Mastering Embedded System Online Diploma

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Github link : https://github.com/adem-marangoz/embedded_system_online_diploma

Drive link : https://drive.google.com/drive/u/1/folders/1U3Q9VHS_tJPKSbI_HdIscY9tNFQn_E6a

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❖ Requirements:

Doing a pressure measurement in the pilot's cabin, and when the pressure is reached to a specific measurement, it alerts the people in the cabin

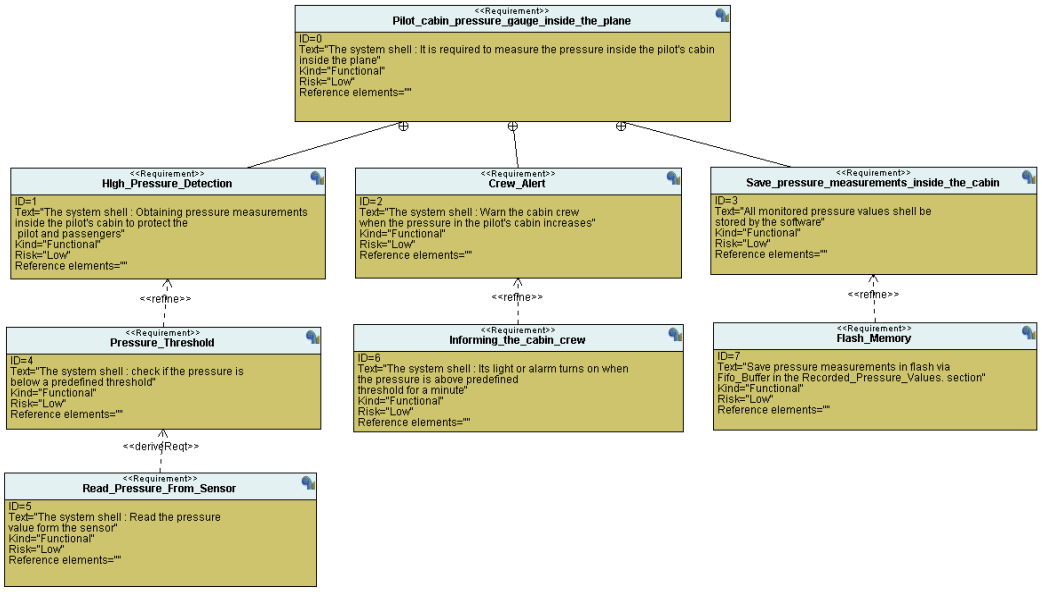
❖ Using Multiple Modules:

In this system, we used 4 models to run the project, the systems are divided into: the pressure measurement system, the system algorithm system, the time control system and finally the alarm control system

❖ Method :

In this project, we used this method : waterfall model

❖ A requirement node identifies a requirement by:



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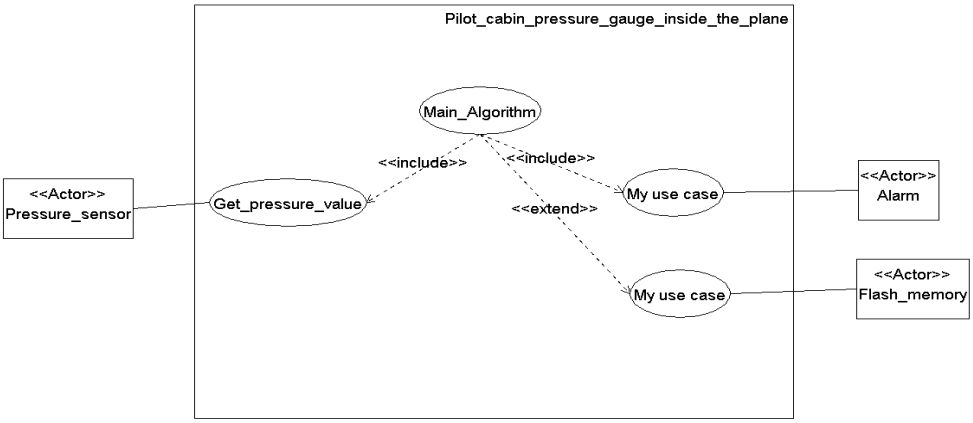
❖ System Analysis :

