Mastering Embedded System
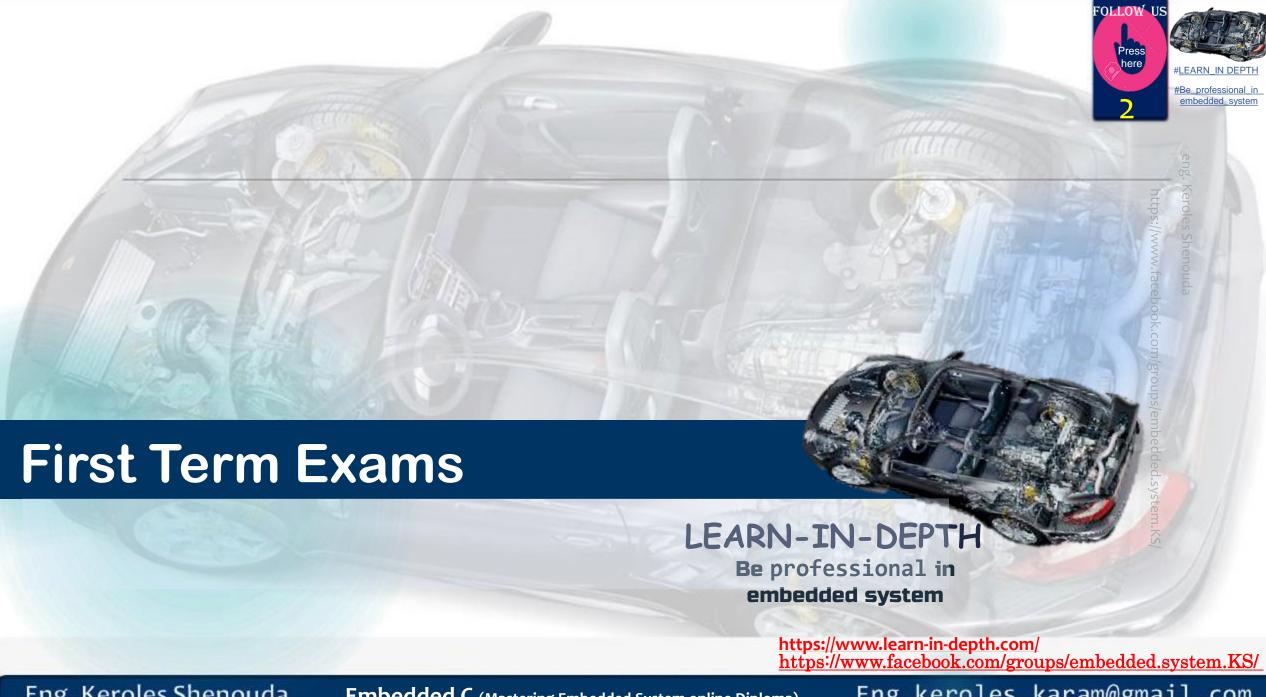
Online Diploma

- ✓ **Full lifetime access**
- ✓ **Access on Android mobile and PC (Windows)**
- ✓ **Certificate of completion**
- ✓ **12 Embedded Course**

