**Mastering Embedded System Online Diploma**

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**First Term (Final Project 1 )**

**Eng. Mostafa AboSalama**

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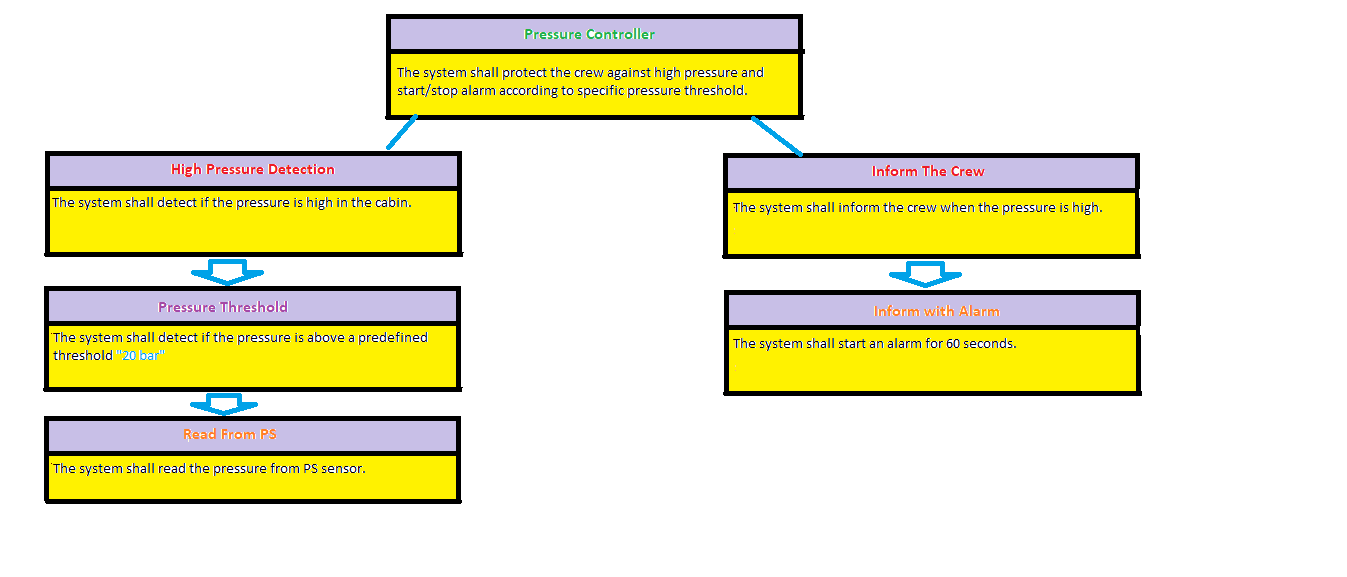
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**1. Requirements**

The client specifies that the system should trigger an alarm when the pressure in the cabin exceeds 20 bars. The alarm should last for 60 seconds.

