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Stroma PICSIMLAB Project Implementation

Aim: We are building a pressure and temperature measuring device for mountaineers. You are expected to use the Blue Pill as the development board and the *BMP280* as the sensor. The embedded system should print the Temperature, Pressure, Altitude and Oxygen values on the virtual terminal screen every second.

We'd like to keep our mountaineers alive and breathing, research at which altitude you'd like to give our user a fair warning for altitude sickness, and when to seriously alert so they can get back to safety. Connect extra peripherals to your choosing using *PICSimLab*'s features.

⚠ **Note**: You are expected to use a software I2C implementation through GPIO pins.

⚡ **Note**: Use */*dev/ttyUSB13 as serial monitor port and localhost:1234 as GDB server port.

✨ **Bonus:** Print calculated values on the PCD8544 (Nokia 5110 display) module. **(+10 pts)**

✨ **Bonus:** Implement the project using the hardware I2C peripheral of the MCU. **(+100 pts) This may be very hard to do. You may need to dig deep into the emulator source code and figure out how QEMU works. A developer of this caliber would get our serious attention.**

Steps to achieve the goal:

- I have started with researching about Platformio. I have used this tool before in my previous developments on ESP32 microcontroller, but its been 2 years since I'm not using it. So, it's not hard to run it properly.
- Then the PicSimlab has been the next step to go. I never use this virtual experiment/simulation software before, just I assumed it's like timited version of Proteus Simulation software. So I have tried to figüre out the mechanism. It's also not hard to understand.
- For demo I have started to creating a very basic experiment to see the led blinking on STM32/Blue pill board. I stucked in here because the Picsimlab haven't give any response to the code/bin file.
- To maintain the work, I restart my experiment on Arduino Mega board to see the effect of the code(created for Arduino Mega/blinking led) on this board. I have loaded the code and it's working. So I decided to creating the experiment with all parts/steps on this board properly. So I could see all working/unworking things on this board.
- As framework I've choosed the Arduino, because implementation steps will be decreased in that way. Beside I could convert my Arduino Mega code to STM32 bluepill as possible as little changes.

- After some development everything compeleted and experiment running well on Arduino Mega. So the next step is doing the work on STM32.
- Again I tried to upload the STM32 bin file to the simulator, the simulation reloaded when new binary uploaded and it doesnt give any response(led blinking).
- I have tried to figure out the problem, so I search about it. After some tryings, I decide to upload existing example on simualtor itself. The example written on CMSIS so I tried changing the framework Arduino to CMSIS and others for test. However there was nothing changed. After these steps I reload the existing example and I got the code which written in Arduino framework for blue pill. It's so weird but the simulator gave response, and led blinks.
- The next step is creating the same system on blue pill. Actually I've expecting that the same code which created for Arduino Mega could run on blue pill with changing pin numbers and assignments properly. Actually it has worked for Nokia5510 and buzzer, but the I2C system doesnt response.
- I tried to figure out to communicate on I2C. I changed pin assignments both on code and the simulator. But it doesnt give any response. Maybe the problem about QEMU emualator because in my research I couldnt see the support for I2C.So I decided to write a new software I2C library to communicate. But first I tried to find a previously created library fort his to not waste the time.
- After some searching I found a library for this operation. However compiled version of this library also ahvent gave any response on I2C.
- As a conclusion I decided to stop the work in this point, because there is no enought time to go. Also most of the things have been tried, there could be waste of time to try the things in wrong way.
- There is the trying to interact with BMP experimental system in the file which named "bluepillWork". It just checks the address(I2C scanner).
- There is first experiment and device implementation in the file which named "ArdMEGA_implementation."
- Files are containing the .pzw files, so you could import them and could see the experiment on simualtor directly. Also bin files were included