

FIRST TERM PROJECT

Pressure Detection | Learn In Depth | Mohamed Elgohary

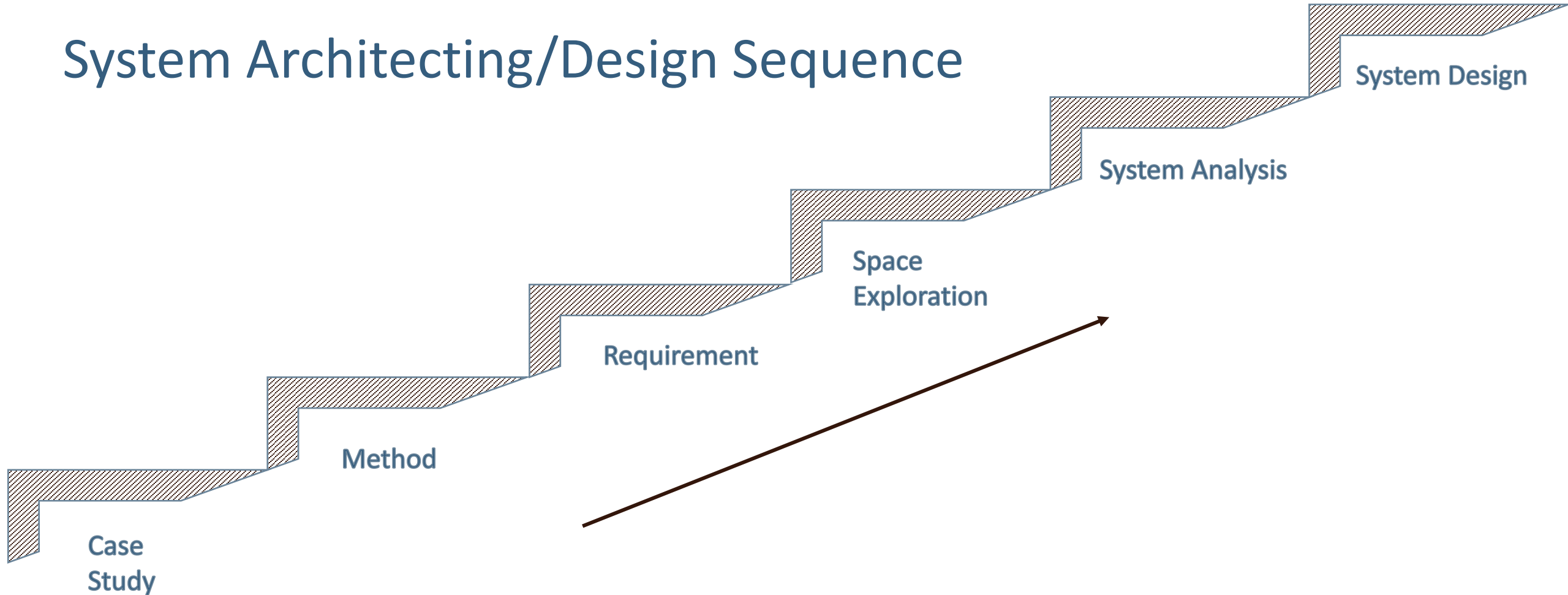
First term project

- Final project 1
- Eng: Mohamed Ayman Abd ElAziz Elgohary
- Project name: Pressure Sensor