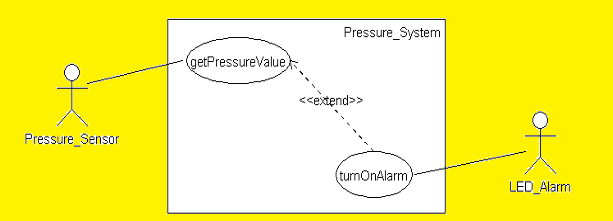
**2. Requirement Diagram**

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**3. System Analysis**

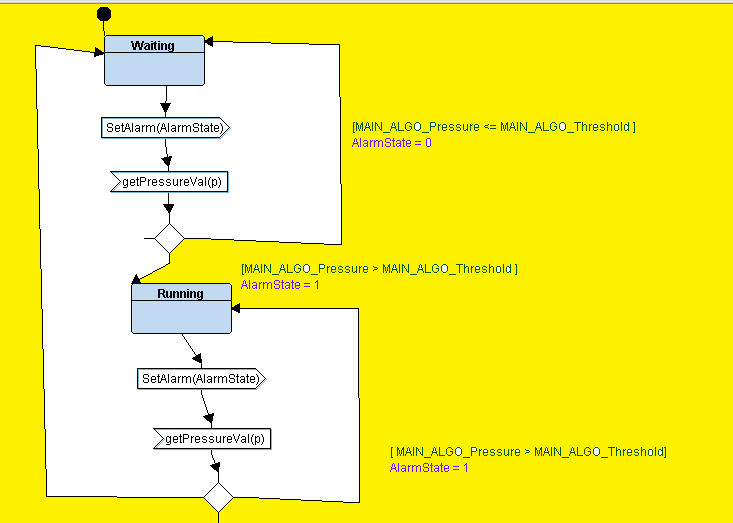
**Use Case Diagram:**

* The pressure sensor measures cabin pressure.
* If pressure > 20 bars, an alarm is triggered for 60 seconds.
* The crew is informed visually and audibly.



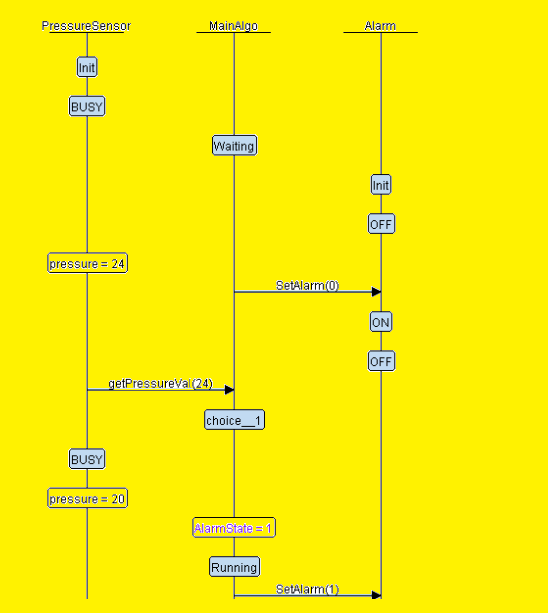
**Activity Diagram:**

* Measure pressure → Check if > 20 bars → Trigger alarm → Wait 60 seconds → Reset alarm.



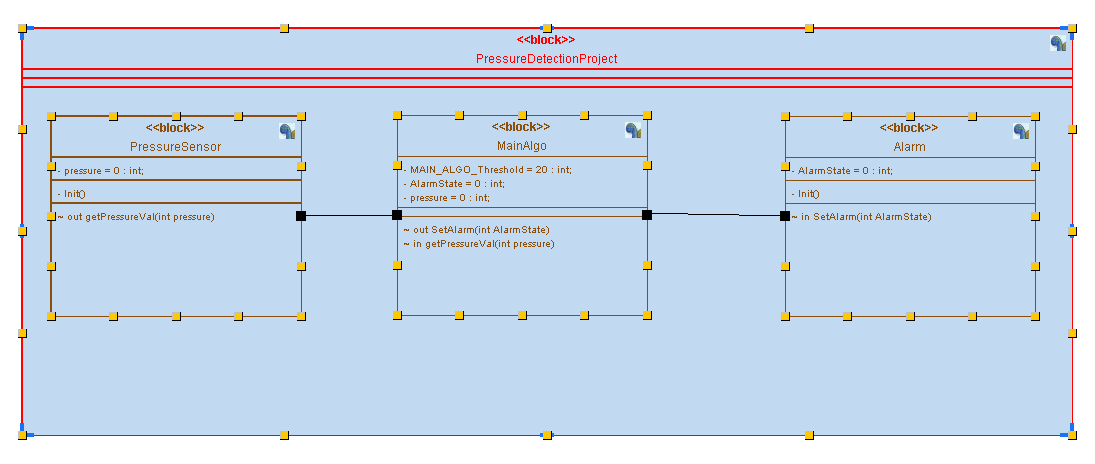
**Sequence Diagram:**

* Pressure Sensor → Microcontroller → Alarm Actuator (if pressure > 20 bars).