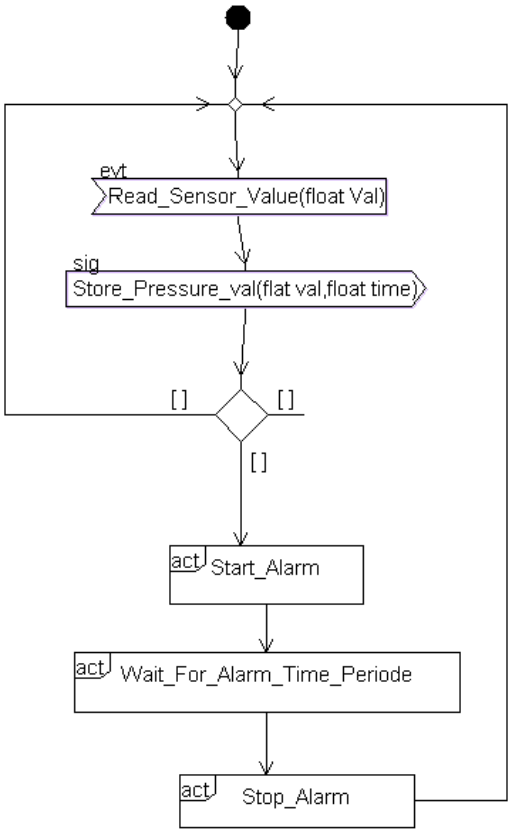
1- Use Case Diagram

This diagram define the boundary of the system and shows the input and output of the system



2- Activity Diagram

In this activity diagrams describe the workflow behaviour of a system



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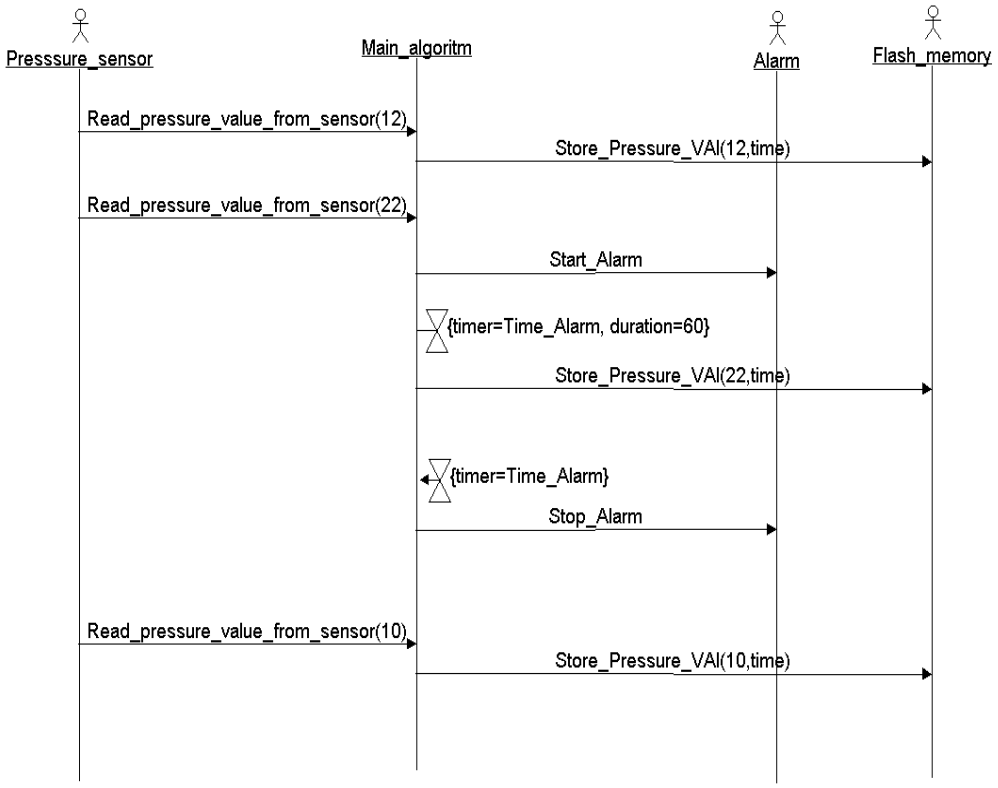
3- Sequence Diagram