Description

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

System Architecting/Design Sequence

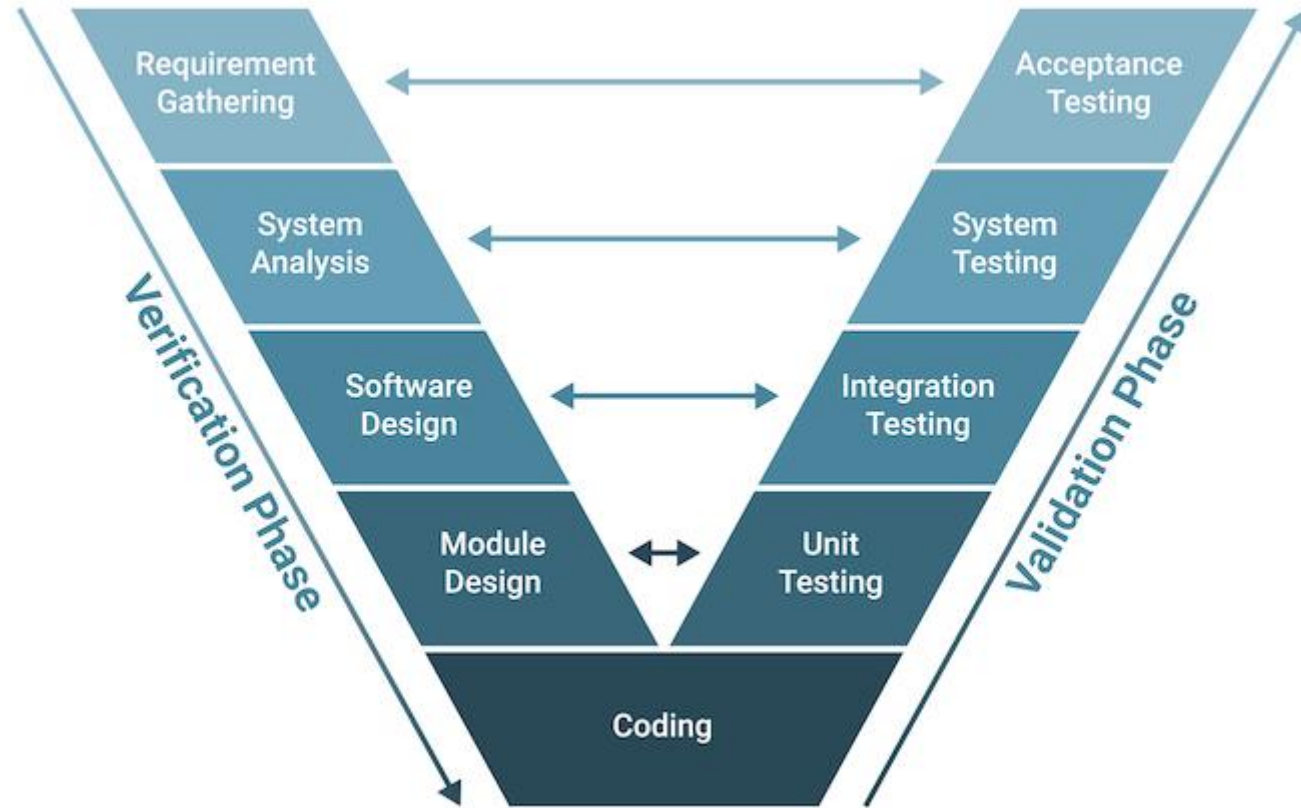


Case Study: a Pressure Controlling System

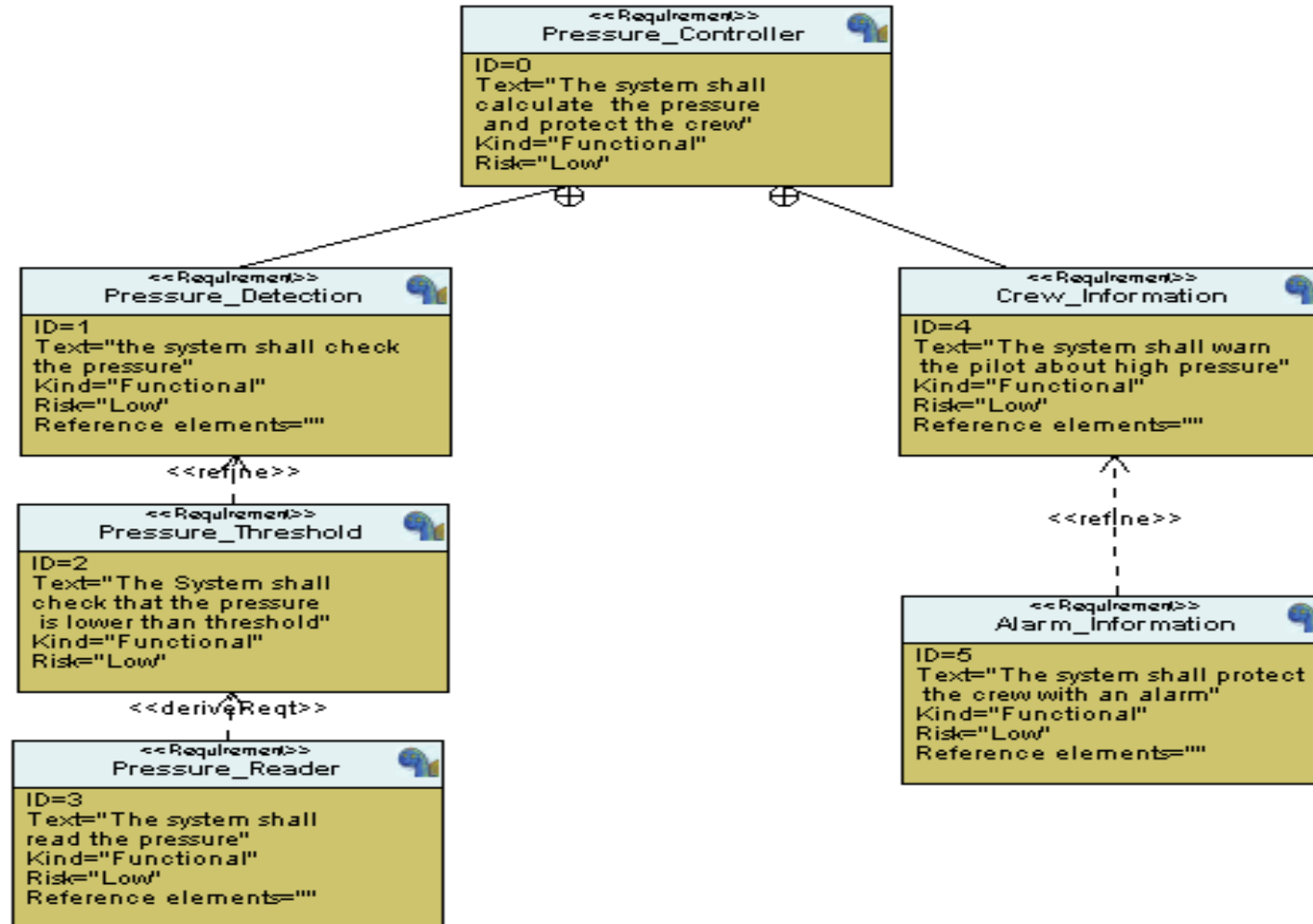
- A pressure controller informs the crew of a cabin with an alarm when the pressure exceeds 20 bars in the cabin
- The alarm duration equals 60 seconds.