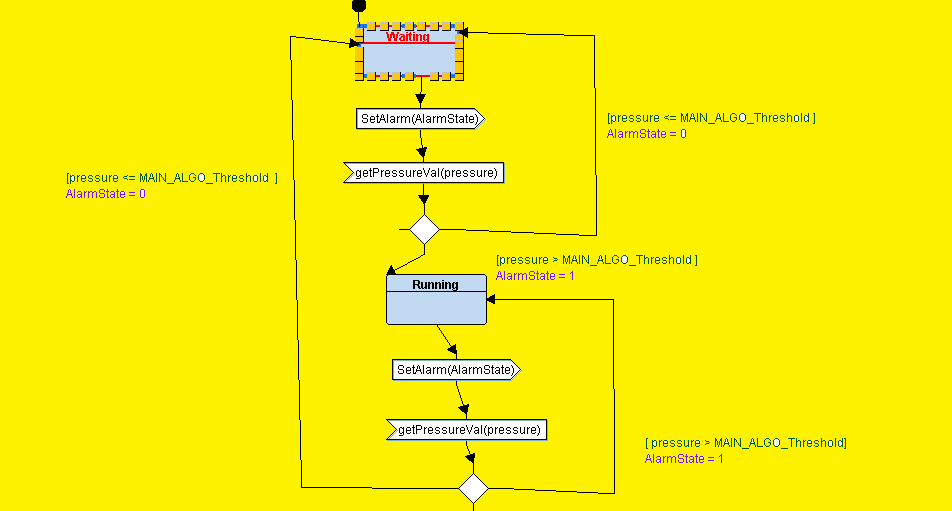
**4. System Design**

**System Block Diagram:**

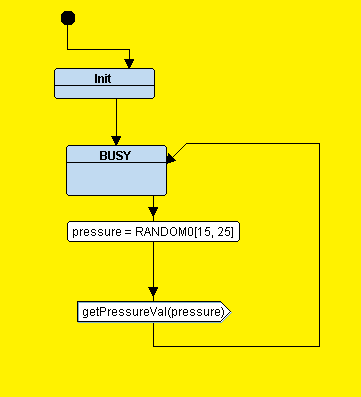


**State Machines:**

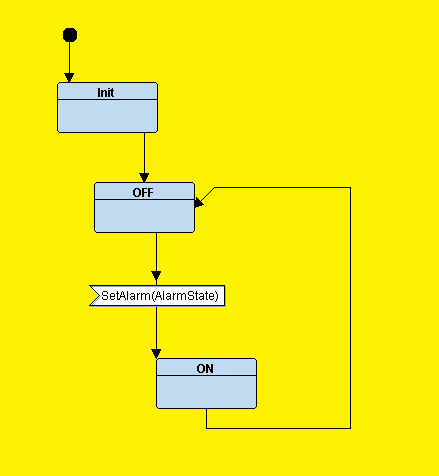
1. Main Algorithm State Machine



1. Pressure Sensor State Machine