First Term
Final Exam & Project

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First Term Exams
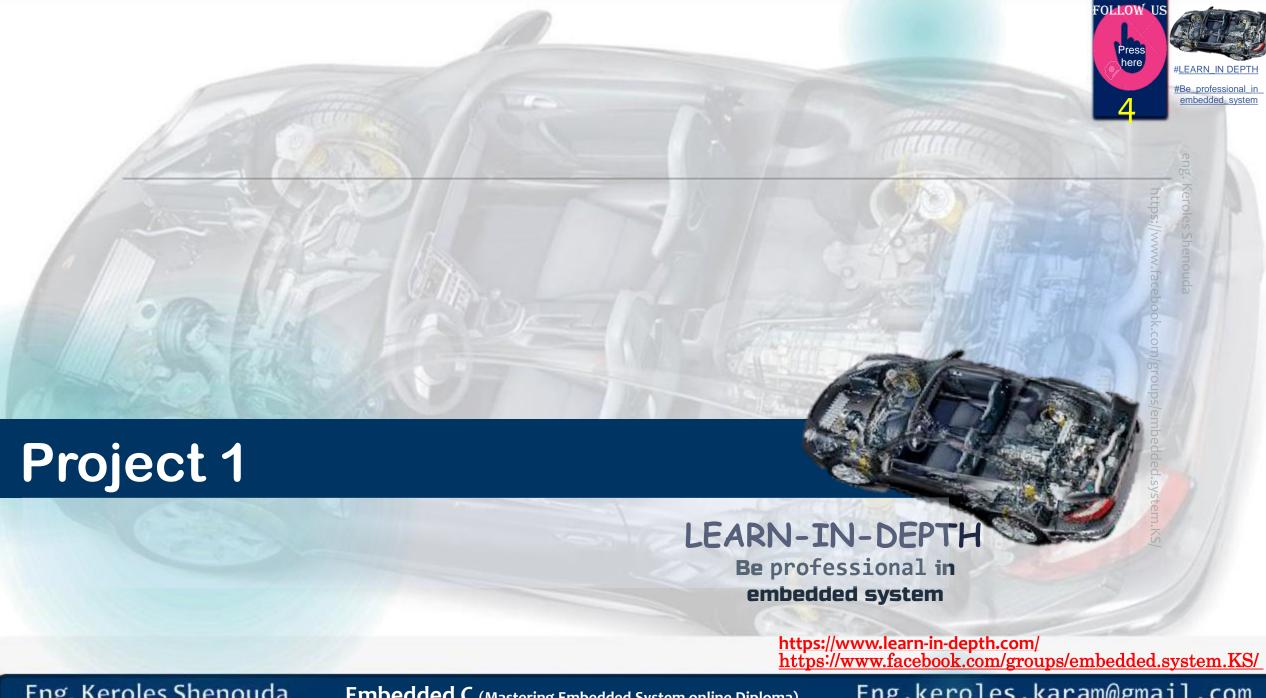
LEARN-IN-DEPTH

Be professional **in**
embedded system

You must enter those exams
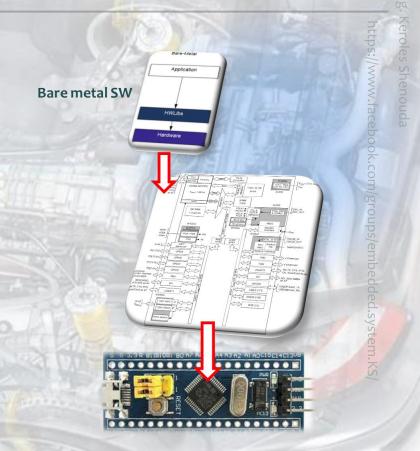
- Part 1 (each exam have a 30 MCQ)

- Part2 (each exam have a 30 MCQ)

- Part 3 (each exam have a 30 MCQ)

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Project 1

LEARN-IN-DEPTH

Be professional **in** **embedded system**

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Pressure Controller

► 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.

Bare metal SW

You have to create a report contains the following Word or Pdf or PowerPoint

▶ This report should have:

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Cover page

You have to create a report contains the following Word or Pdf or PowerPoint

▶ This report should have:

▶ **requirements Diagram**

<<Requirement>>
Pressure_Controller_KS
ID=0
Text="The System Shall protect the crew against high pressure"
Kind="Functional"
Risk="Low"
Reference elements=""

<<Requirement>>
HighPressureDetection
ID=1
Text="The System Shall Check the high pressure in the cabin"
Kind="Functional"
Risk="Low"
Reference elements=""

<<Requirement>>
CrewInformation
ID=4
Text="The System Shall to inform the crew when the cabin has a too high pressure "
Kind="Functional"
Risk="Low"
Reference elements=""

<<Requirement>>
OptionalStoringOfPressureValues
ID=6
Text="All monitored pressure values shall be stored by the software (optional requirement)"
Kind="Functional"
Risk="Low"
Reference elements=""

<<refine>>

<<Requirement>>
PressureThreshold
ID=2
Text="the System Shall check if the pressure is below a predefined threshold"
Kind="Functional"
Risk="Low"
Reference elements=""

<<Requirement>>
InformWithAlerm
ID=5
Text="The System will start Alram with AlramDuration=60S"
Kind="Functional"
Risk="Low"
Reference elements=""

<<refine>>

<<Requirement>>
FlashMemory
ID=7
...
a fifo inside FlashMemeory at Section "recordded_VAL_Section""
Kind="Functional"
Risk="Low"
Reference elements=""