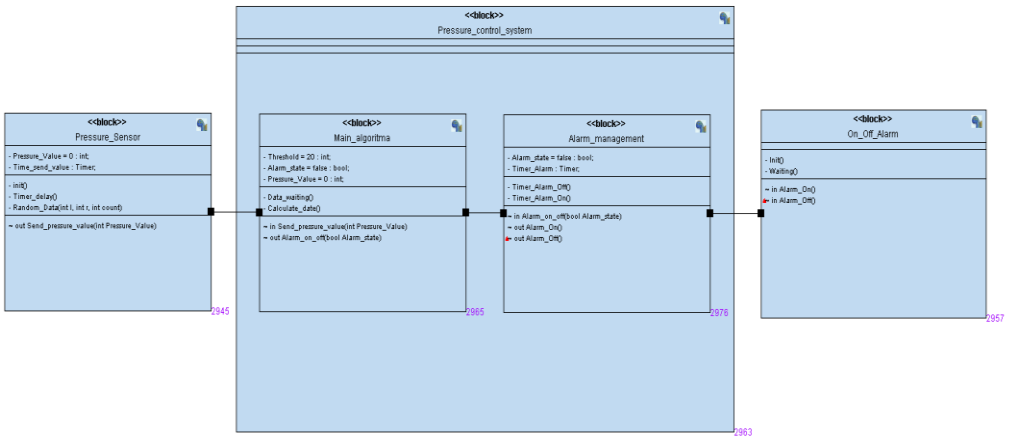
Interaction diagram showing how the system works



❖ System Design :

- Block Diagram

Through these blocks, we can see the models that make up the system, and we can see the inputs and outputs of any block



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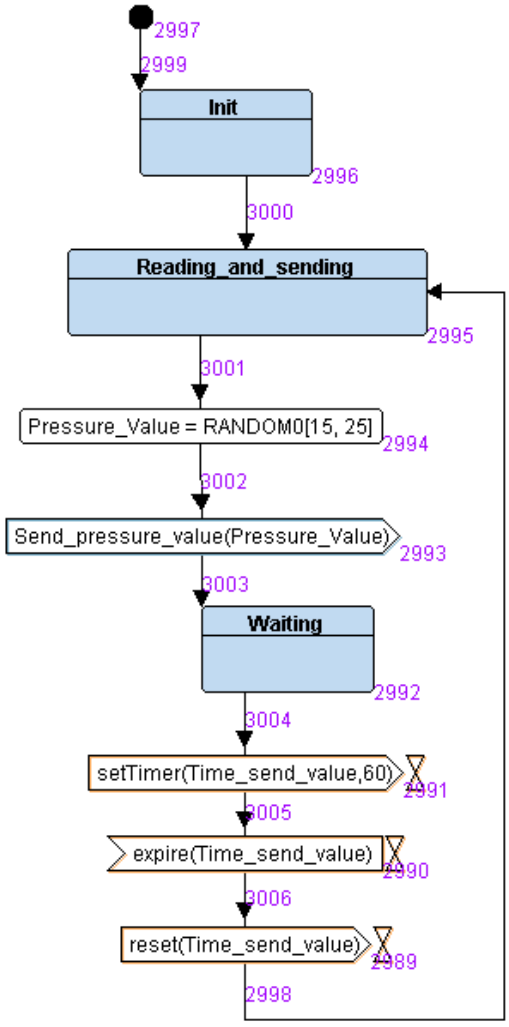
- State Machine of Pressure sensor

  At first, we configure the pressure sensor, then it moves to the process of reading the cabin pressure and sending it to the algorithm block and then entering the idle state until the other reading of the sensor