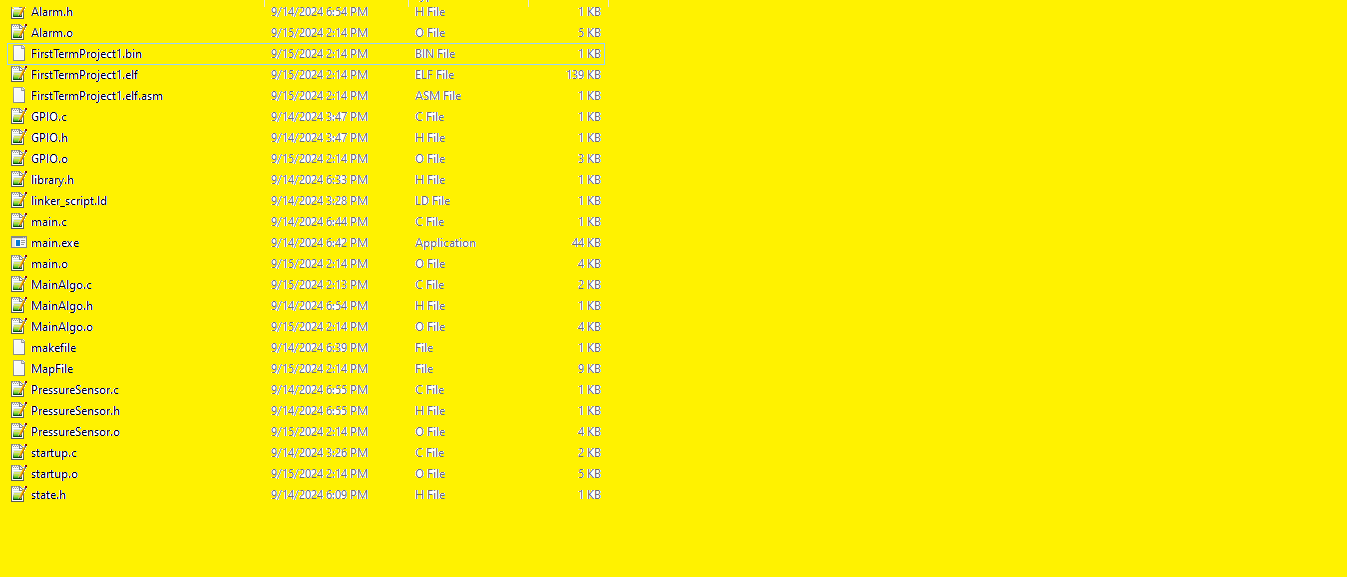


1. Alarm State Machine

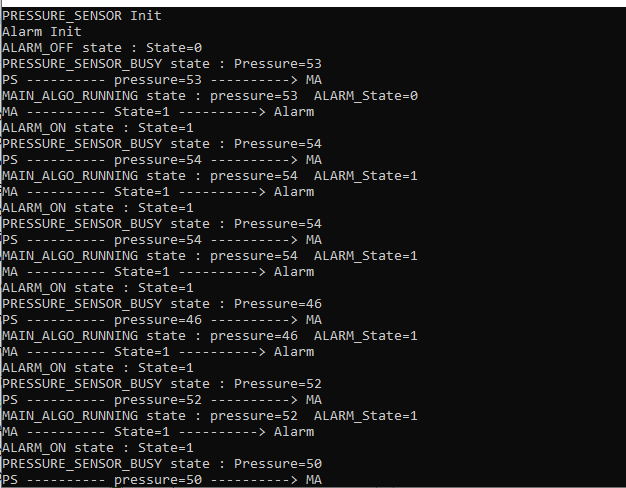


**5. Embedded C Code Modules**

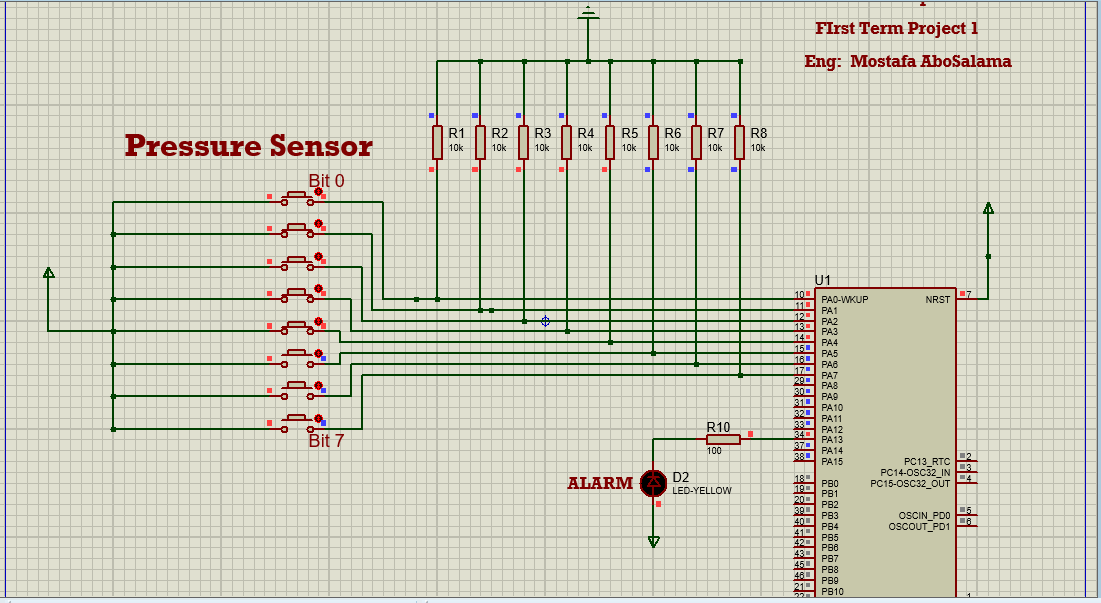
Provide .c and .h files for each module, Makefile, Startup, LnkerScript:



