CABIN PRESSURE CONTROLLER

1st Term project

Profile
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Content table

Case Study

Client Specification:

- 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.
- keeps track of the measured values.

Assumptions

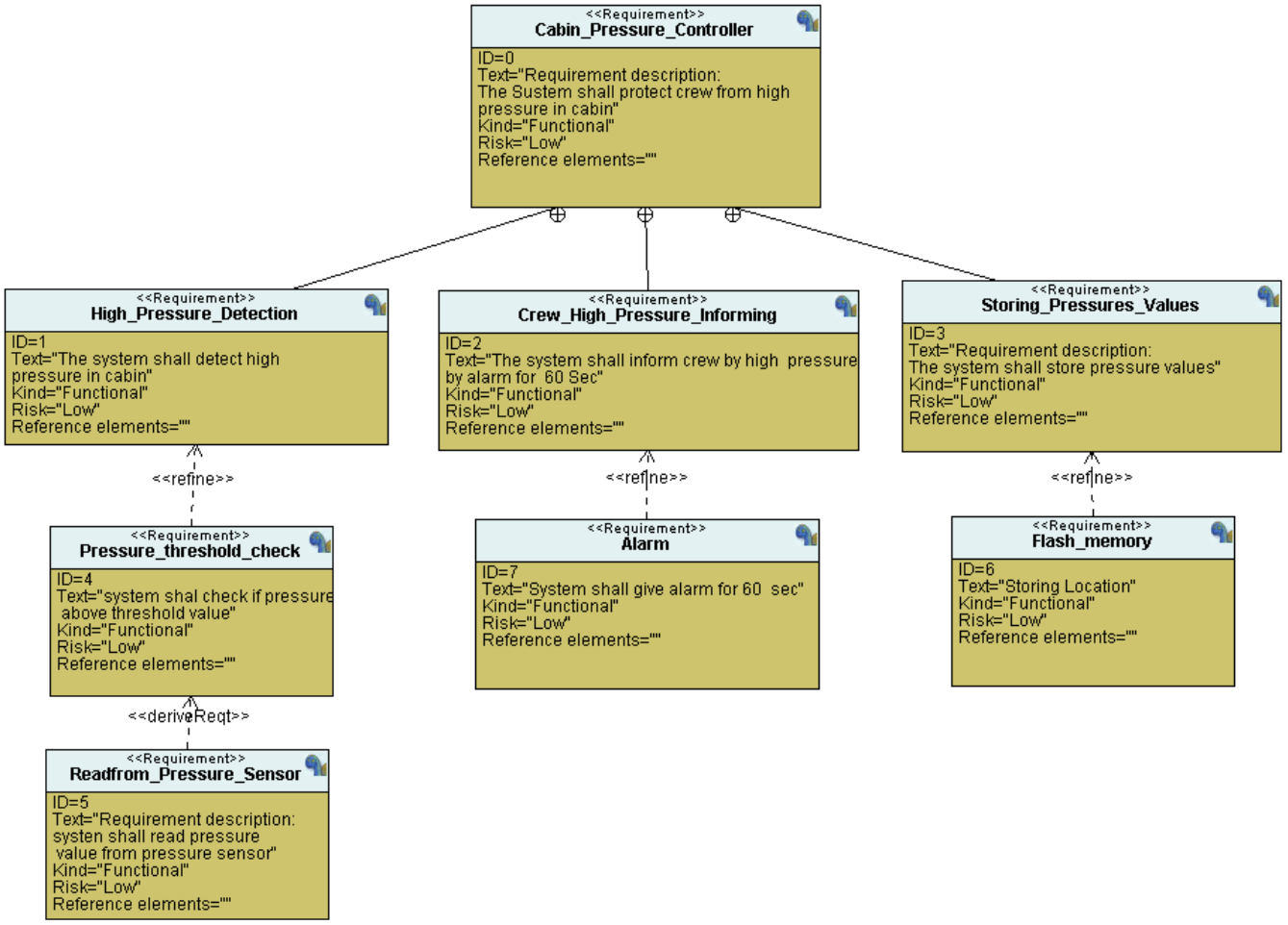
- The controller set up and shutdown procedures are not modeled
- The controller maintenance is not modeled
- The pressure sensor never fails the alarm never fails
- The controller never faces power cut