Method

- V-Model

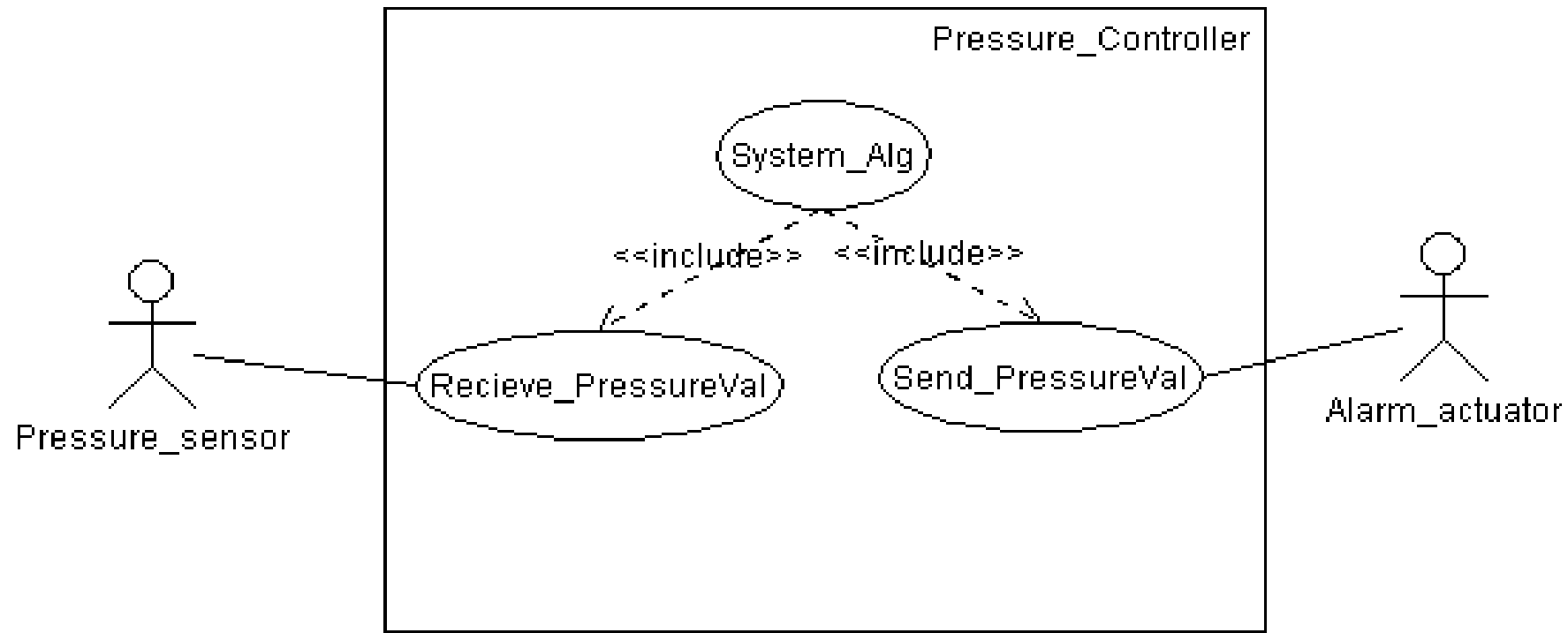


System Requirements



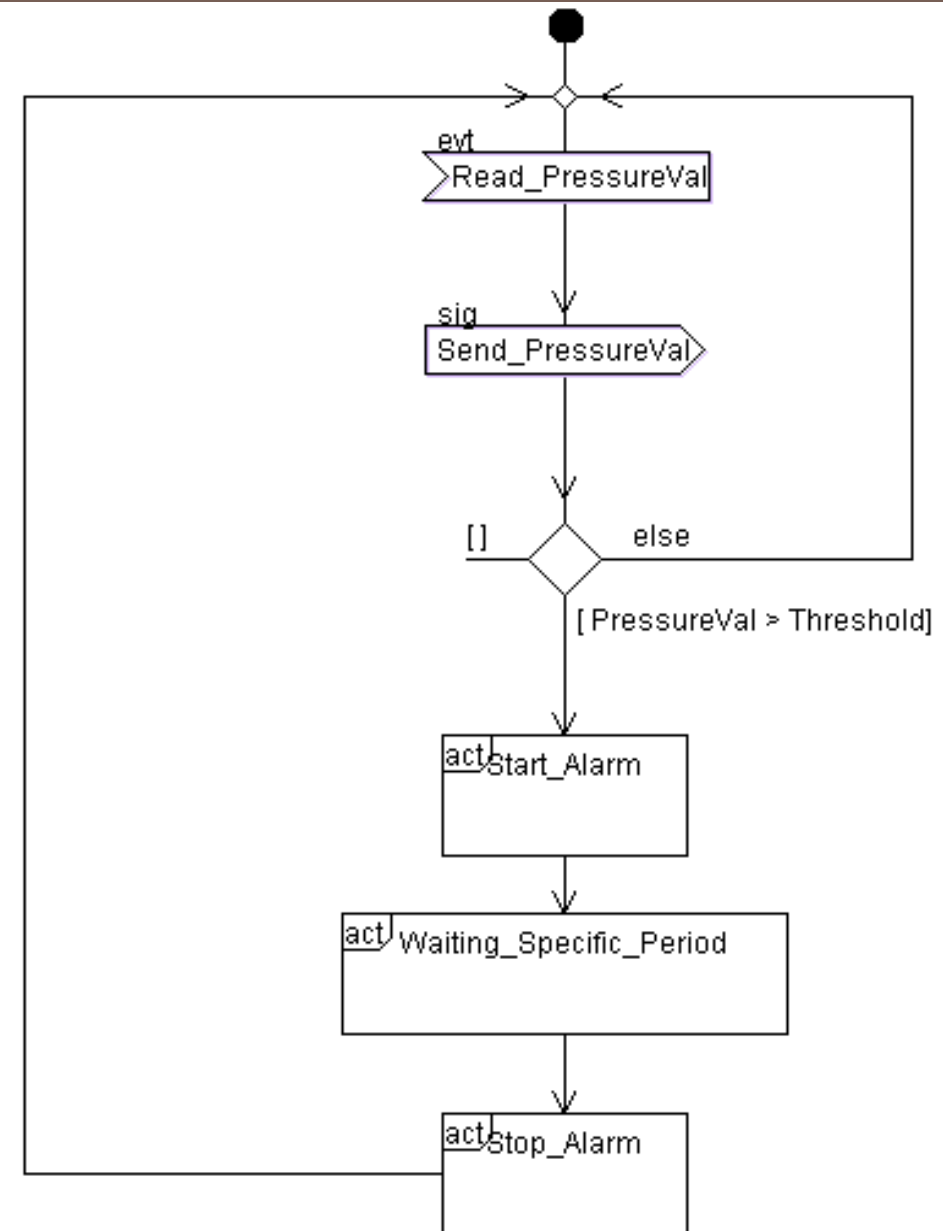
System Analysis

1- Use Case Diagram



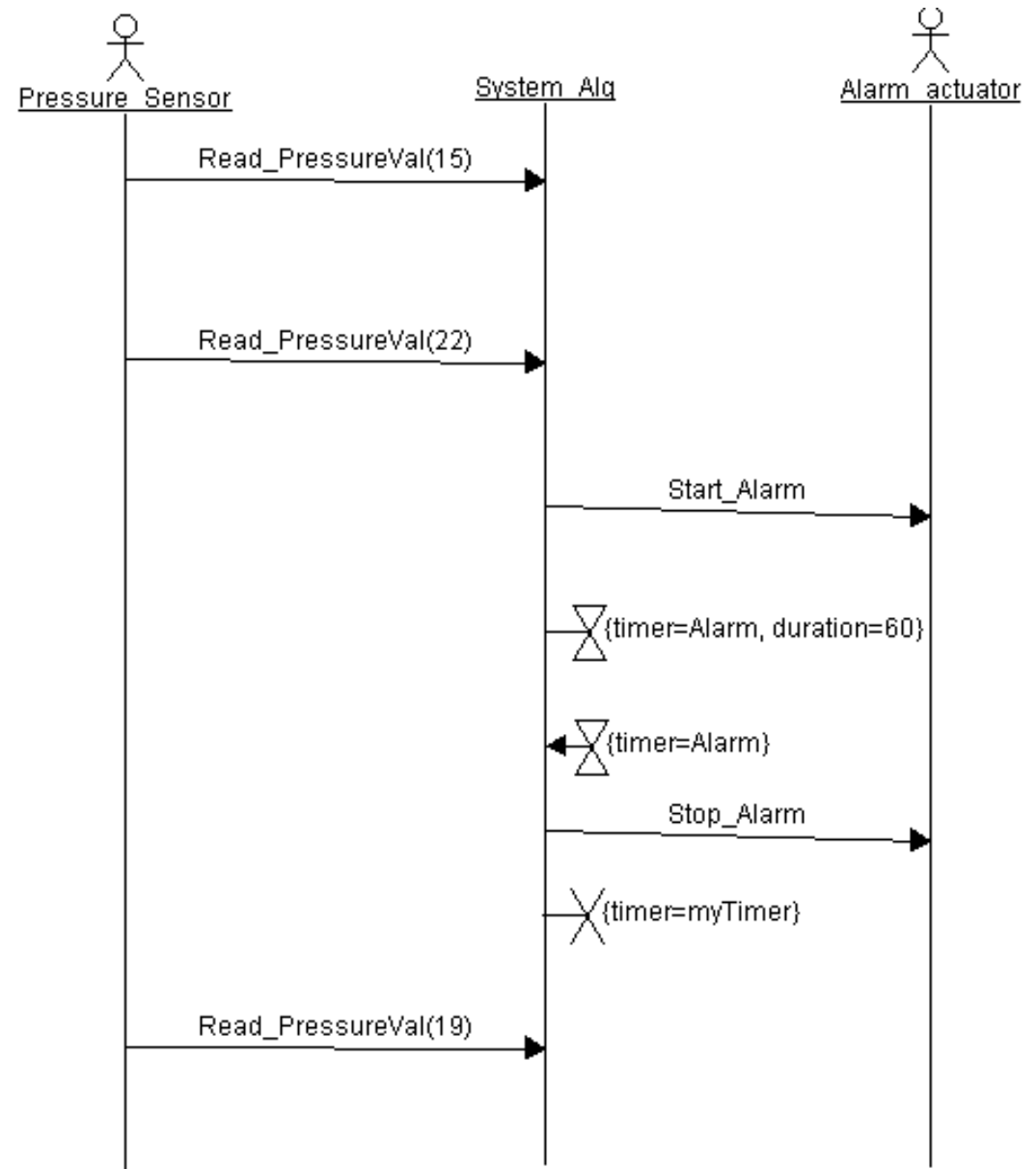
System Analysis

2- Activity Diagram



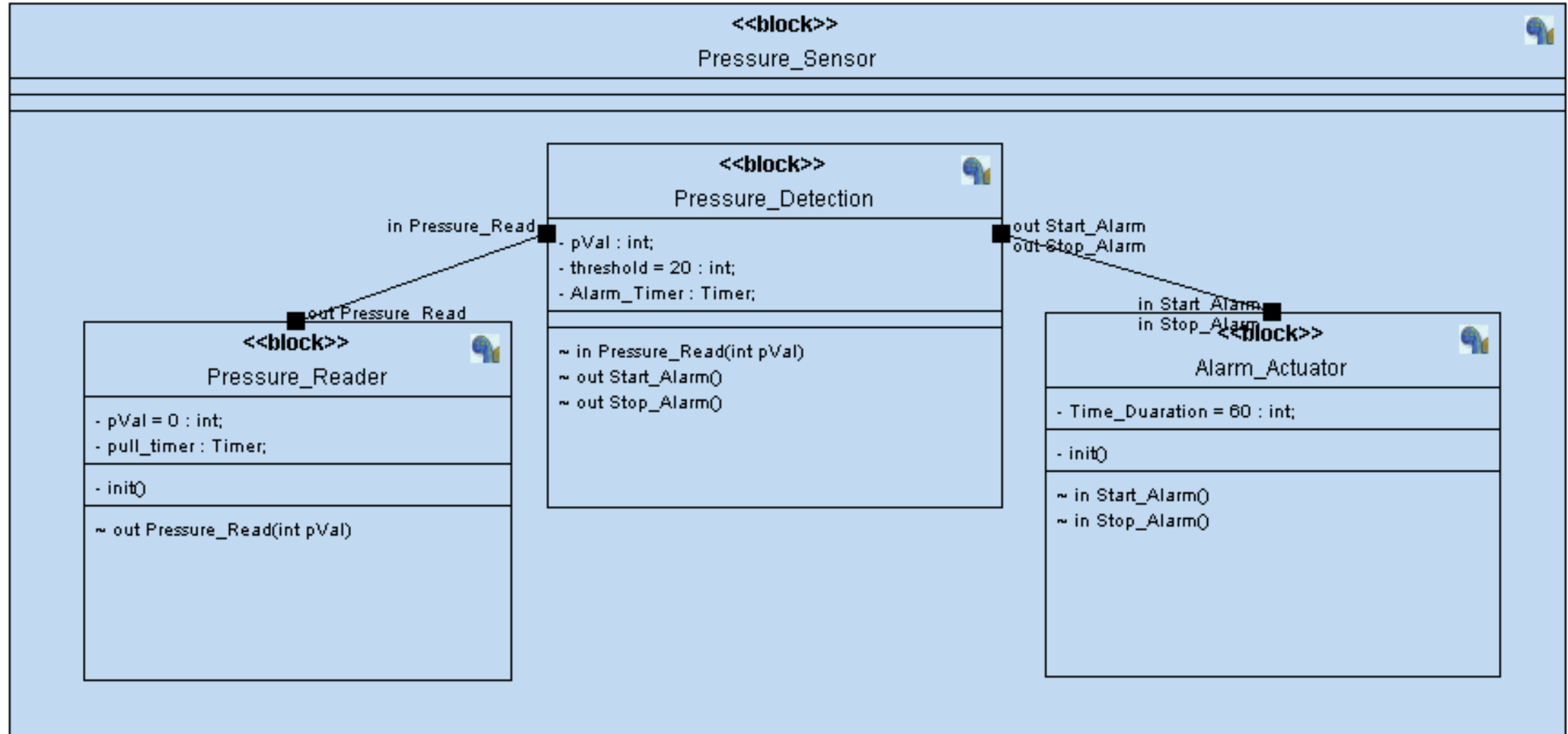
System Analysis

3- Sequence Diagram



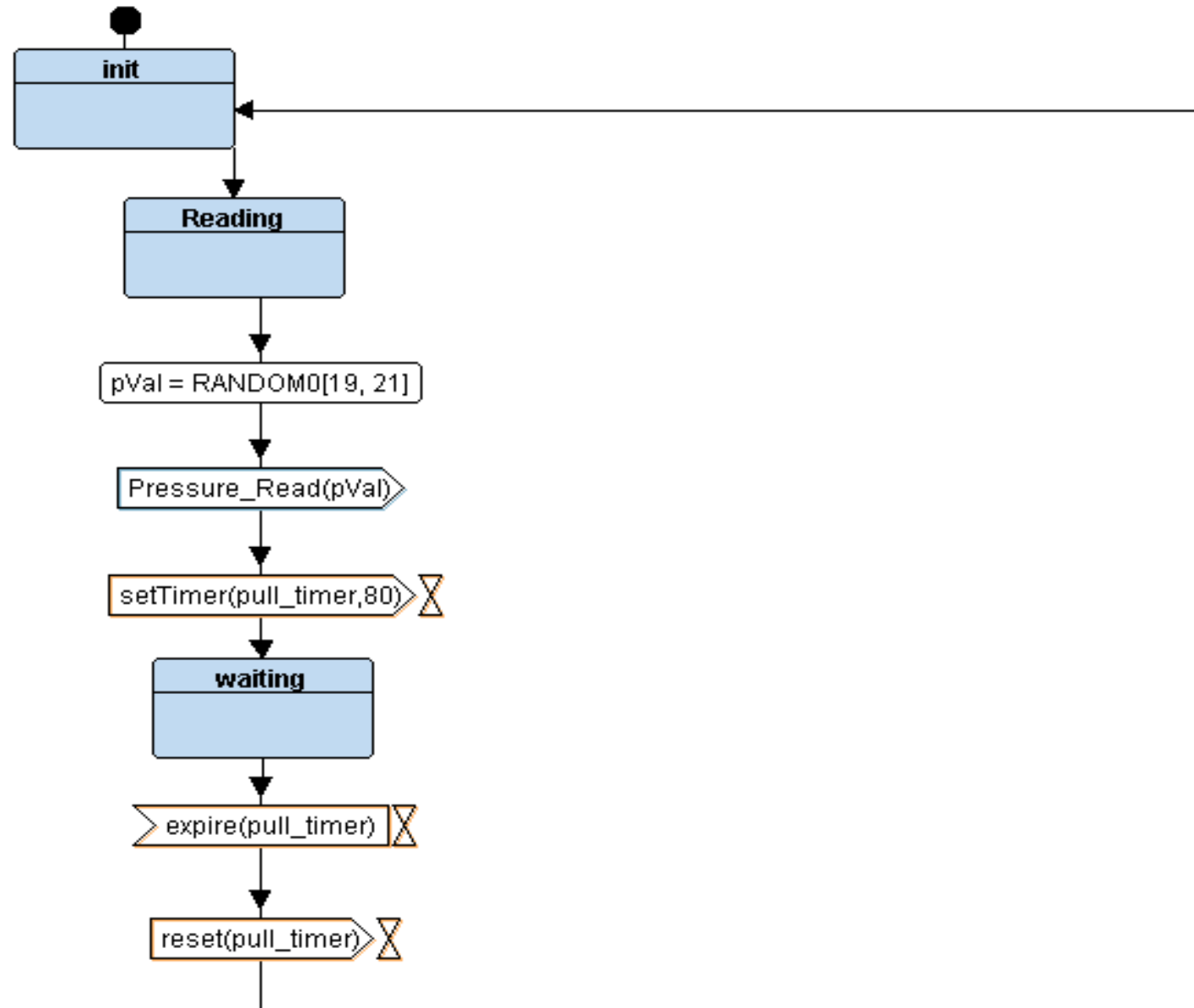
System Design

- Blocks



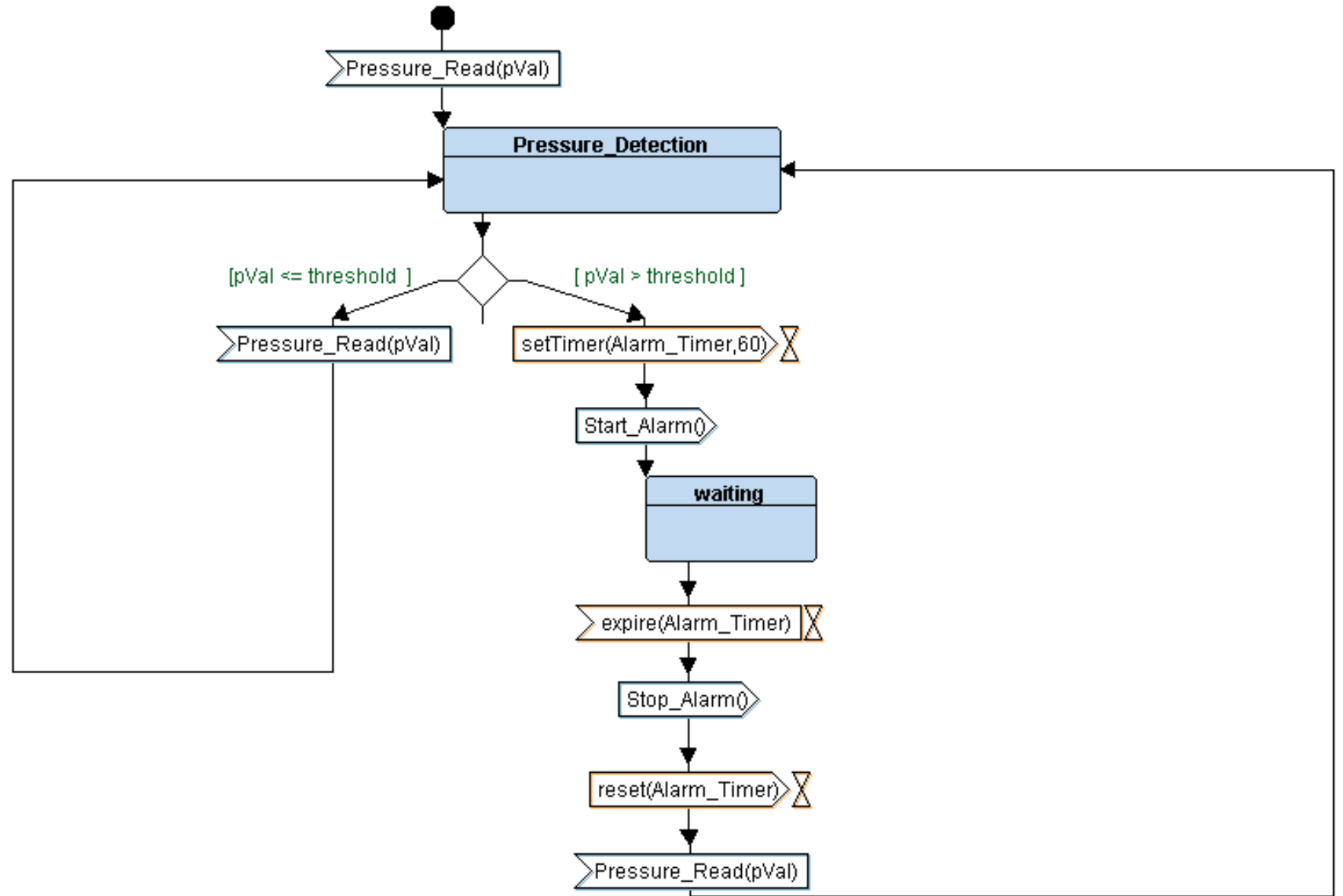
System Design

- Pressure Reader



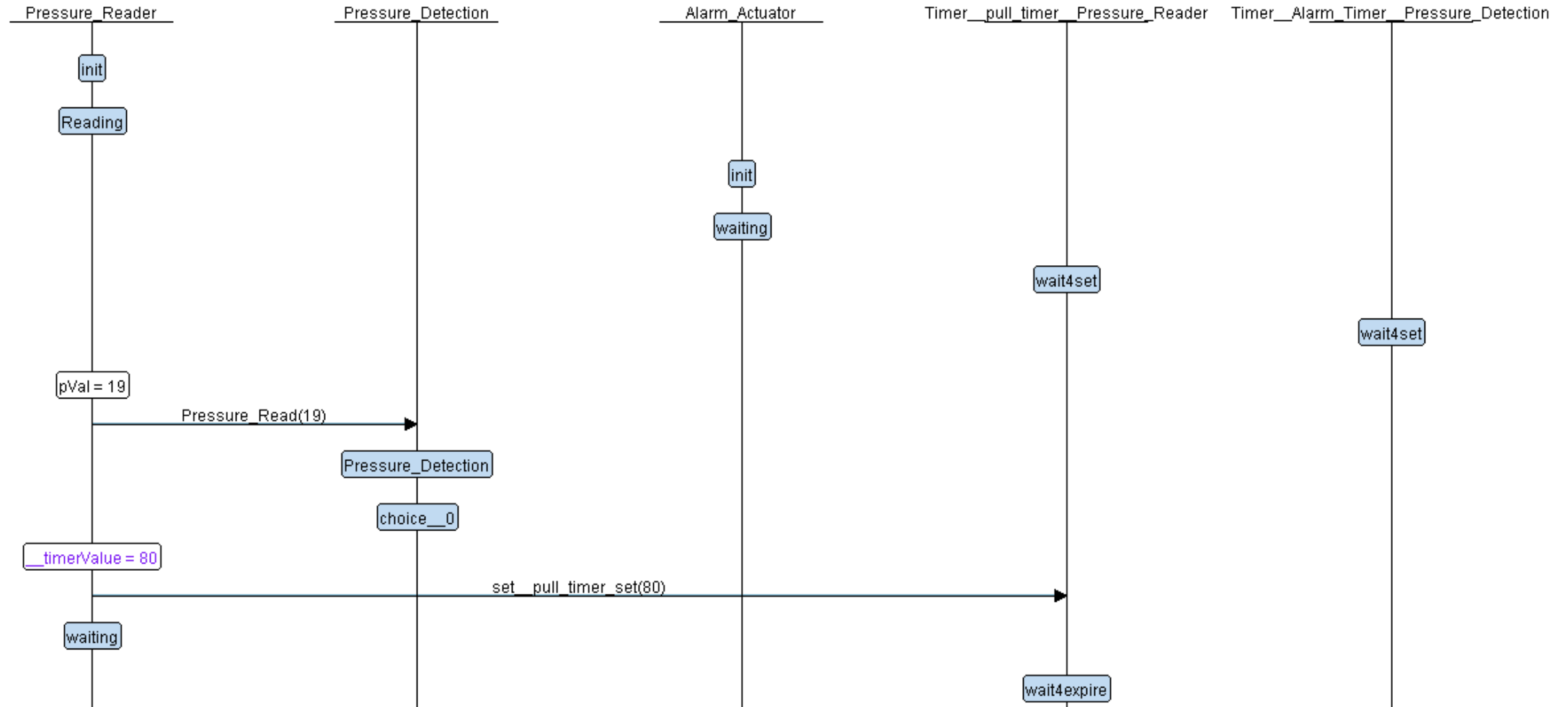