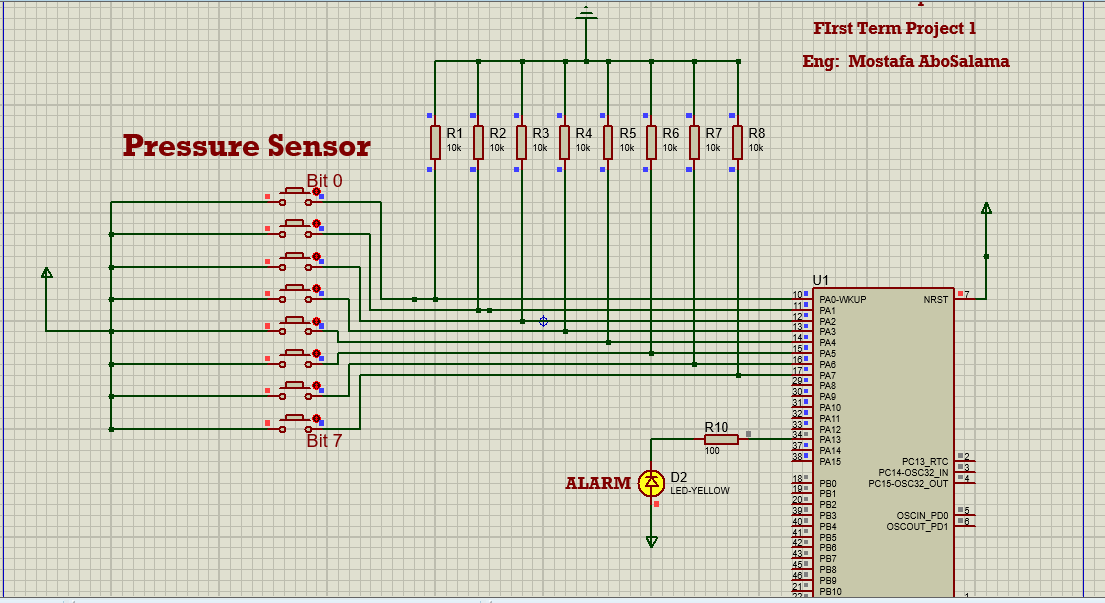
**6. Simulation and Results**

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* **Pressure < 20** 🡺 **Alarm Off**

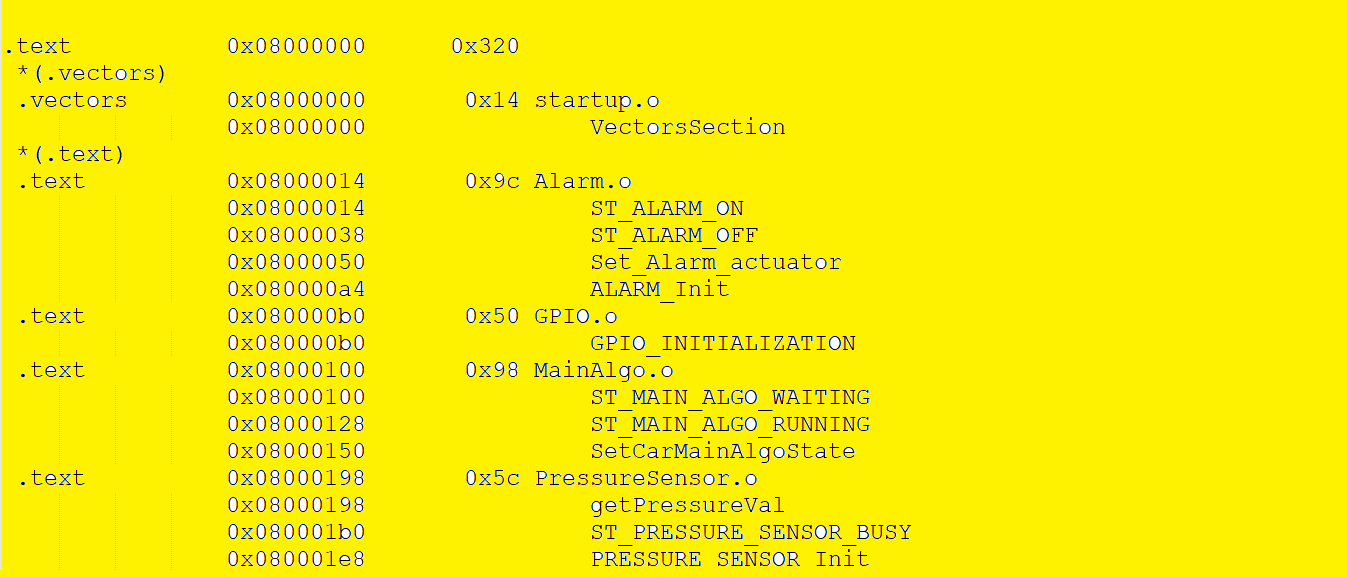
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* **Pressure < 20** 🡺 **Alarm On**

