Case 2b

Improved Arduino Library for (e.g.) i2c sensors

Improving Cohesion / Coupling

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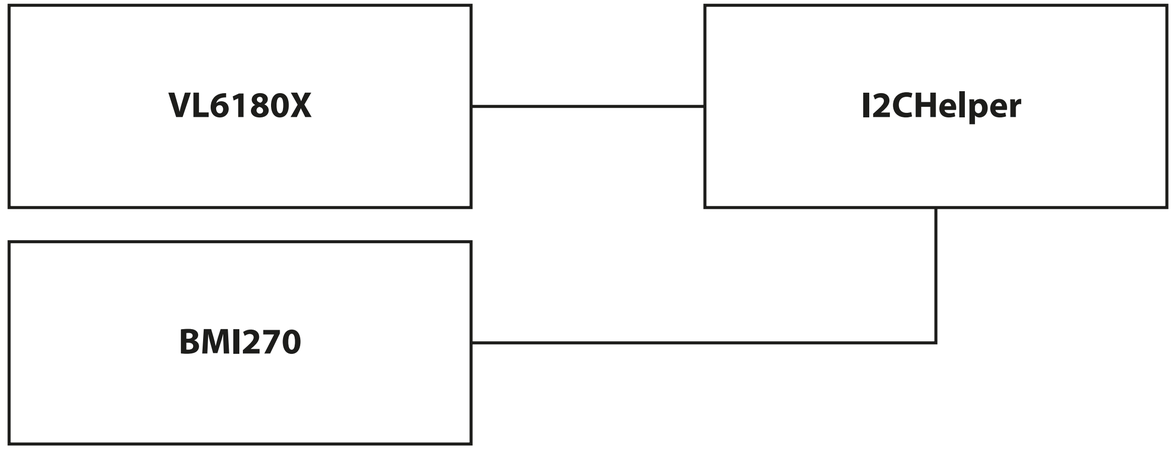
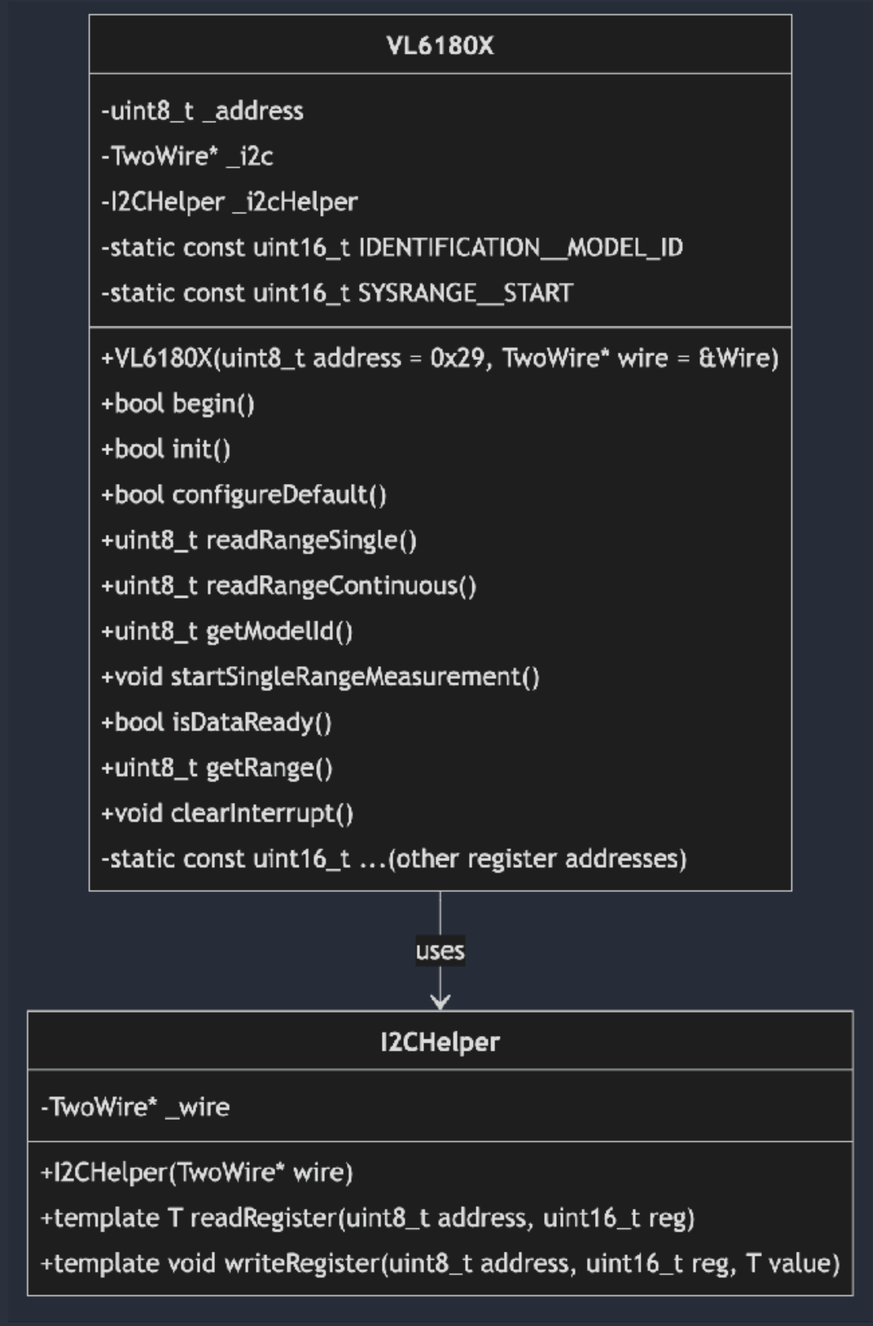
- Remember we had writeRegister8, writeRegister16 etc all over VL6180X.cpp
- How many instances of I2CHelper will we (ever) need?!



