 20 bars in the cabin
* The alarm duration equals 60 seconds.

# **Method**

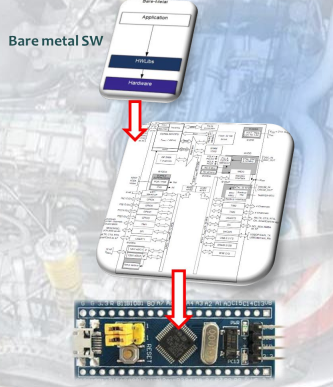
* We will Apply V Model.



# **Requirements Diagram**

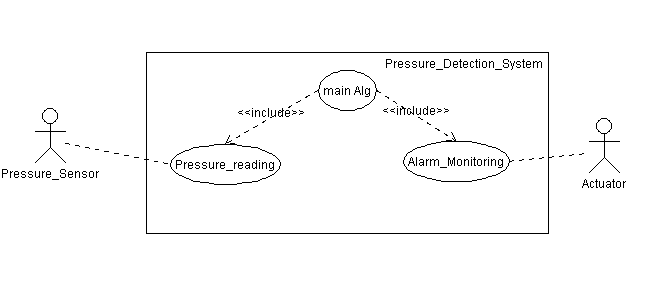


# **Space Exploration**

* We will use only one ECU with one CPU Cortex M3 (STM32f103) Microcontroller.