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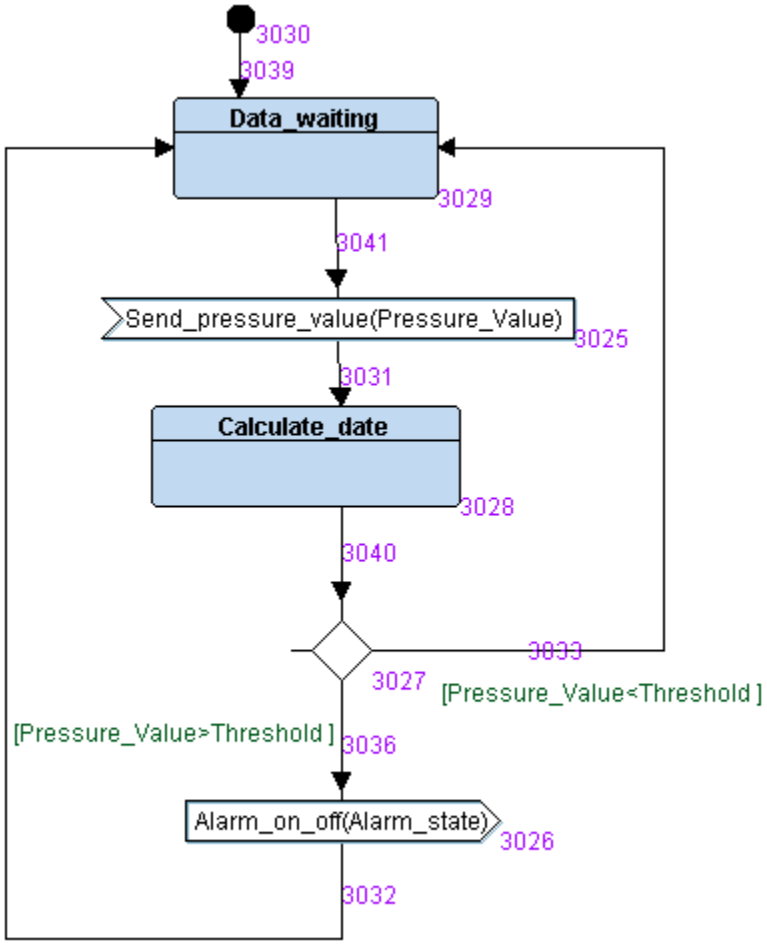
- State Machine of Main algorithm

  Here the model receives the values of the pressure sensor and the measurement with arithmetic operations to calculate the pressure. If the pressure is above the permissible limit, it sends a signal to the time model, otherwise it enters from the inactivity period until another value from the pressure model arrives



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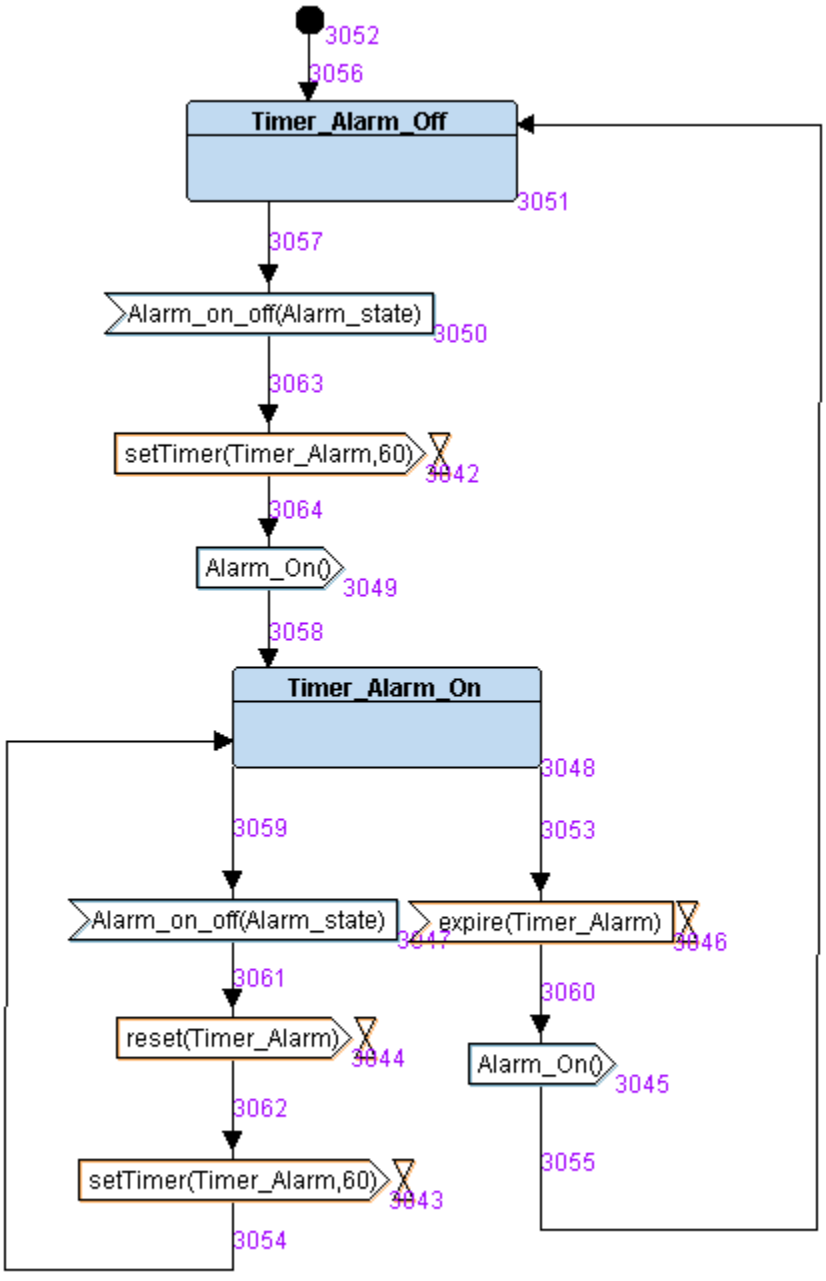
- State Machine of Timer