System Design

- Pressure Detection

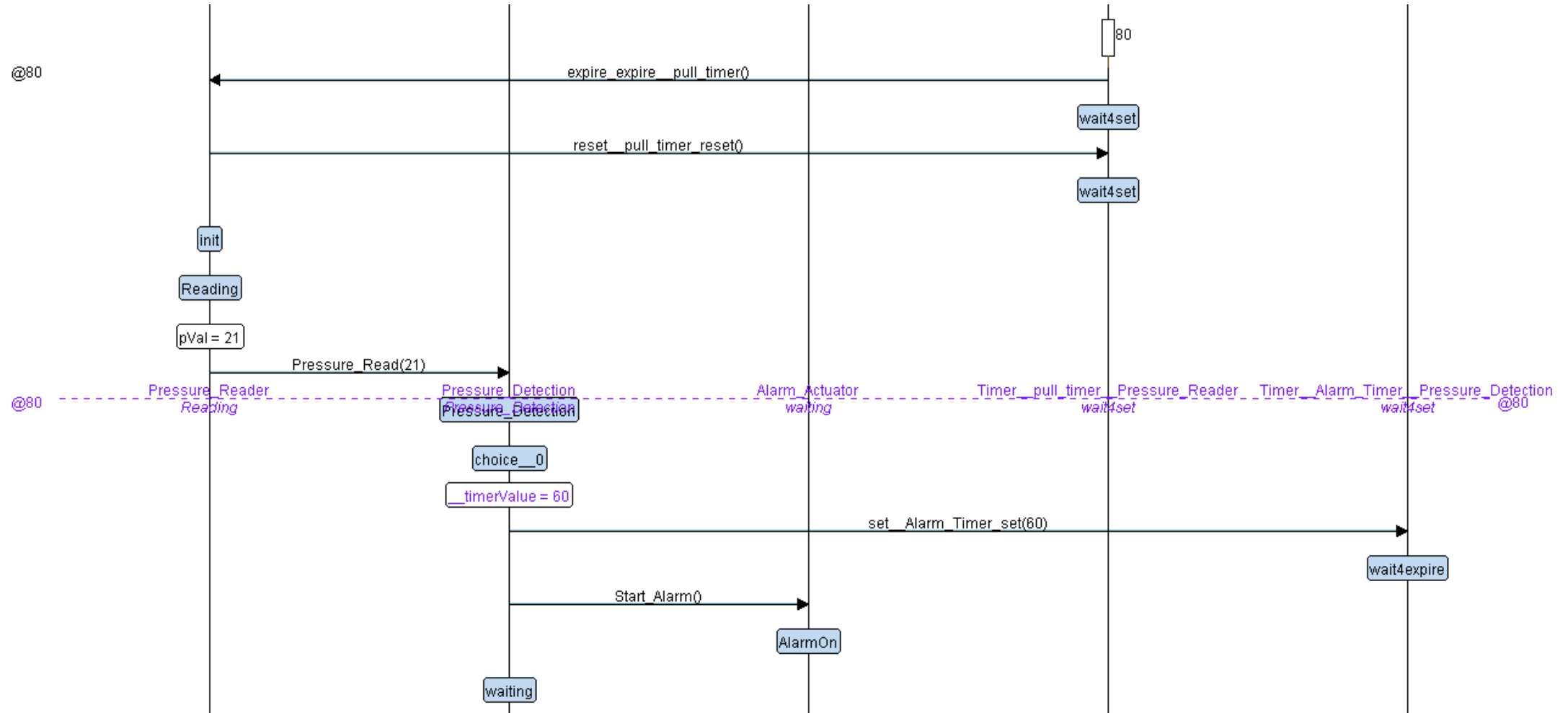


Logic Design

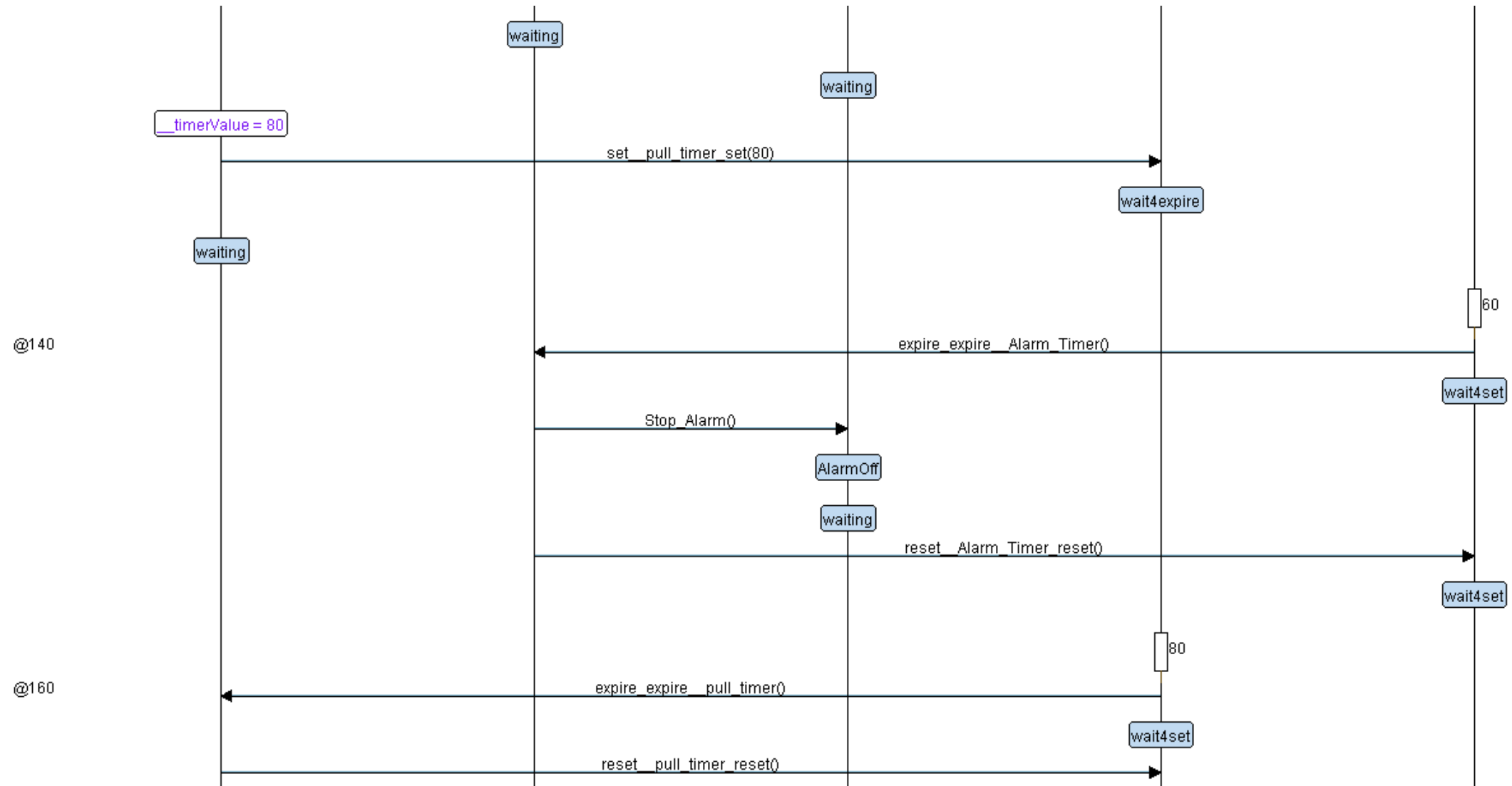
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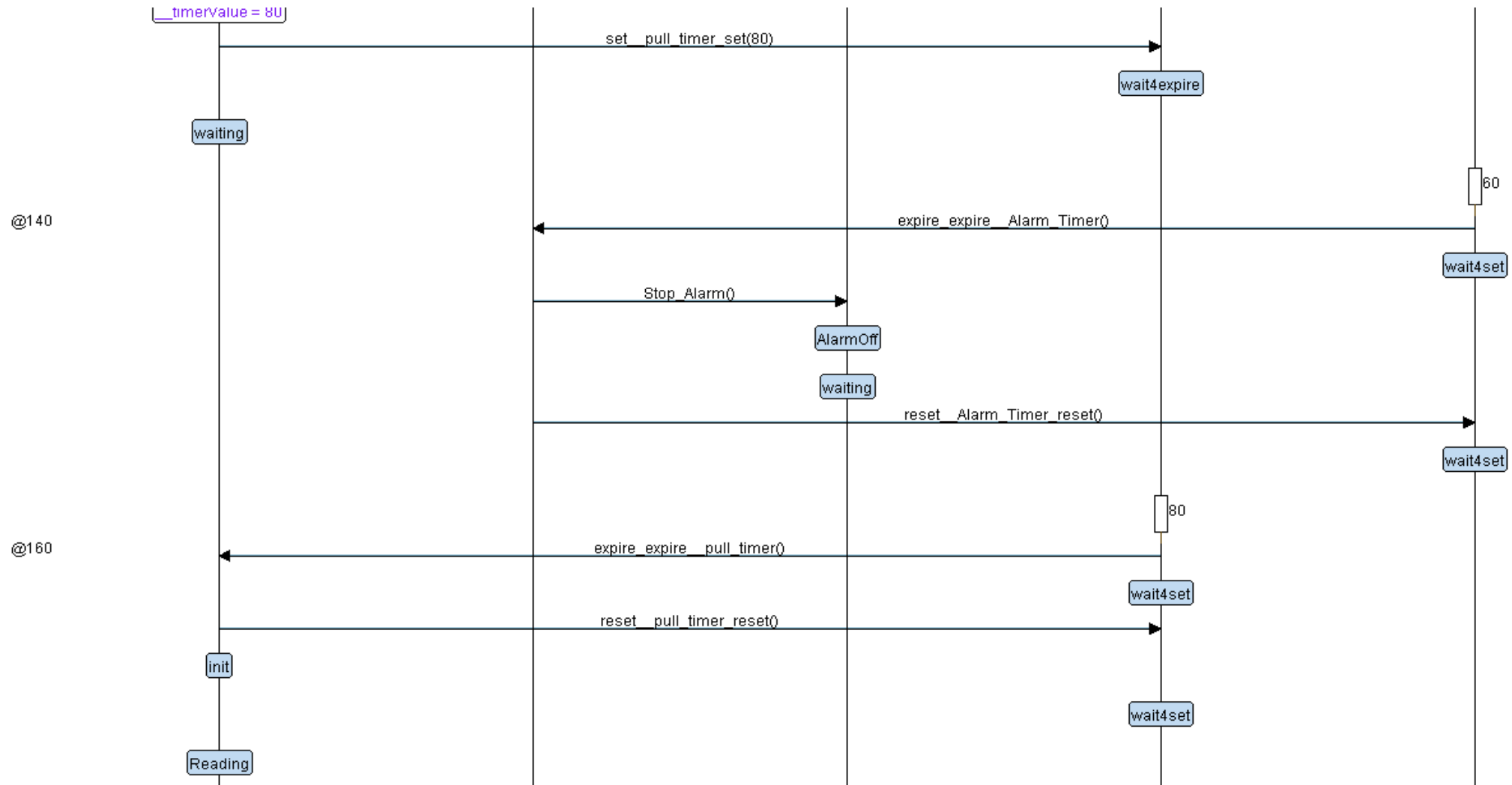
Logic Design



Logic Design



Logic Design



Program implementation

- .c&.h Files.
 - After system analysis and system design it is time to write the code
- .o Files.
 - And then execute the (.o) files
- .map&.elf Files.
 - And execute (.map), (.elf) and (. hex) files