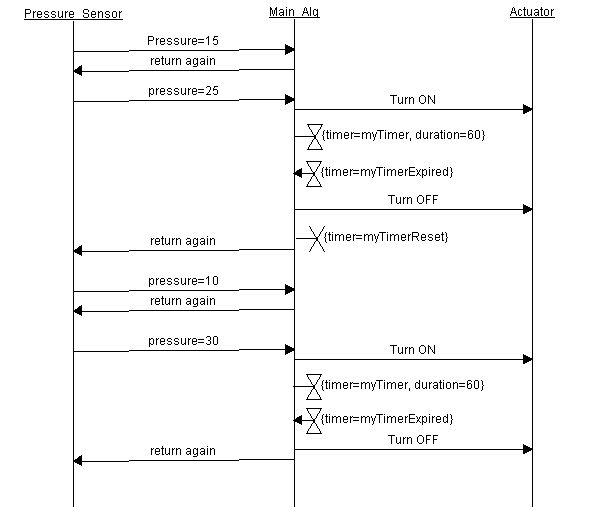
# **System Analysis**

## Use Case Diagram



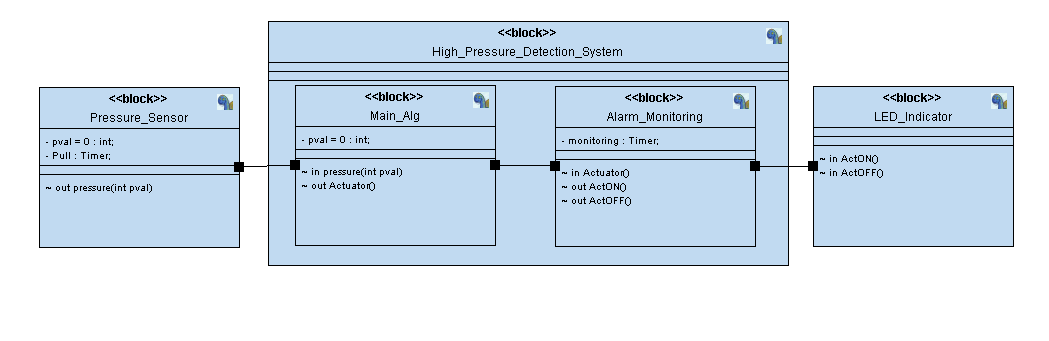
## Activity Diagram

## Sequence Diagram



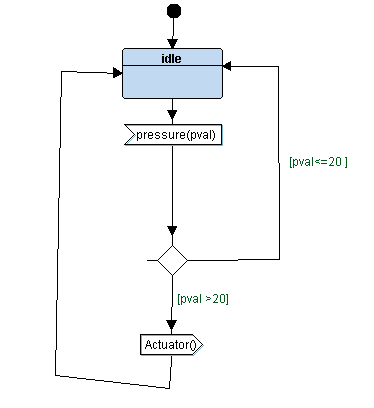
# **System Design**

## All System



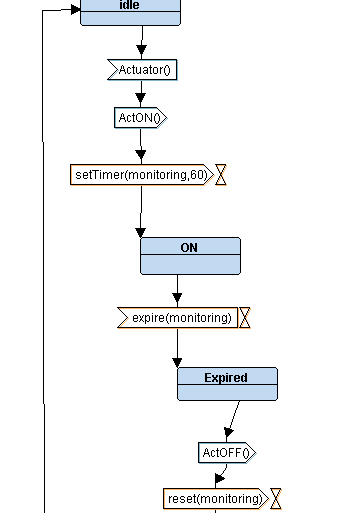
## Pressure Sensor Block

## Main Alg Block



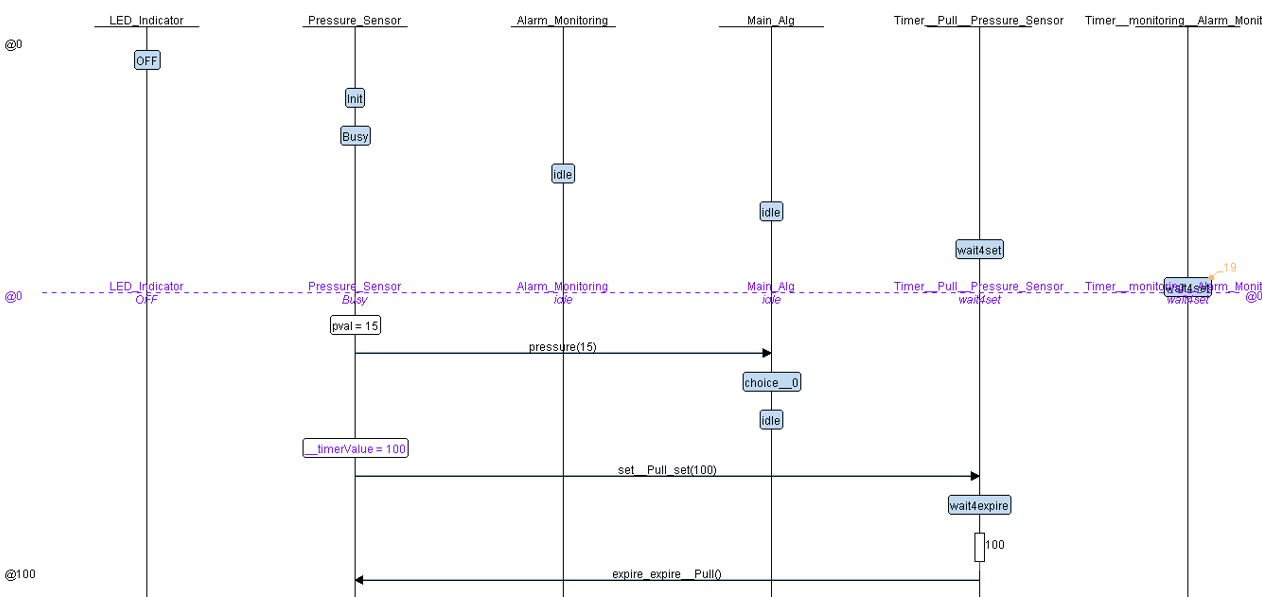
