Assignment 2

Names and IDs

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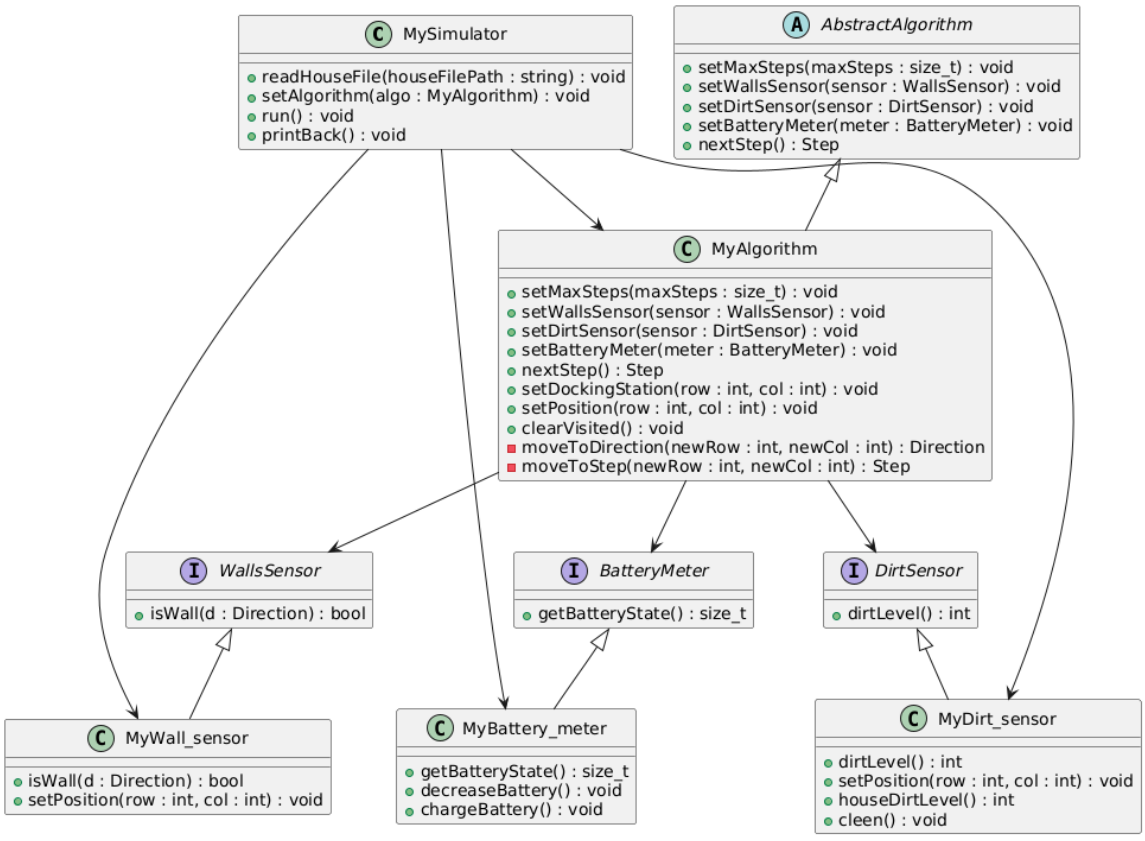
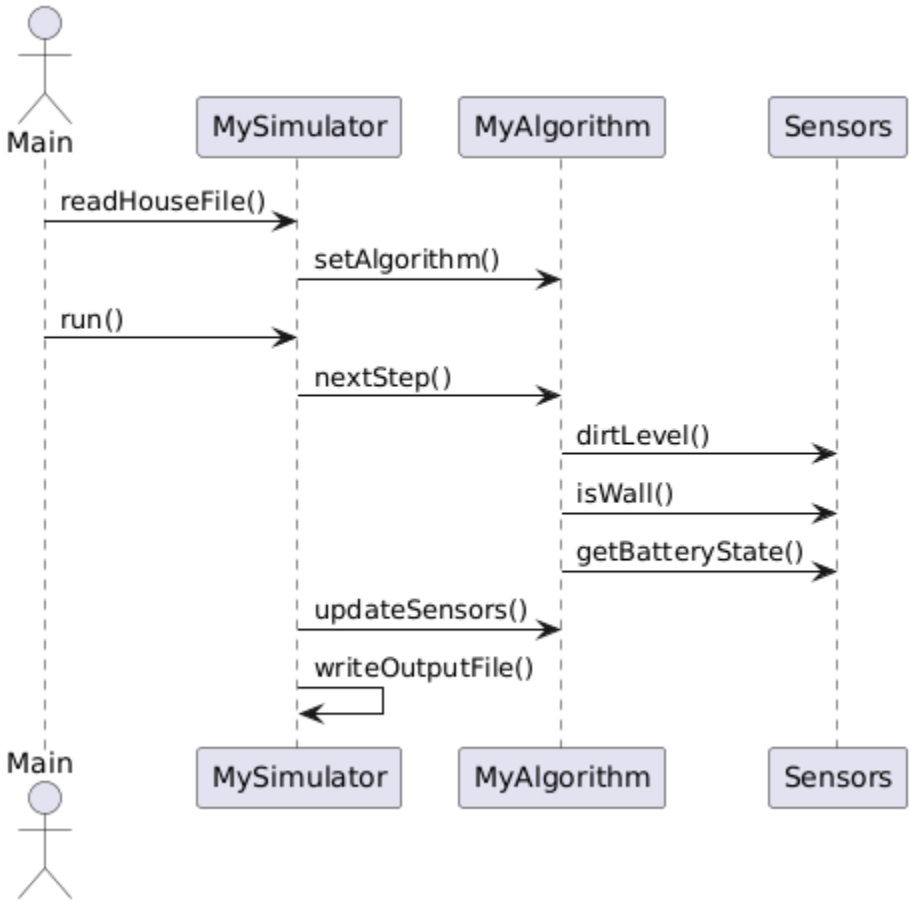
1. UML Class Diagram

The UML Class Diagram below shows the structure and relationships of the classes in the program.



2. UML Sequence Diagram

The UML Sequence Diagram below illustrates the main flow of the program.



3. Design Considerations and Alternatives

Algorithm Choice: A deterministic DFS-based algorithm is used to ensure reproducibility.

Sensor Abstraction: Sensors are abstracted for modularity and ease of testing.

Smart Pointers: Smart pointers are used for memory management to avoid manual handling and potential leaks.

Error Handling: Robust error handling ensures the program does not crash and gracefully handles file parsing errors.

Alternatives:

Single Class Design: Combine all functionalities into a single class (less modular, harder to maintain).

4. Testing Approach

Unit Tests: Testing individual classes such as MyWall_sensor, MyDirt_sensor, and MyBattery_meter for correctness.

Integration Tests: Ensuring MyAlgorithm and MySimulator work together correctly with different house files.

Boundary Testing: Testing edge cases such as empty or malformed house files and scenarios with the battery running out.

End-to-End Tests: Simulate full cleaning scenarios with different house layouts.