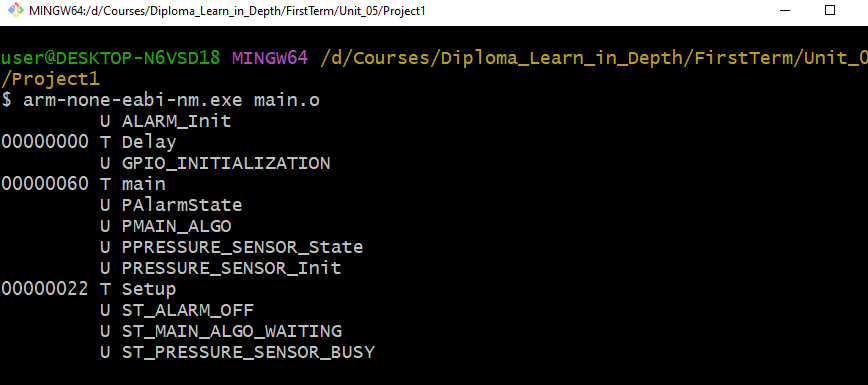
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**7. Software Analysis**

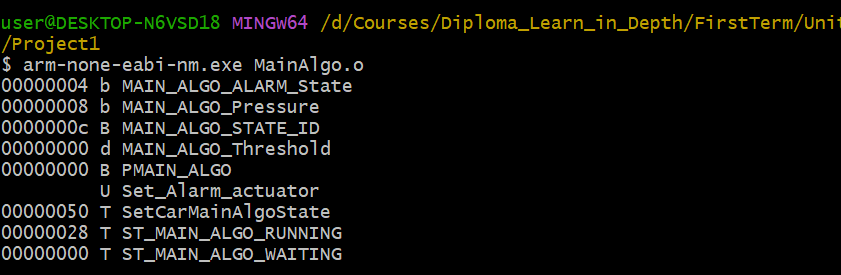
* **.map file**



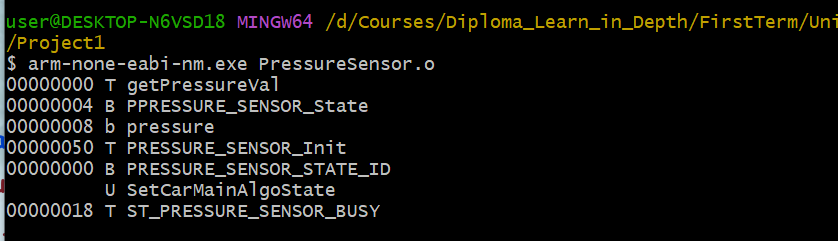
* **Symbols Table**
  1. Main



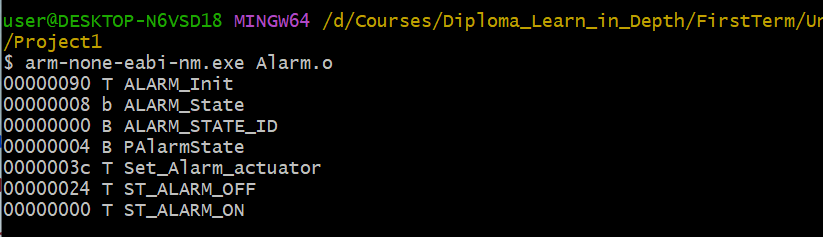
