Project 3: Hardware Store Simulation

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IDE: Java 8, Eclipse

UML Creation Tool: LucidChart

We used the Observer, Factory, and Decorator pattern throughout our code.

- The Decorator pattern is documented in Tool.java, and is used to add options to Tool objects.

- The Observer pattern is documented in Customer.java and HardwareStore.java. For our observer pattern, we treated the HardwareStore object as a subject and Customer objects as observers of the HardwareStore.

- The Factory Pattern is documented in Tool.java and Customer.java. It is utilized in Simulation.java to generate Tool and Customer objects, as well as in Customer.java to to automate the wrapping of Tool objects in Option decorators.

*Note: Although we do not cite it in our code, we referenced the class lecture slides on Factory, Observer, and Decorator to write our code and draw our UML

UML Below:

Project3 UML

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PaintingTool
+name: String
+type: String
#cost: int

+cost(): int
+getDescription(): String

ConcreteTool
+name: String
+type: String
#cost: int

+cost(): int
+getDescription(): String

PlumbingTool
+name: String
+type: String
#cost: int

+cost(): int
+getDescription(): String

WoodworkTool
+name: String
+type: String
#cost: int

+cost(): int
+getDescription(): String

YardworkTool
+name: String
+type: String
#cost: int

+cost(): int
+getDescription(): String

<<interface>>
Tool

+ cost(): int
+ getDescription(): String

Simulation

+main()

ToolDecorator
#tool: Tool

Customer
+name: String
+canRent: boolean
+store: HardwareStore
+canRent: boolean
+rentals: List<Rental>
+rentAlgorithm: RentAlgorithm

+completeRental(Rental)
+checkMaxTools(): int
+getRentalStatus(int): bool
+update(): null

HardwareStore
-inventory: List<Tool>
-customers: List<Customer>
-completedRentals: List<Rental>
-activeRentals: List<Rental>
-currentDay: int
-revenue: int
-casualRentCount: int
-businessRentCount: int
-regularRentCount: int
-rentCount: int

+doDay()
+completeRental(Rental)
+getRandomTool(): Tool
+notifyCustomers(): int
+printCompletedRentals()
+printActiveRentals()
+printInventory()
+getInventorySize(): int
+addCustomer()
+runSimulationn()

ExtensionCord

+getDescription(): String
+cost(): int

AccessoryKit

+getDescription(): String
+cost(): int

ProtectiveGearPackage

+getDescription(): String
+cost(): int

ToolFactory

+addOption(Tool): Tool

ExtensionCordFactory

+addOption(Tool): Tool

AccessoryKitFactory

+addOption(Tool): Tool

ProtectiveGearFactory

+addOption(Tool): Tool

RentAlgorithm

+rent(HardwareStore, int): Rental

CasualRentAlgorithm

+rent(HardwareStore, int):
Rental

BusinessRentAlgorithm

+rent(HardwareStore, int):
Rental

RegularRentAlgorithm

+rent(HardwareStore, int):
Rental

Rental
-baseTools: List<Tool>
+tools: List<Tool>
-days: int
+remainingDays: int
-cost: int
-customerName: String
+id: int

+printRental()
+getCost(): int