Method

Assuming use V model

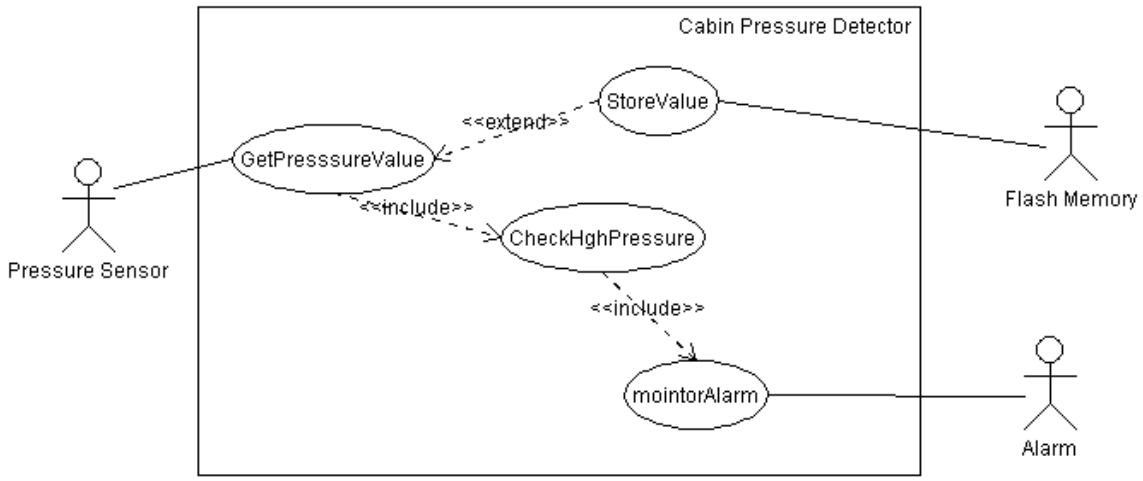
Requirements

Requirement Diagram

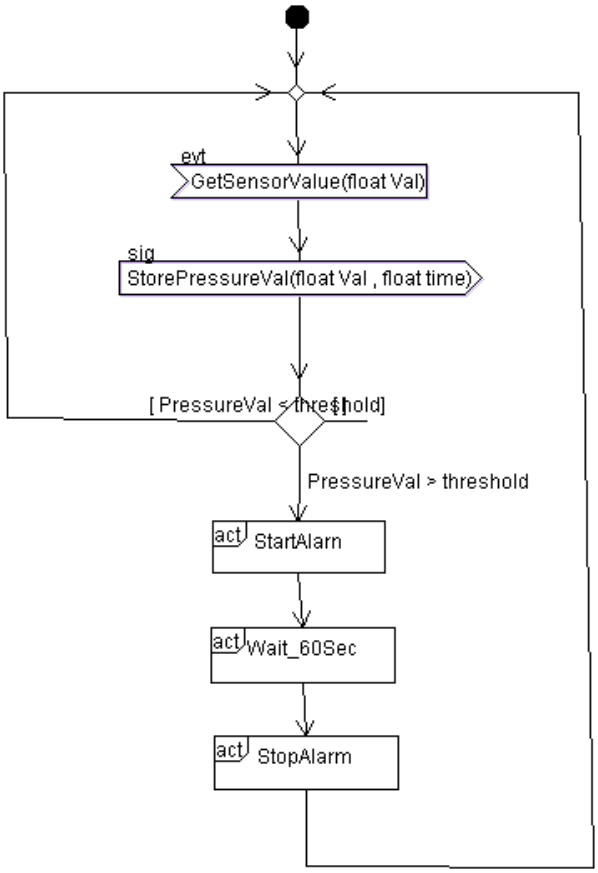


System Analysis

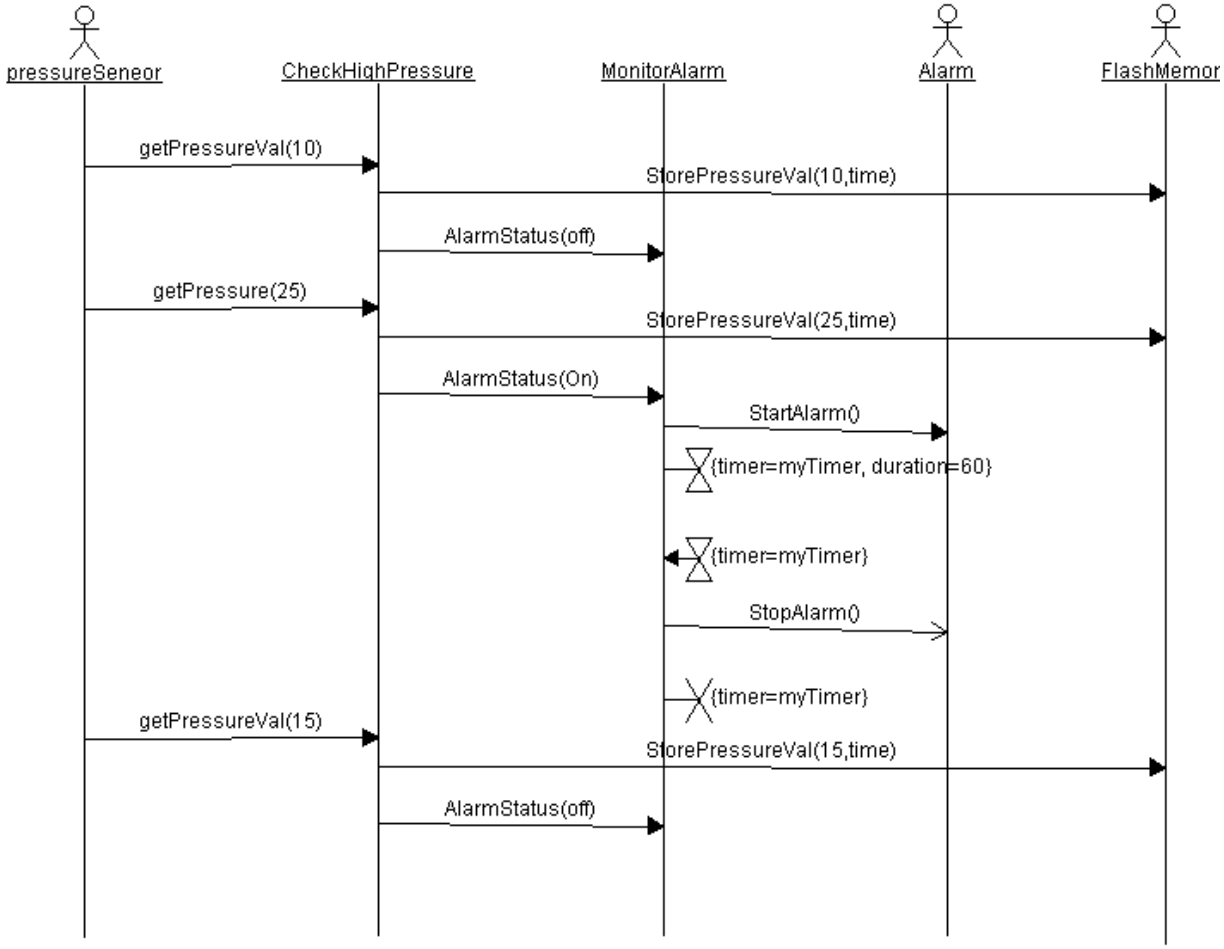
Use case diagram



Activity diagram

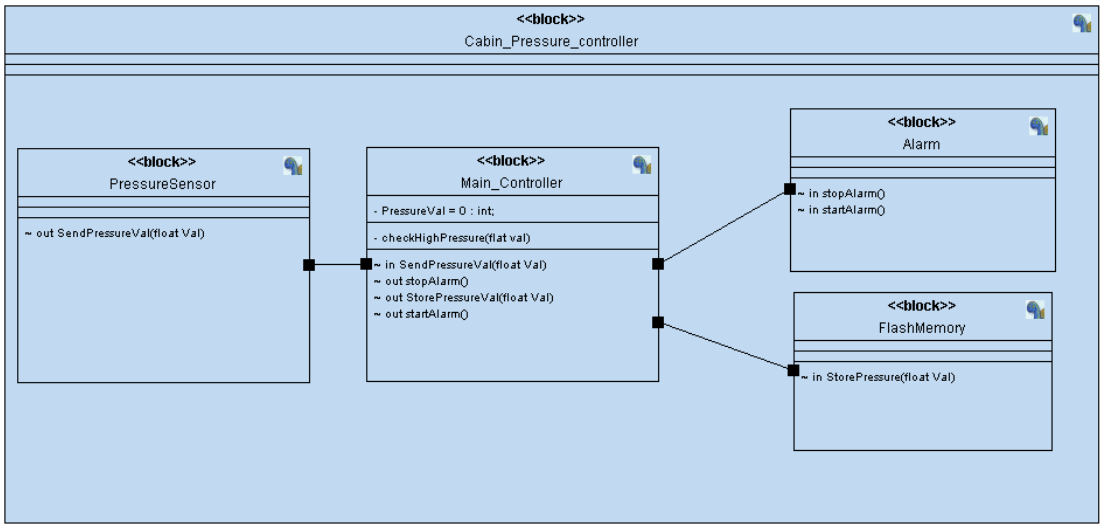


Sequence Diagram



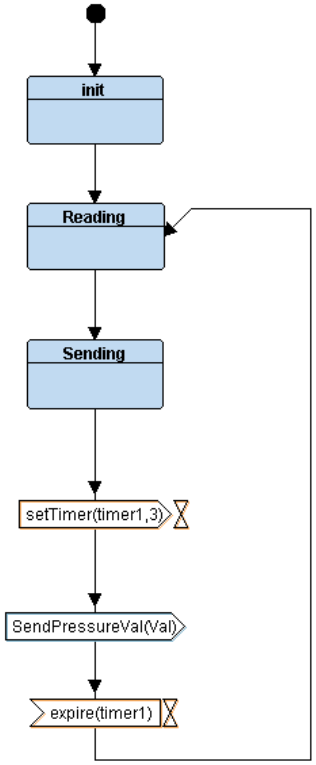
System Design

Block diagram