<<deriveReqt>>

<<Requirement>>
Read_FromPressureSensor
ID=3
Text="The System Shall read from the pressure sensor "
Kind="Functional"
Risk="Low"
Reference elements=""

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You have to create a report contains the following Word or Pdf or PowerPoint

▶ This report should have:

   ▶ **requirements Diagram**

   ▶ **System Analysis**

      1. **Use Case Diagram**

      2. **Activity Diagram**

      3. **Sequence Diagram**

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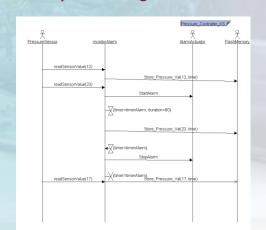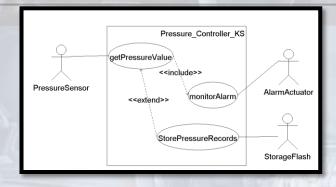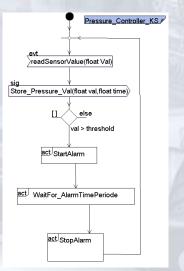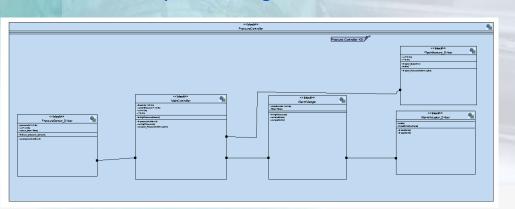<Enter your progress page URL in learn-in-depth.com>

Cover page

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        2. **Activity Diagram**

        3. **Sequence Diagram**

    ▶ **System Design (Modules with its own state machines)**

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My Profile:
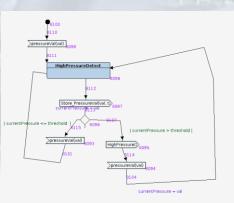<Enter your progress page URL in learn-in-depth.com>

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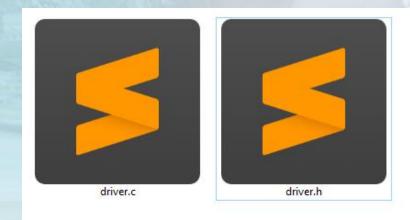
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   2. Activity Diagram

   3. Sequence Diagram

▶ **System Design (Modules with its own state machines)**

▶ **You have to write Embedded C Codes consists of Modules**

   ▶ .c & .c for each module

   ▶ MakeFile

   ▶ Startup.c

   ▶ Linker.ld

You will need

Startup.s

Linker Script

C Code files Bare metal SW

Cross Toolchain

Makefile

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You have to create a report contains the following Word or Pdf or PowerPoint

▶ In the driver.c file we provide the following APIS

  ▶ void Delay(int nCount);

  ▶ int getPressureVal();

  ▶ void Set_Alarm_actuator(int i);

  ▶ void GPIO_INITIALIZATION ();

driver.c   driver.h
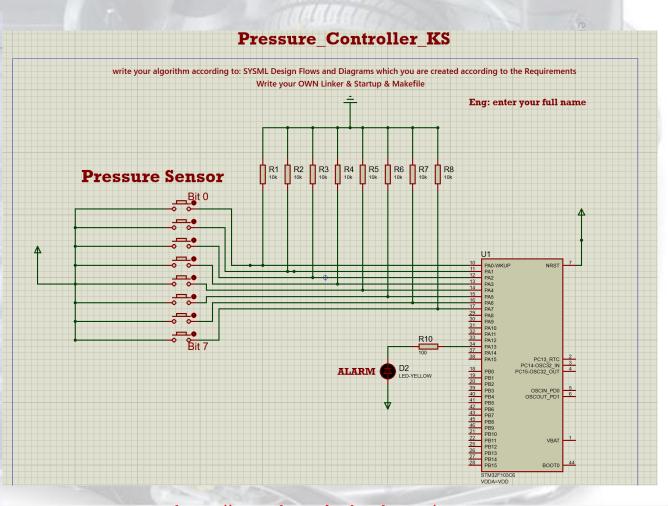
```c
1   #include <stdint.h>
2   #include <stdio.h>
3
4   #include "driver/driver.h"
5
6   int main (){
7       GPIO_INITIALIZATION();
8       while (1)
9       {
10          //Implement your Design
11      }
12
13  }
```