LLM (Gemini) cue

- Huge improvements:
  - Delegation of i2c stuff to I2CHelper
  - Design for change: your main can not create more than one instance of i2c

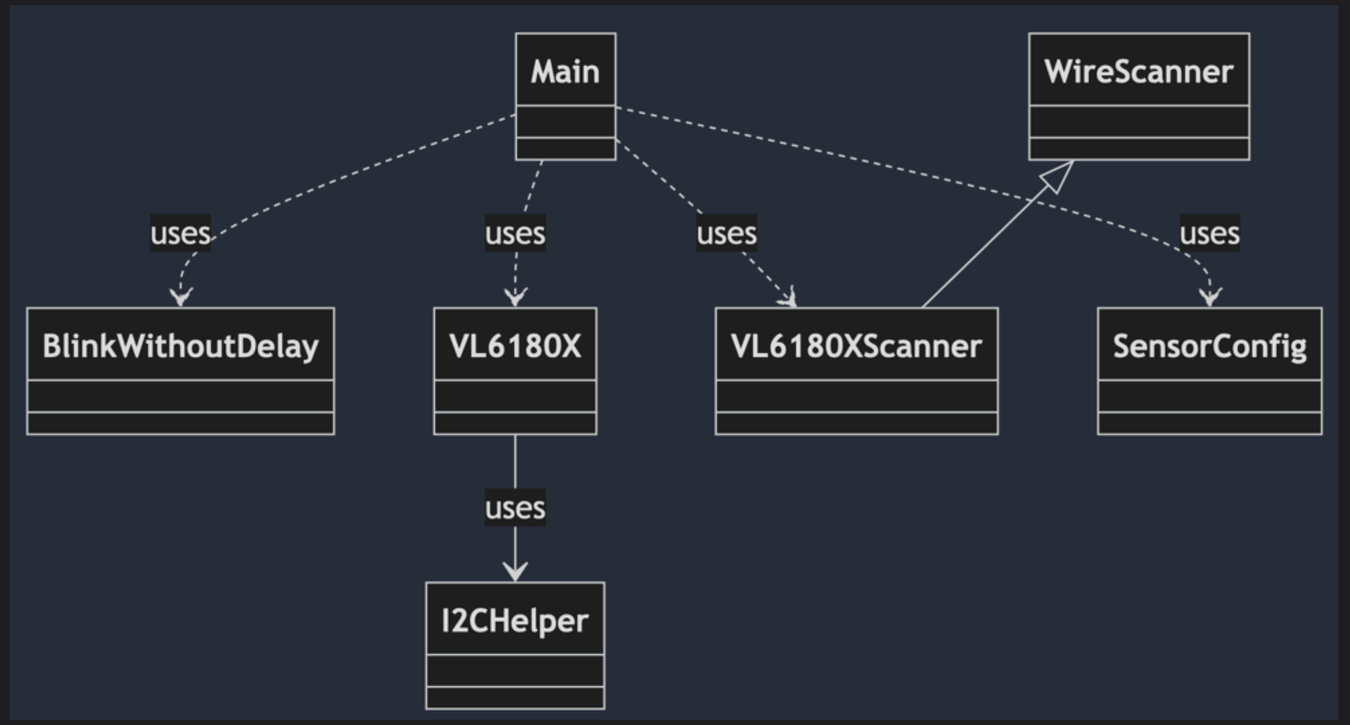
Note: refer to Prog5_Lab3_I2CSensorLib.md on how to use mermaid UML diagrams in markdown files.