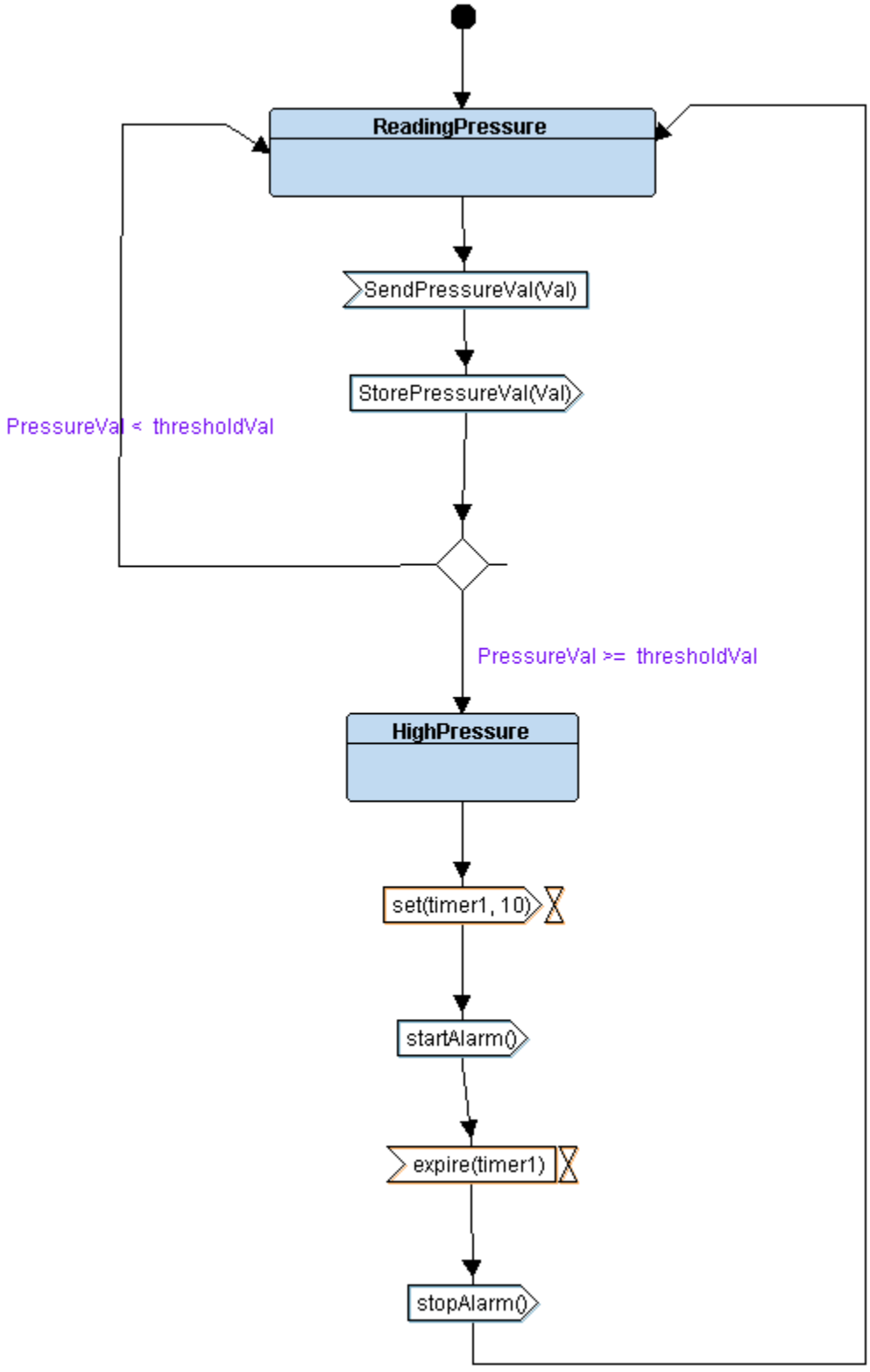


State Machines

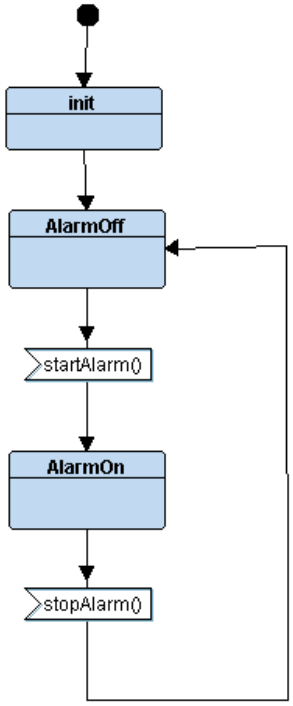
1- Pressure_Sensor_Driver



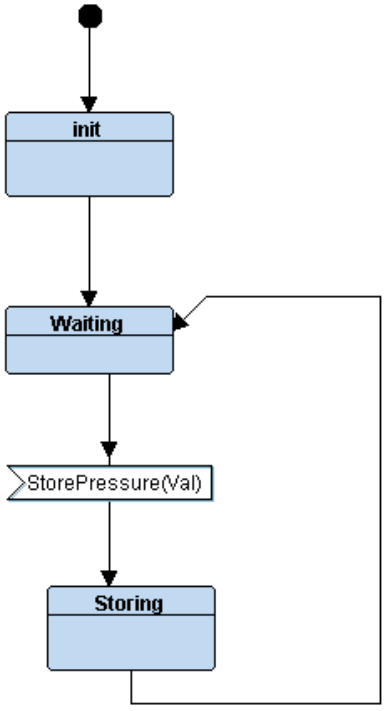
2- Main_Control_Algorthim



3- Alarm_Driver



4- FlashMemory

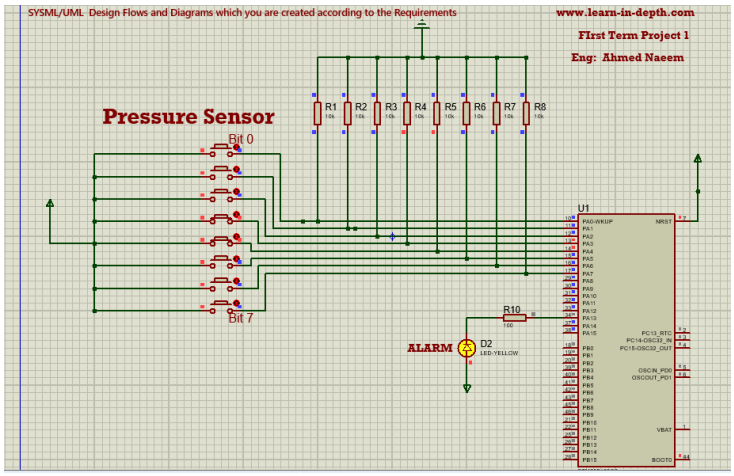


Building with Makefile

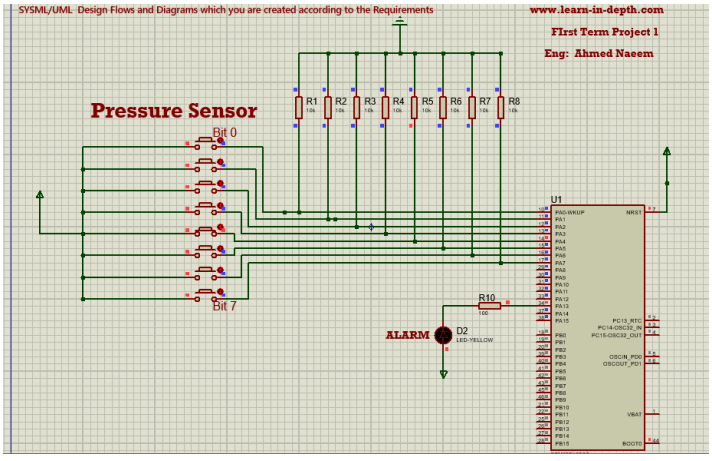
```
$ make all