main.c

You have to create a report contains the following Word or Pdf or PowerPoint

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    ▶ **Startup.c**

    ▶ **Linker.ld**

▶ **Put an Image for each file.C & file.h with the Corresponding state machine**

▶ **Put the Simulation results with description**

Pressure_Controller_KS

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

Eng: enter your full name

Pressure Sensor

Bit 0

Bit 7

R1 10k R2 10k R3 10k R4 10k R5 10k R6 10k R7 10k R8 10k

R10 100

ALARM D2 LED-YELLOW

U1
PA0-WKUP NRST
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PA8
PA9
PA10
PA11
PA12
PA13
PA14
PA15   PC13_RTC
PB0   PC14-OSC32_IN
PB1   PC15-OSC32_OUT
PB2
PB3   OSCIN_PD0
PB4   OSCOUT_PD1
PB5
PB6
PB7
PB8
PB9
PB10
PB11   VBAT
PB12
PB13
PB14
PB15   BOOT0
STM32F103C6
VDDA=VDD

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You have to create a report contains the following Word or Pdf or PowerPoint

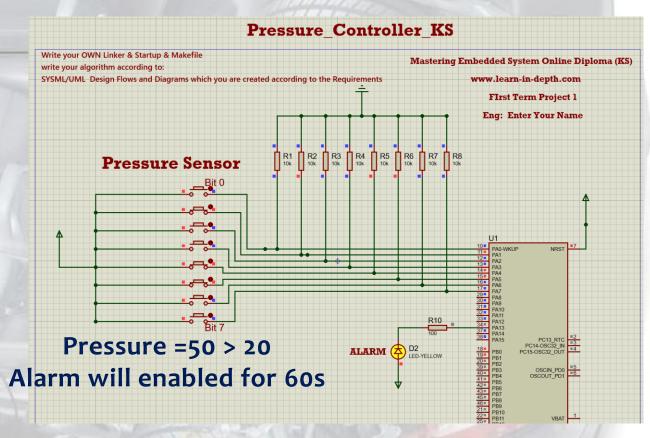▶ This report should have:

   ▶ **requirements Diagram**

   ▶ **System Analysis**

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     2. Activity Diagram

     3. Sequence Diagram

   ▶ **System Design (Modules with its own state machines)**

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     ▶ Linker.ld

▶ **Put an Image for each file.C & file.h with the Corresponding state machine**

▶ **Put the Simulation results with description**

Pressure_Controller_KS

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

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FIrst Term Project 1

Eng: Enter Your Name

Pressure Sensor

R1 10k R2 10k R3 10k R4 10k R5 10k R6 10k R7 10k R8 10k

Bit 0

Bit 7

U1
PA0-WKUP
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PA8
PA9
PA10
PA11
PA12
PA13
PA14
PA15
NRST
R10 100
ALARM D2 LED-YELLOW
PB0
PB1
PB2
PB3
PB4
PB5
PB6
PB7
PB8
PB9
PB10
PB11
PC13_RTC
PC14-OSC32_IN
PC15-OSC32_OUT
OSCIN_PD0
OSCOUT_PD1
VBAT

Pressure =50 > 20
Alarm will enabled for 60s

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You have to create a report contains the following Word or Pdf or PowerPoint

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    ▶ Linker.ld

▶ **Put an Image for each file.C & file.h with the Corresponding state machine**

▶ **Put the Simulation results with description**

▶ **Generate SW analysis .map file & symbols table & Section taples**

Pressure_Controller_KS

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

Mastering Embedded System Online Diploma (KS)
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FIrst Term Project 1
Eng: Enter Your Name

Pressure Sensor

R1 10k R2 10k R3 10k R4 10k R5 10k R6 10k R7 10k R8 10k

Bit 0
Bit 7

R10 100

ALARM
D2 LED-YELLOW

U1
PA0-WKUP NRST
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PA8
PA9
PA10
PA11
PA12
PA13
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PA15
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PB9
PB10
PB11
PC13_RTC
PC14-OSC32_IN
PC15-OSC32_OUT
OSCIN_PD0
OSCOUT_PD1
VBAT

**Pressure =50 > 20
Alarm will enabled for 60s**

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Project 1 delivery

▶ Finaly you have to put on the Project Post :

  ▶ the GitHUP link for your first term project

  ▶ Upload the report on your githup repo and put also the url in a comment