## LED Indicator Block

## Alarm Monitoring Block

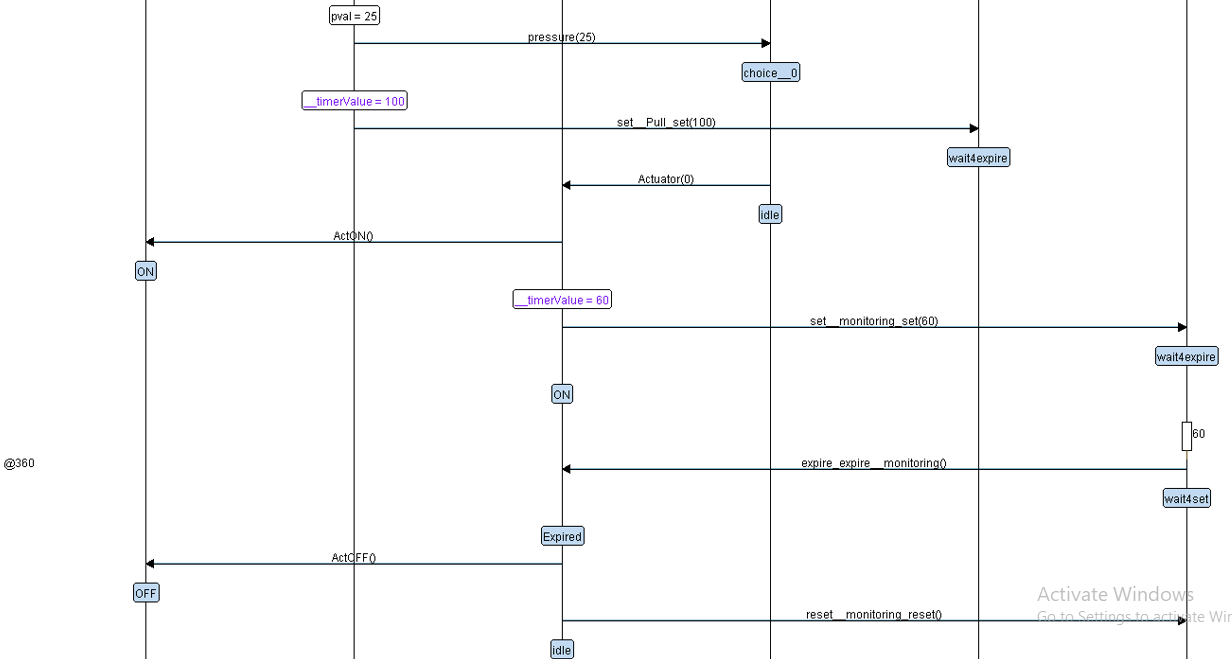


# **System Design Simulation**

## Pressure Less than 20

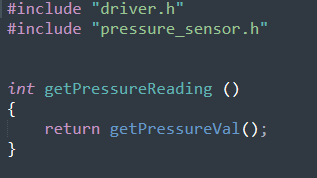
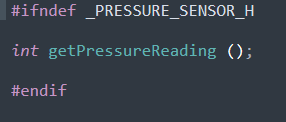


## Pressure More than 20



# **Implementation**

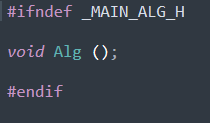
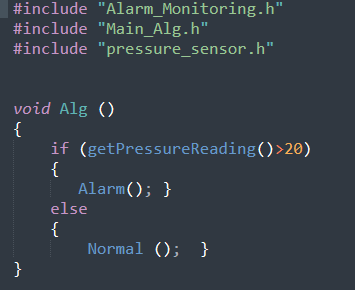
## Pressure Sensor