arm-none-eabi-gcc.exe -c -gdwarf-2 -mcpu=cortex-m4 -mthumb -I . Alarm.c -o Alarm.o
arm-none-eabi-gcc.exe -c -gdwarf-2 -mcpu=cortex-m4 -mthumb -I . ControlAlgorthim.c -o ControlAlgorthim.o
arm-none-eabi-gcc.exe -c -gdwarf-2 -mcpu=cortex-m4 -mthumb -I . driver.c -o driver.o
arm-none-eabi-gcc.exe -c -gdwarf-2 -mcpu=cortex-m4 -mthumb -I . LoggingFlash.c -o LoggingFlash.o
arm-none-eabi-gcc.exe -c -gdwarf-2 -mcpu=cortex-m4 -mthumb -I . main.c -o main.o
arm-none-eabi-gcc.exe -c -gdwarf-2 -mcpu=cortex-m4 -mthumb -I . PressureSensor.c -o PressureSensor.o
arm-none-eabi-gcc.exe -c -gdwarf-2 -mcpu=cortex-m4 -mthumb -I . startup.c -o startup.o
arm-none-eabi-ld.exe -T linker_script.ld  Alarm.o ControlAlgorthim.o driver.o LoggingFlash.o main.o PressureSensor.o sta
rtup.o -o PressureController.elf -Map=Mapfile.map
cp PressureController.elf PressureController.axf
arm-none-eabi-objcopy.exe -O binary PressureController.elf PressureController.bin
========== Build is Done =============
```

Simulation

Alarm On Pressure > 20



Alarm Off Pressure < 20



Video:
https://drive.google.com/drive/folders/10wEz2EdXIWmI9AXrTGbIBK5TFzIeM4tn?usp=share_link