- Section & Symbol tables.

Section table

```
MINGW64:/e/Embedded_Deploma/Projects/FirstTerm_projects/Project1_Pressure_Detection

iTECH@DESKTOP-K4E23LL MINGW64 /e/Embedded_Deploma/Projects/FirstTerm_projects/Pr
object1_Pressure_Detection
$ arm-none-eabi-objdump.exe -h Pressure_Sensor.elf

Pressure_Sensor.elf:      file format elf32-littlearm

Sections:
Idx Name          Size      VMA       LMA       File off  Algn
 0 .text          00000264  08000000  08000000  00008000  2**2
   CONTENTS, ALLOC, LOAD, READONLY, CODE
 1 .bss           00001004  20000000  08000264  00010000  2**2
   ALLOC
 2 .debug_info    000004e2  00000000  00000000  00008264  2**0
   CONTENTS, READONLY, DEBUGGING
 3 .debug_abbrev  000002a0  00000000  00000000  00008746  2**0
   CONTENTS, READONLY, DEBUGGING
 4 .debug_loc     000001dc  00000000  00000000  000089e6  2**0
   CONTENTS, READONLY, DEBUGGING
 5 .debug_aranges 000000c0  00000000  00000000  00008bc2  2**0
   CONTENTS, READONLY, DEBUGGING
 6 .debug_line    0000025a  00000000  00000000  00008c82  2**0
   CONTENTS, READONLY, DEBUGGING
 7 .debug_str     000001d8  00000000  00000000  00008edc  2**0
   CONTENTS, READONLY, DEBUGGING
 8 .comment       00000011  00000000  00000000  000090b4  2**0
   CONTENTS, READONLY
 9 .ARM.attributes 00000033  00000000  00000000  000090c5  2**0
   CONTENTS, READONLY
10 .debug_frame   00000174  00000000  00000000  000090f8  2**2
   CONTENTS, READONLY, DEBUGGING

iTECH@DESKTOP-K4E23LL MINGW64 /e/Embedded_Deploma/Projects/FirstTerm_projects/Pr
object1_Pressure_Detection
$ |
```