  Here, the model receives a signal from the algorithm model to start the timer to count for 60 seconds. It also sends a signal to the alarm model. When the timer reaches 60 seconds, the counter stops and sends another signal to the alarm model and then goes to the idle state, waiting for another signal from the algorithm model.



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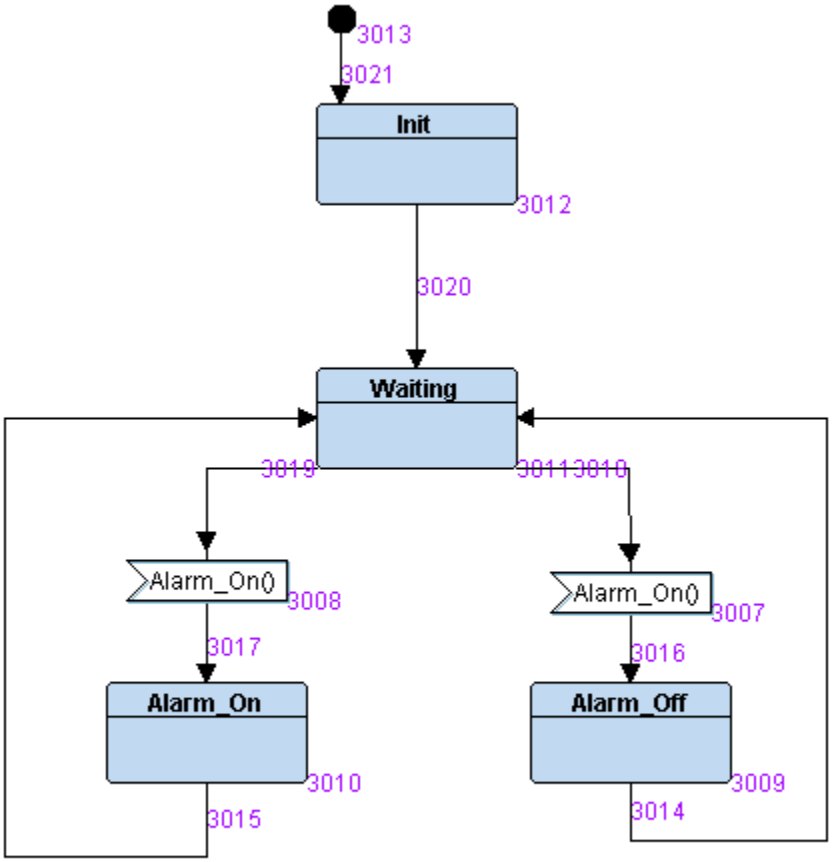
- State Machine of Alarm

  At first, we configure the alarm, and then here, the alarm model receives a signal from the timer model, to turn on the alarm and when a signal to turn it off. After entering the off state, then it turns into a idle state, waiting for another signal from the timer model



