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ENPM808X Software Development for Robotics
Week 3 Written Responses

Software Engineering 3.13
What is inheritance in object-oriented technology? Give an example.

Inheritance describes the idea of a class using another class as a starting point for initialization. A parent class can be used to make a child class that inherits the parents attributes and methods. Anexample would be if a parent class called Car defined the company attribute then the derived class Truck would inherit the company attribute but may also define the color of the car.

Software Engineering 3.14
What is the difference between an object and a class in OO technology?

A class is the blueprint used for defining an object in OOP. A class may have attributes defining the common properties that will define the objects created using that class. An object is an instance of the class.

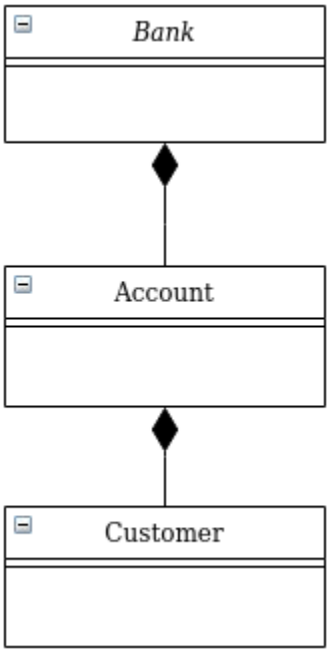
Software Engineering 3.15
Describe the role of polymorphism in object-oriented technology. Give an example.

Polymorphism in OOP allows for multiple versions of a method to be defined. When the method is called the program will run whichever one corresponds to the appropriate object class that called it. This allows for many class instances to call the same method but perform a different action based on the parameters passed to the method. An example would be if a class method called Print takes a string then would print out a message based off of a string passed to it. Then a second Print method is defined that takes a string and an integer, this method will print out the string multiple times based on the value of the integer passed.

Software Engineering 4.1

Draw a class diagram of a small banking system showing the associations between three classes:

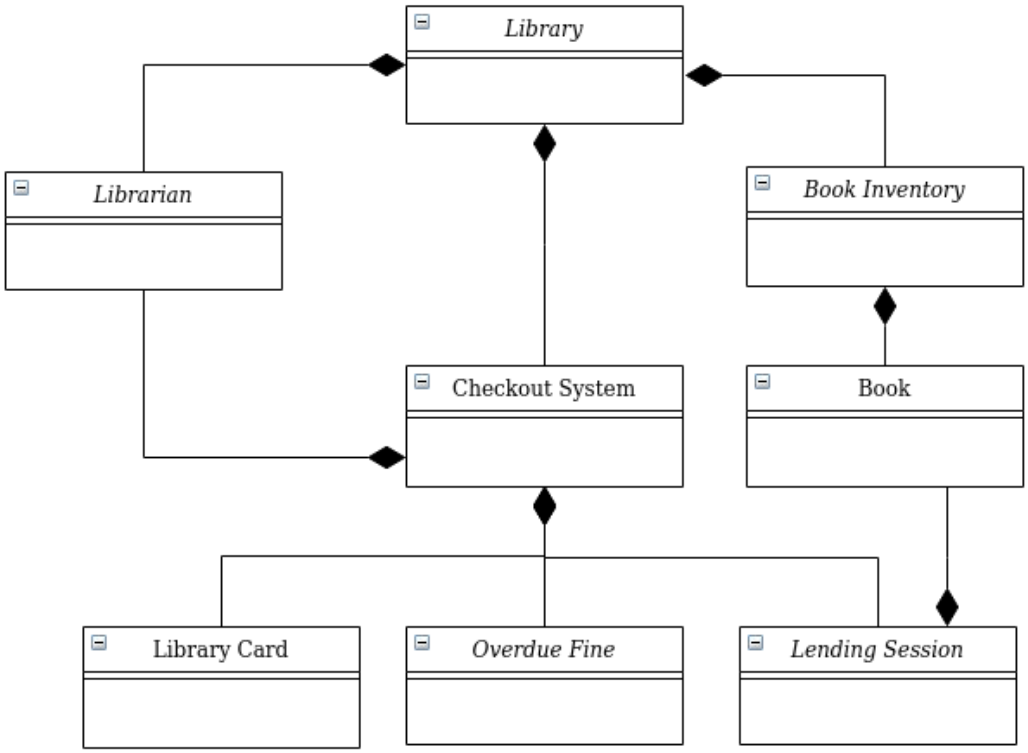
the bank, customer, and the account.



Software Engineering 4.2

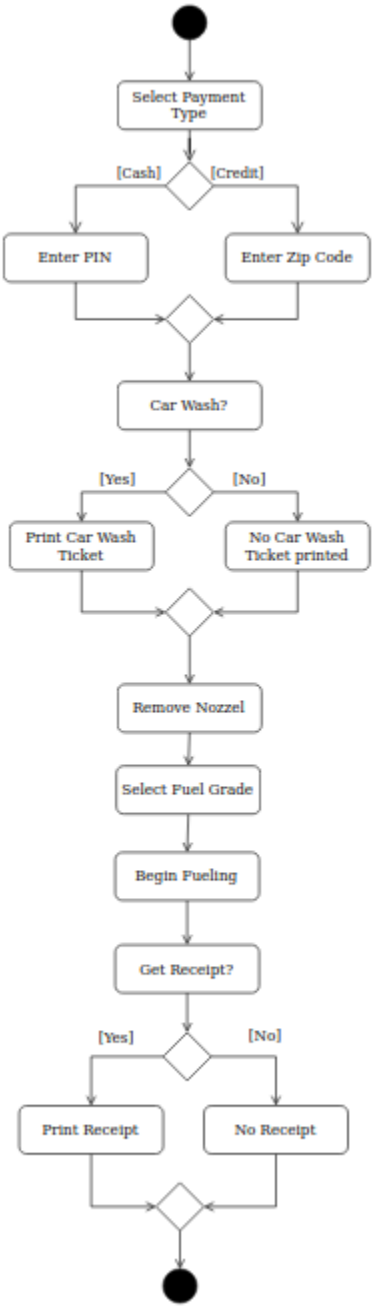
Draw a class diagram of a library lending books using the following classes: Librarian, Lending Session, Overdue Fine, Book Inventory, Book, Library, Checkout System, and Library Card. (Provide one-sentence definition of each class)

Librarian: Works at the Library and runs the check out system.
Lending Session: The Book is checked out for the duration of the Lending Session.
Overdue Fine: Part of the Checkout Session is if a Book is returned late, a fine is issued.
Book Inventory: Part of the Library, the inventory tells us which Books are in stock.
Book: Part of the Book Inventory and is the item checked out during the Lending Session.
Library: The over all establishment that the Librarian works at, stores the Book Inventory, and has an established Checkout System.
Checkout System: Part of the Library, system that requires a library Card to checkout a Book for the duration of a Lending Session.
Library Card: Required to check out a Book through the Checkout System for the duration of a Lending Session.



Software Engineering 4.3

Draw an activity diagram of pumping gas and paying by credit card at the pump. Include at least five activities, such as “Select fuel grade” and at least two decisions, such as “Get receipt?”



Software Engineering 4.5
Explain how a class dependency graph differs from a UML class diagram.

A dependency graph shows how classes depend on each other and is made by referencing existing code. It is useful when maintaining legacy code to know how changes can affect other parts of the code.

A UML class diagram shows the breakdown of class structures. The UML class diagram shows the class attributes, methods, if they are public or private, and how they are connected to other classes. They are independent of the software.