**.h file**

**.c file**

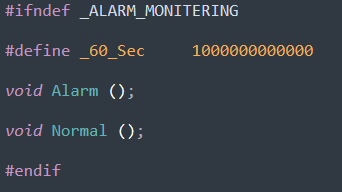
## Main Alg



**.h file**

**.c file**

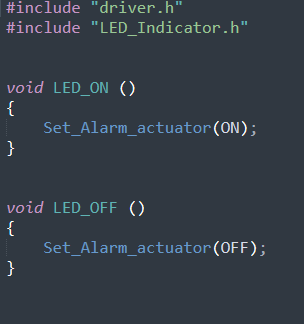
## Alarm Monitoring

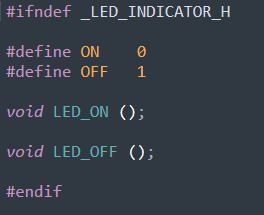


**.h file**

**.c file**

## LED Indicator

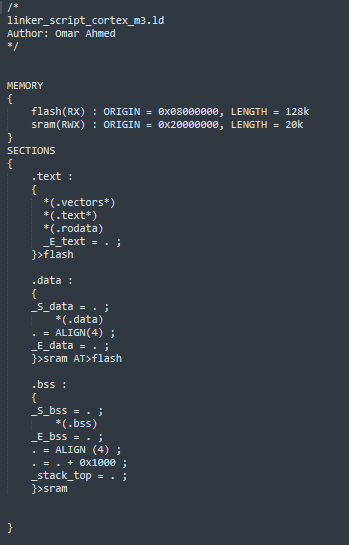




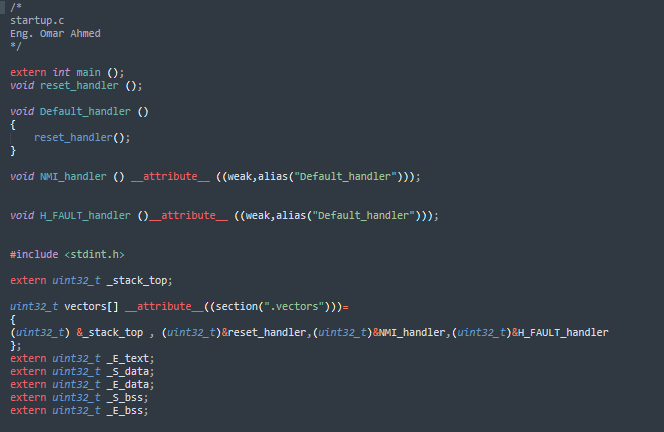
**.h file**

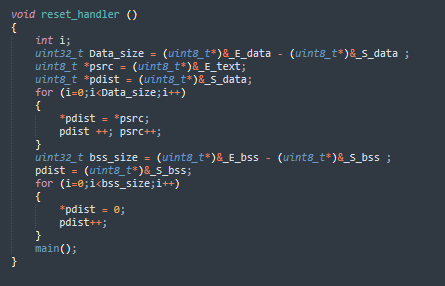
**.c file**

## Linker script file



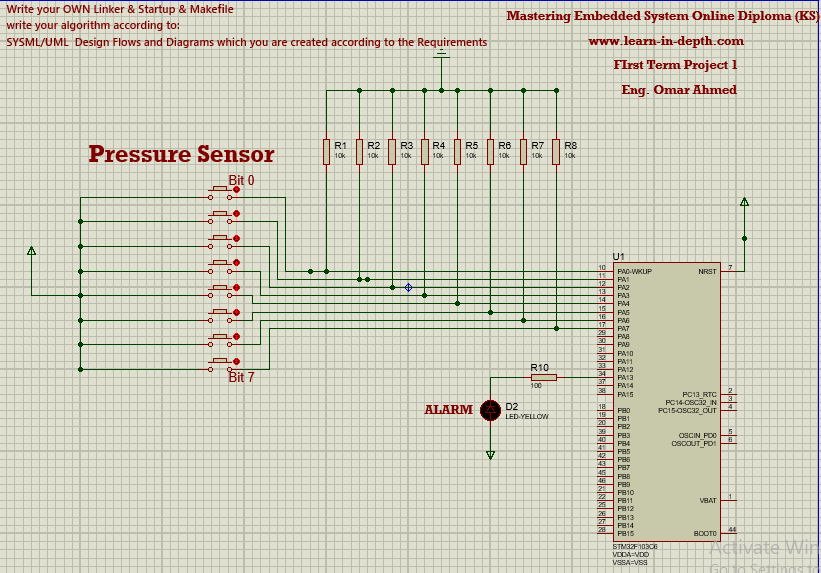
## Startup file



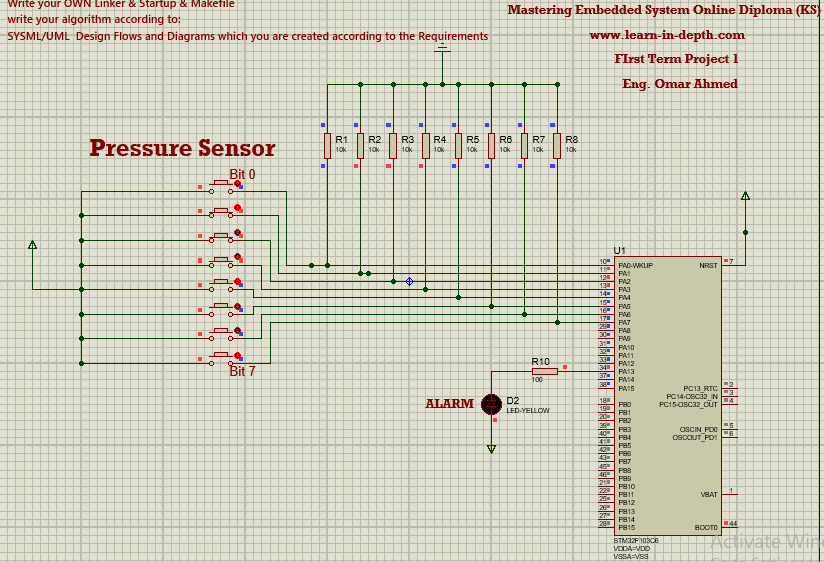


# **Simulation on proteus**

## Hardware



## Pressure less than 20 bar



## Pressure more than 20 bar