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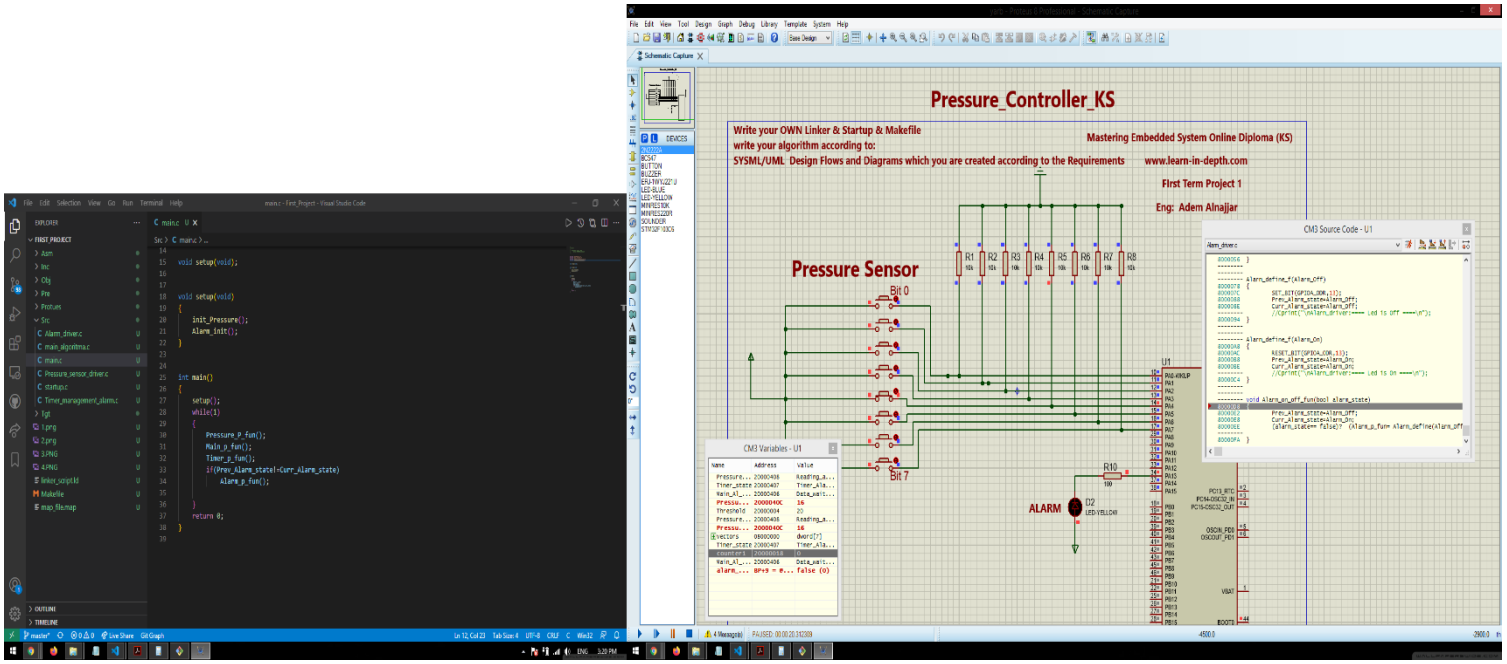
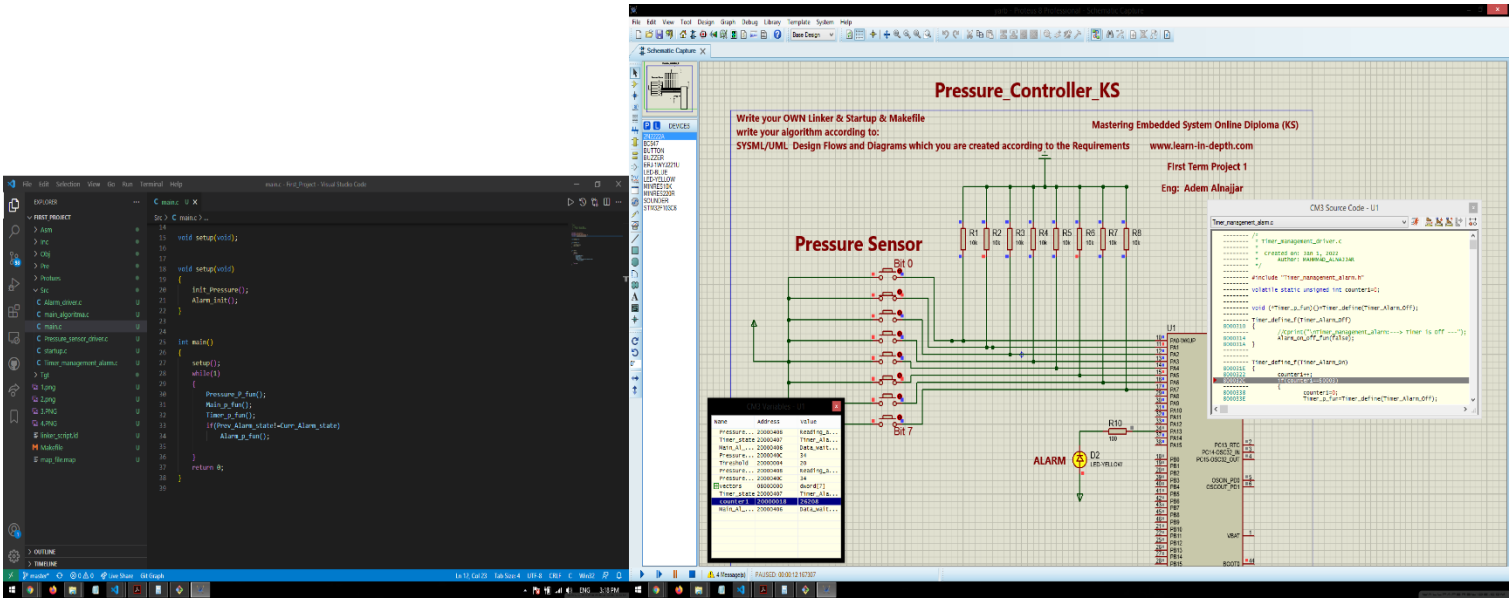
❖ Simulation :





