



WEEK 2 WRITTEN RESPONSES

Software Development for Robotics

XX

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Student:
Jerry Pittman, Jr. (117707120)

Instructors:
T. Chang

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1 3.13

Inheritance is also known as different classes have a "Is-A" relationship. An example is that a Vampire Class and Werewolf Class would be inherited from a Monster Class. They may have the same members but have their own specific members.

2 3.14

An object represents an object of the real world while a class is a module that defines properties and methods of several objects.

3 3.15

Polymorphism is when there are derived types of a base type. An example would be if there are several Monster derived classes (Vampire, Werewolf) and they each have Life member like the base class but they have different values for the life and different implementations of methods of the base class in how their life may be decreased or increased.

4 4.1



Figure 1: UML Showing Association of Bank, Customer, and Account classes

5 4.2

- Library: Base class object.
- Librarian: Derived Class of library to conduct lending sessions and charge fines if overdue books.
- Lending Session (method): pulls book inventory and checks out book by associating it to the library card.
- Overdue Fine (method): if book is past due date, determine fine and charges library card account holder.
- Book Inventory: base class for deriving books. tracks which books are in stock or checked out. Used/accessed by Lending Session.

- Book: derived class object of Book Inventory. item to be checked out and maintained in inventory.
- Checkout System (method): determines if any fees are associated to library card.
- Library Card (method): tracks due date for overdue fees and books that are currently checked out/lended. Has account owner name and addresses members.