Class diagram

- For now “Final” version:

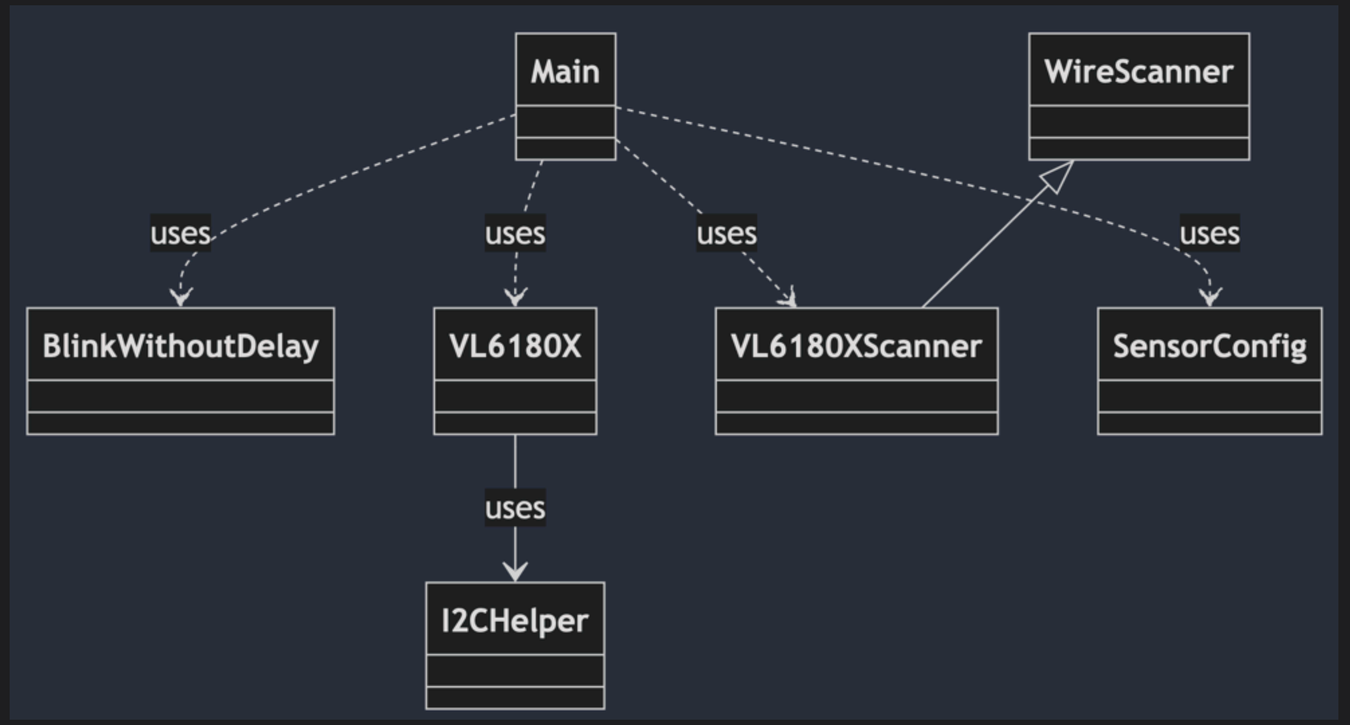
- Note: this is a very concise class diagram, readability is great but virtually no details.



Class diagram

“Final” version:

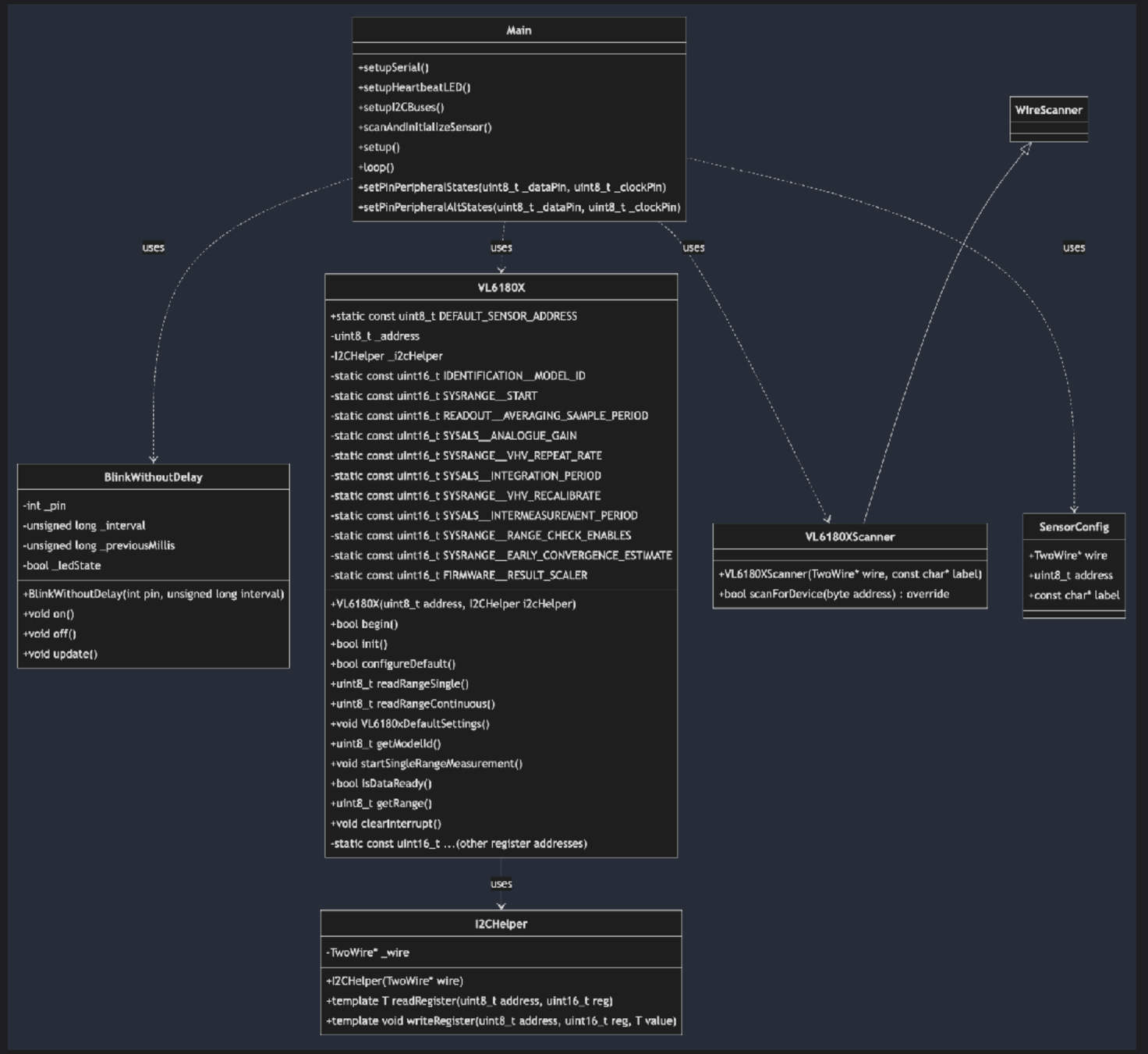
- Inheritance (is-a) vs Dependency (uses-a)
- Solid vs. Dotted Line
- The solid line in inheritance indicates a stronger, more direct relationship, as the child class inherits the parent's structure.
- The dotted line in dependency signifies a looser coupling, where one class simply uses another class's features.



Class diagram

- “Final” version:

- Note: this is a very complete class diagram, but not very readable.



LLM (Gemini) - Key Points

Use them to learn, check and recheck the reasoning…

- **Register Addresses:** The register addresses are defined as constants at the beginning of the .cpp file for better readability and maintainability.
- **init():** This function performs the mandatory register settings as per the datasheet.
- **configureDefault():** This function sets up the recommended register settings. You can customize it further based on your application's requirements.
- **readRangeSingle():** This function triggers a single range measurement and returns the result.
- **readRangeContinuous():** This function starts continuous range measurements and returns the latest available result.
- **Helper Functions:** The readRegister, writeRegister, and writeRegister16Bit functions encapsulate the I2C communication for register access.

LLM (Gemini) - Remember

Some advice…

- **Datasheet:** Always refer to the VL6180X datasheet for the most accurate and up-to-date register information.
- **Error Handling:** Consider adding error handling to the register access functions and other critical parts of the library for robustness.
- **Additional Features:** Implement functions for other sensor features like ambient light sensing, proximity detection,and interrupt handling as needed.
- **Optimization:** You might need to optimize the code further for performance or power consumption, especially in resource-constrained embedded systems.

- Note: we will refactor the entire project for week 7