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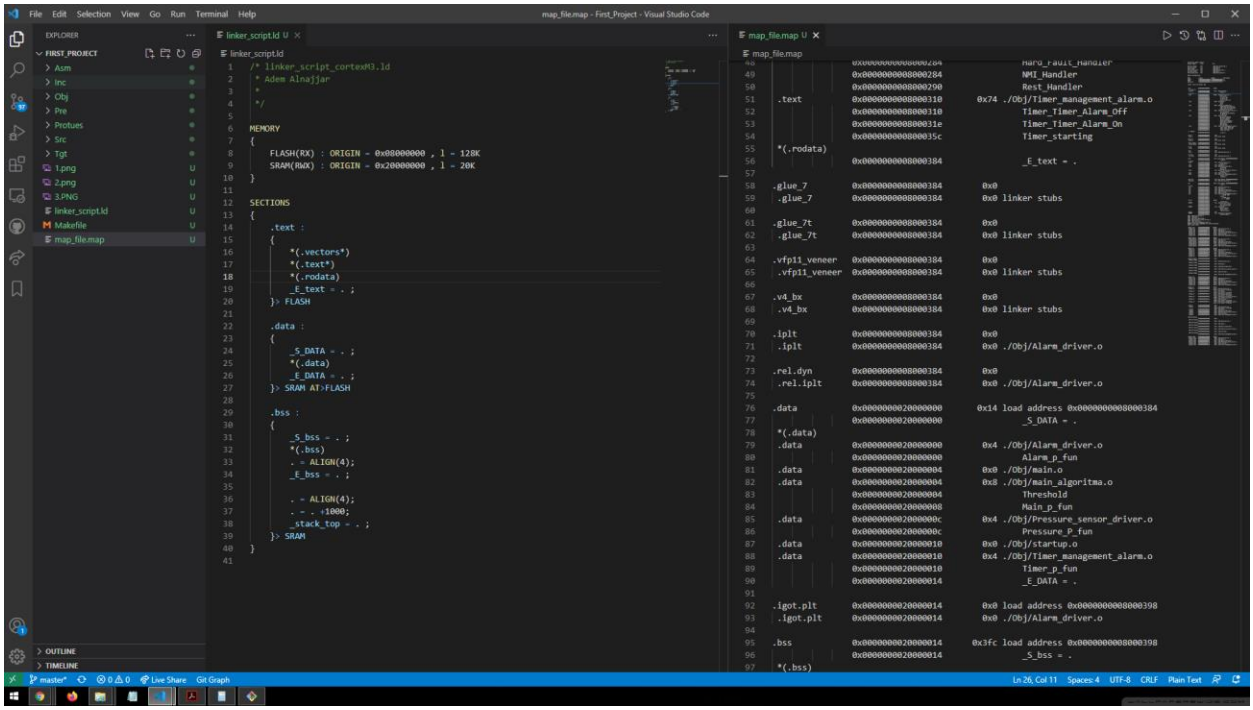
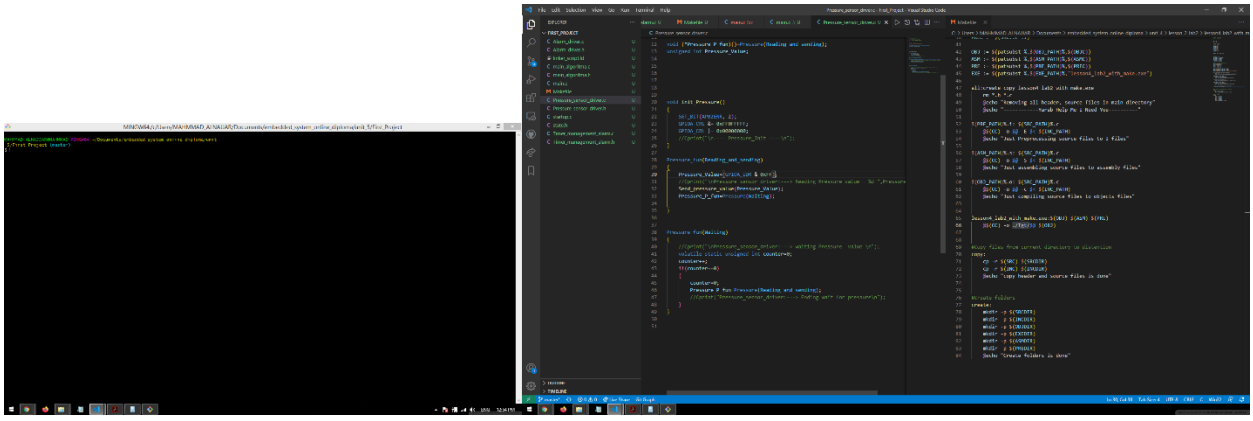
In the images below, some information about the types of data within the system appears in the map file, as well as the linker script code