2- Main Algorithm



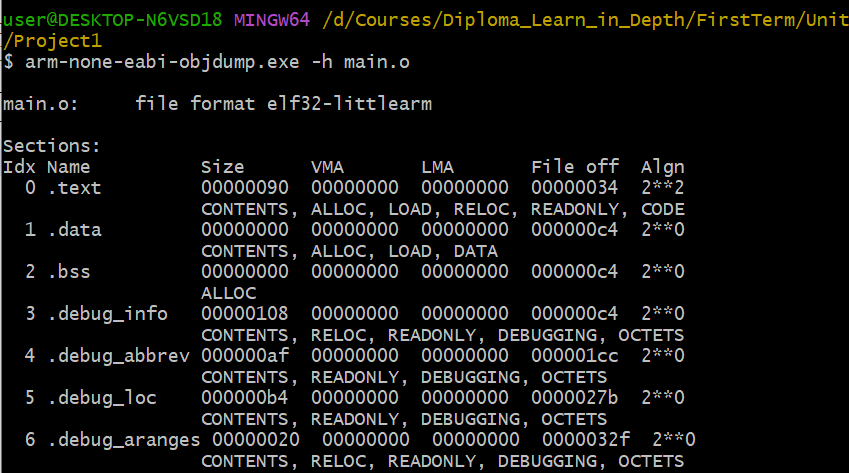
3-Pressure Sensor



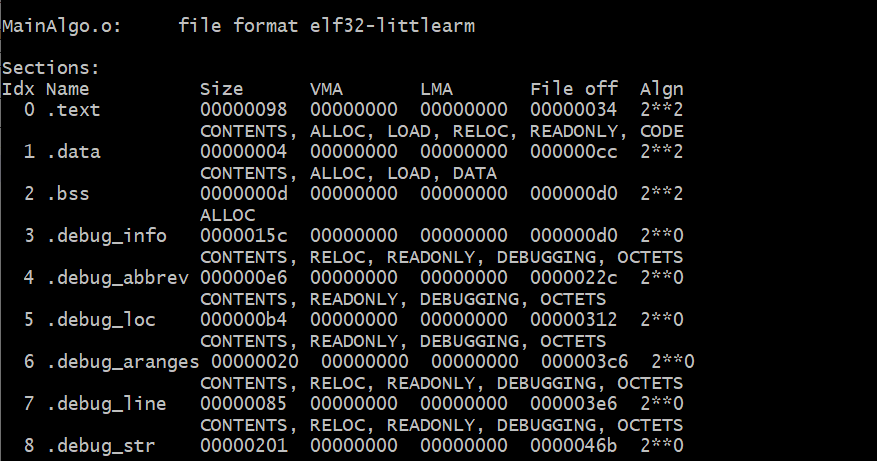
4-Alarm



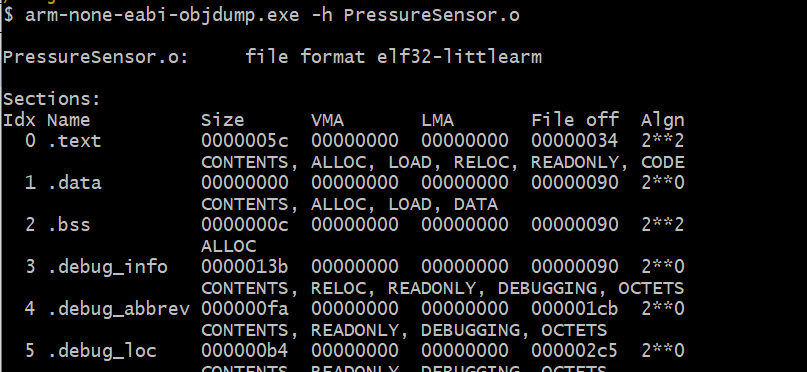
* **Section Tables**
  1. Main



2-Main Algorithm



3-Preesure Sensor



4-Alarm