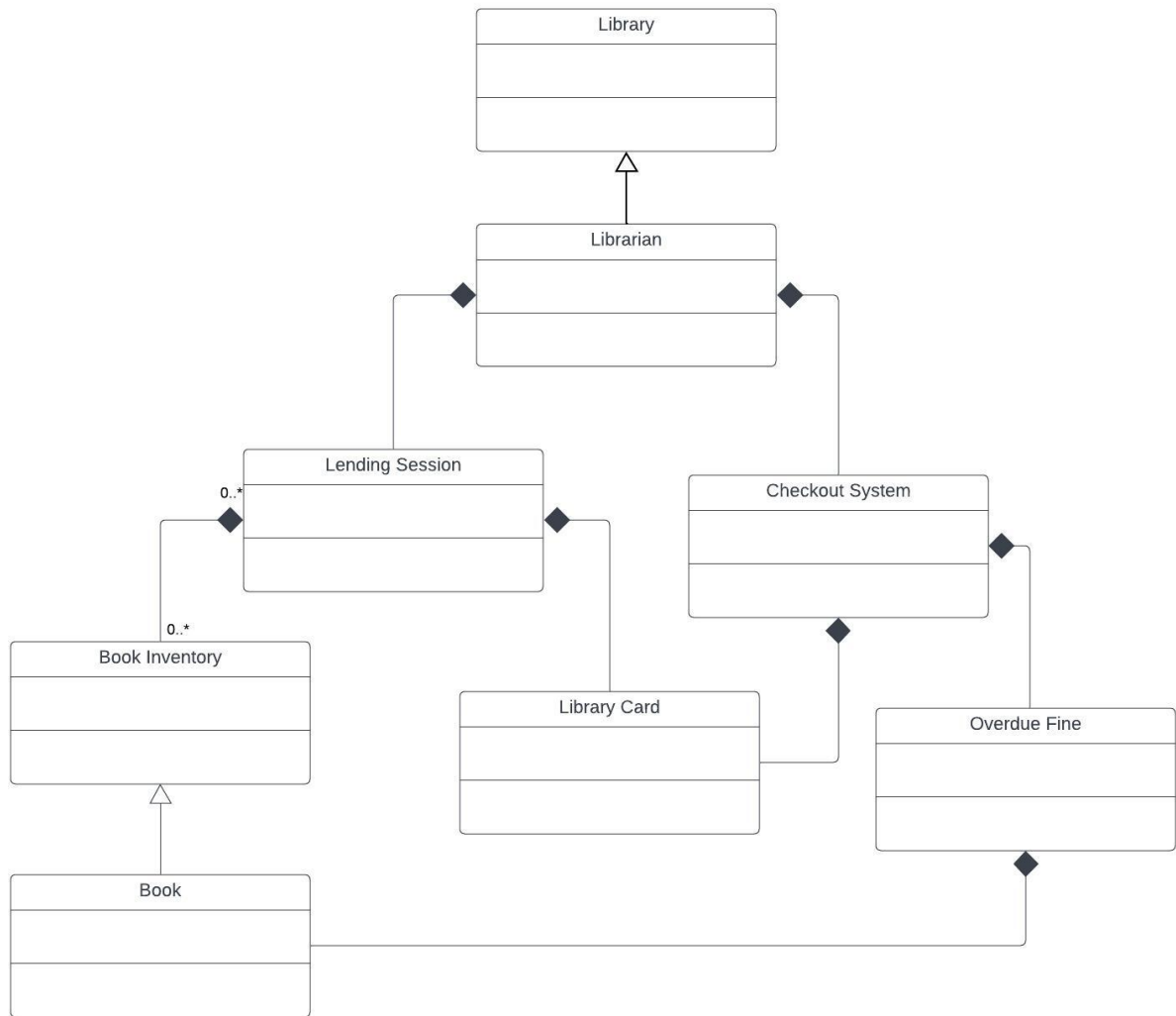


Figure 2: UML Showing Library Lending Books

6 4.3

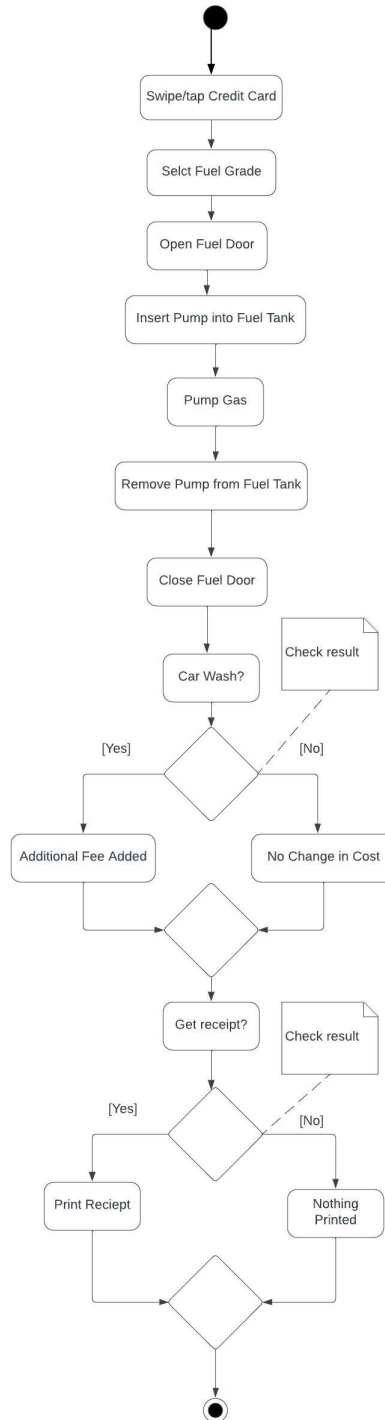


Figure 3: UML Activity Diagram of Pumping Gas

7 4.5

Class dependency graph shows dependencies and their associated directions (Ex: 1 way for part-of or non-polymorphism and 2-way for polymorphism). In other words, in addition to showing the inheritance versus association in the UML class diagram, a class dependency graph includes all dependencies that would otherwise not be shown in an UML class diagram.

References

- [1] T. Chang, “Enpm808x fall 2023 notes,” University of Maryland - College Park, MAGE, College Park, MD, Tech. Rep. Lectures, Sep. 2023.
- [2] V. Rajlich, *Software Engineering: The Current Practice*. Apr. 2016, pp. 1–281, ISBN: 9780429088759. DOI: [10.1201/b11678](https://doi.org/10.1201/b11678).