Linker Script and map file



Pressure file and Make file

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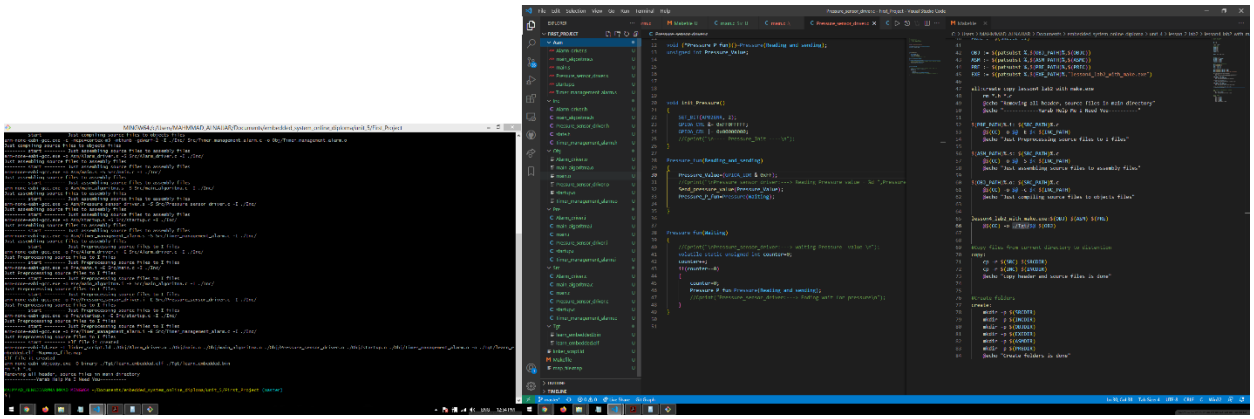

Picture while running make