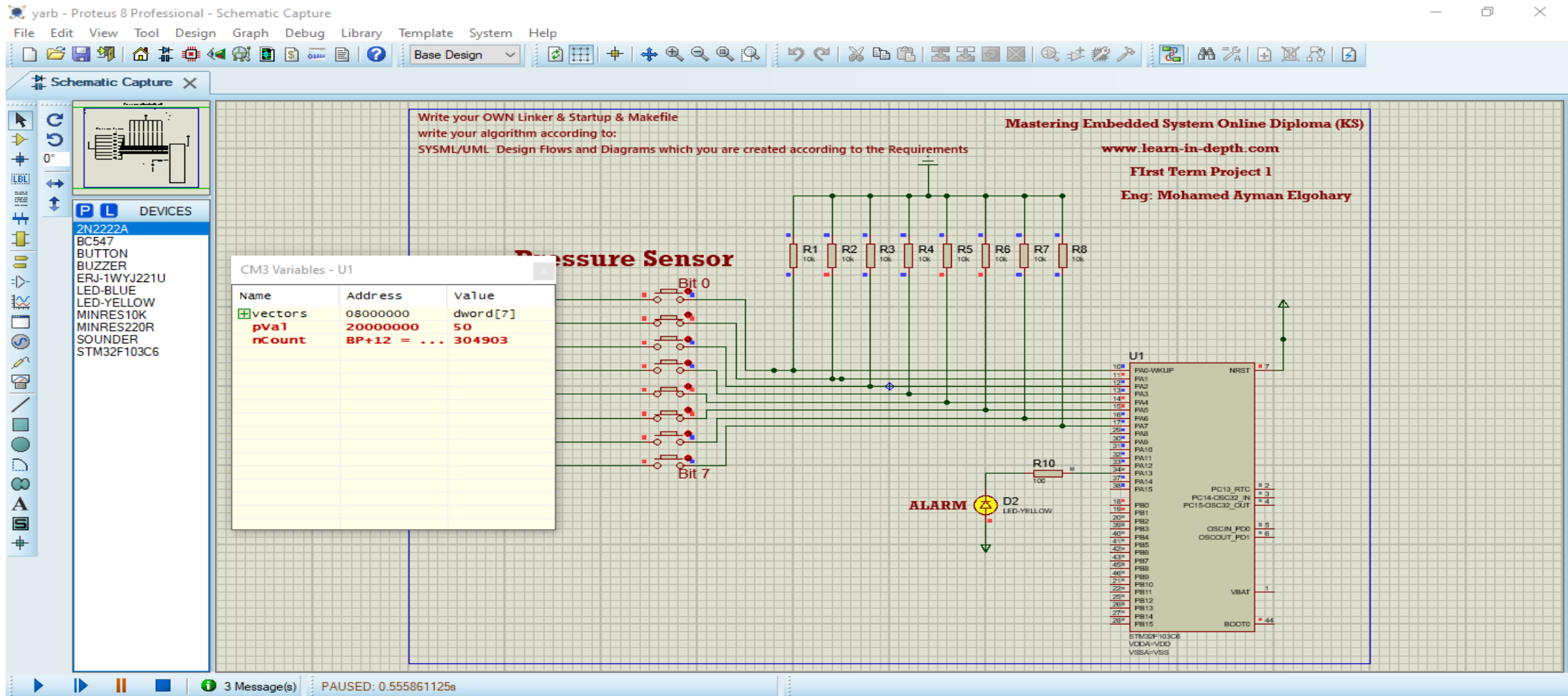
Symbol table

```
MINGW64:/e/Embedded_Deploa/Projects/FirstTerm_projects/Project1_Pressure_Detection

iTECH@DESKTOP-K4E23LL MINGW64 /e/Embedded_Deploa/Projects/FirstTerm_projects/Project1_Pressure_Detection
$ arm-none-eabi-nm.exe Pressure_Sensor.elf
20000004 B _E_bss
20000000 T _E_DATA
08000264 T _E_text
20000000 B _S_bss
20000000 T _S_DATA
20001004 B _stack_top
080001a8 W Bus_fault
080001a8 T Default_Handler
08000040 T Delay
08000064 T getPressureVal
080000cc T GPIO_INITIALIZATION
080001a8 W H_fault_Handler
0800014c T main
080001a8 W MM_fault_Handler
080001a8 W NMI_Handler
08000190 T Pressure_Reader
20000000 B pVal
080001b4 T Reset_Handler
0800007c T Set_Alarm_actuator
0800001c T Start_Alarm
080001a8 W Usage_fault_Handler
08000000 T vectors
08000168 T Waiting

iTECH@DESKTOP-K4E23LL MINGW64 /e/Embedded_Deploa/Projects/FirstTerm_projects/Project1_Pressure_Detection
$ |
```

Proteus Run



Proteus Run

yarb - Proteus 8 Professional - Schematic Capture

File Edit View Tool Design Graph Debug Library Template System Help

Schematic Capture

DEVICES

- 2N2222A
- BC547
- BUTTON
- BUZZER
- ERJ-1WYJ221U
- LED-BLUE
- LED-YELLOW
- MINRES10K
- MINRES220R
- SOUNDER
- STM32F103C6

CM3 Variables - U1

Name	Address	Value
Vectors	08000000	dword[7]
pva1	20000000	8
nCount	BP+12 = ...	745559

Pressure Sensor

Write your OWN Linker & Startup & Makefile
write your algorithm according to:
SYSML/UML Design Flows and Diagrams which you are created according to the Requirements

Mastering Embedded System Online Diploma (KS)
www.learn-in-depth.com
First Term Project 1
Eng: Mohamed Ayman Elgohary

Bit 0

Bit 7

ALARM

D2 LED-YELLOW

R10 100

U1

- 10M PAD-WKUP
- 11M PA1
- 12M PA2
- 13M PA3
- 14M PA4
- 15M PA5
- 16M PA6
- 17M PA7
- 20M PA8
- 30M PA9
- 31M PA10
- 32M PA11
- 33M PA12
- 34M PA13
- 35M PA14
- 36M PA15
- 18M PB0
- 19M PB1
- 20M PB2
- 21M PB3
- 40M PB4
- 41M PB5
- 42M PB6
- 43M PB7
- 44M PB8
- 45M PB9
- 22M PB10
- 23M PB11
- 24M PB12
- 25M PB13
- 26M PB14
- 27M PB15

PC13_RTC
PC14-OSC32_IN
PC15-OSC32_OUT

OSCIN_PD0
OSCOU_PD1

NRST

VBAT

BOOT0

STM32F103C6
VDDA-VDD
VSSA-VSS

3 Message(s) PAUSED: 00:00:05.354694