PROJECT 3

PROGRAM TITLE:

Tool Rental Store Design.

TEAM MEMBERS:

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LANGUAGE:

JAVA 8

ENVIRONMENT USED FOR DEVELOPMENT:

ECLIPSE

PROGRAM DESIGN:

We have used Factory, Decorator and Observer Patterns in this project. We have made Painting, Plumbing, Concrete, WoodWork and Yardwork as concrete products which extends the InventoryFactory class. The abstract class for factory pattern in this project is Inventory.java. It has the functions required for each of the categories. The decorator pattern is implemented by having the Cost_accessory as the decorator class which holds the getPrice function. The concrete decorators here are Extension_cord, Accessory_kit and Gear_Package which overrides the getPrice function to return the decorated price. We have Order_Observer interface which initializes the day count and tools available. Order_Obser_Class implements the interface and performs update_Observer and announce_event function. The publisher (Order_main) performs the function and whenever a change is seen, it updates the observer and the event is announced.

Objects for the required classes are created. Random() is used to allow random number of customers for each day. Provided the customers, the tool and accessory are obtained from user input and the prices are calculated. Hashmap is used to store the tools and number of days it is rented. For each day, this map is visited to reduce the rented days count for each tool. Once the count is 0, value is removed from Hashmap. The profit made by the rental store is calculated as and when a tool is rented. A List is maintained for the available tools each day. When a day begins, the day number, profit made the previous day, tools available on the current day and the transactions made will be printed.

ASSUMPTIONS MADE:

- We have assumed that random number of customers (max 2) visit the store every day.
- Tool list in each of the categories are assumed.
- Number of tools in each category is assumed to be 5,5,5,5,4 in Painting, Plumbing, Concrete, WoodWork and Yardwork respectively.

JUNIT Test Case:

We have designed the JUNIT Test case to test few method calls with test parameters to verify if the value was returned as expected. They were executed successfully in manual run. But when called from main, because we weren't able to enter the run-time parameters, it returns false negatives.

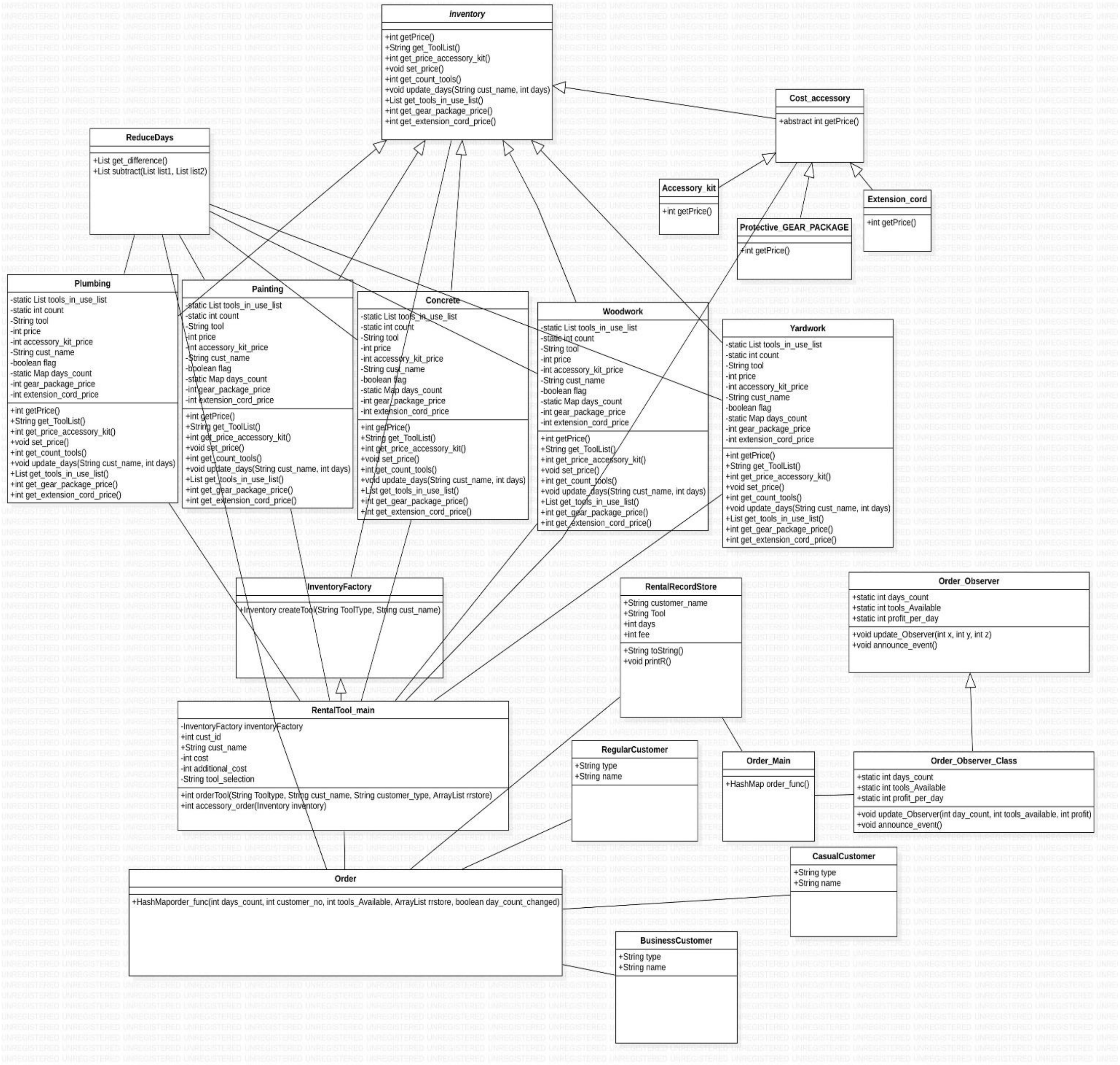
REFERENCES:

1. https://coderanch.com/t/412443/java/subtract-arrayLists

2. https://stackoverflow.com/questions/1526826/printing-all-variables-value-from-a-class/45128748#45128748

UML CLASS DIAGRAM:

The UML class diagram is shown below. It includes all the classes and relationships. Each class has all the data attributes and member functions used in the program.


Inventory
+int getPrice()
+String get_ToolList()
+int get_price_accessory_kit()
+void set_price()
+int get_count_tools()
+void update_days(String cust_name, int days)
+List get_tools_in_use_list()
+int get_gear_package_price()
+int get_extension_cord_price()
ReduceDays
+List get_difference()
+List subtract(List list1, List list2)
Cost_accessory
+abstract int getPrice()
Accessory_kit
+int getPrice()
Extension_cord
+int getPrice()
Protective_GEAR_PACKAGE
+int getPrice()
Plumbing
-static List tools_in_use_list
-static int count
-String tool
-int price
-int accessory_kit_price
-String cust_name
-boolean flag
-static Map days_count
-int gear_package_price
-int extension_cord_price
+int getPrice()
+String get_ToolList()
+int get_price_accessory_kit()
+void set_price()
+int get_count_tools()
+void update_days(String cust_name, int days)
+List get_tools_in_use_list()
+int get_gear_package_price()
+int get_extension_cord_price()
Painting
-static List tools_in_use_list
-static int count
-String tool
-int price
-int accessory_kit_price
-String cust_name
-boolean flag
-static Map days_count
-int gear_package_price
-int extension_cord_price
+int getPrice()
+String get_ToolList()
+int get_price_accessory_kit()
+void set_price()
+int get_count_tools()
+void update_days(String cust_name, int days)
+List get_tools_in_use_list()
+int get_gear_package_price()
+int get_extension_cord_price()
Concrete
-static List tools_in_use_list
-static int count
-String tool
-int price
-int accessory_kit_price
-String cust_name
-boolean flag
-static Map days_count
-int gear_package_price
-int extension_cord_price
+int getPrice()
+String get_ToolList()
+int get_price_accessory_kit()
+void set_price()
+int get_count_tools()
+void update_days(String cust_name, int days)
+List get_tools_in_use_list()
+int get_gear_package_price()
+int get_extension_cord_price()
Woodwork
-static List tools_in_use_list
-static int count
-String tool
-int price
-int accessory_kit_price
-String cust_name
-boolean flag
-static Map days_count
-int gear_package_price
-int extension_cord_price
+int getPrice()
+String get_ToolList()
+int get_price_accessory_kit()
+void set_price()
+int get_count_tools()
+void update_days(String cust_name, int days)
+List get_tools_in_use_list()
+int get_gear_package_price()
+int get_extension_cord_price()
Yardwork
-static List tools_in_use_list
-static int count
-String tool
-int price
-int accessory_kit_price
-String cust_name
-boolean flag
-static Map days_count
-int gear_package_price
-int extension_cord_price
+int getPrice()
+String get_ToolList()
+int get_price_accessory_kit()
+void set_price()
+int get_count_tools()
+void update_days(String cust_name, int days)
+List get_tools_in_use_list()
+int get_gear_package_price()
+int get_extension_cord_price()
InventoryFactory
+Inventory createTool(String ToolType, String cust_name)
RentalRecordStore
+String customer_name
+String Tool
+int days
+int fee
+String toString()
+void printR()
Order_Observer
+static int days_count
+static int tools_Available
+static int profit_per_day
+void update_Observer(int x, int y, int z)
+void announce_event()
RentalTool_main
-InventoryFactory inventoryFactory
+int cust_id
+String cust_name
-int cost
-int additional_cost
-String tool_selection
+int orderTool(String Tooltype, String cust_name, String customer_type, ArrayList rrstore)
+int accessory_order(Inventory inventory)
RegularCustomer
+String type
+String name
Order_Main
+HashMap order_func()
Order_Observer_Class
+static int days_count
+static int tools_Available
+static int profit_per_day
+void update_Observer(int day_count, int tools_available, int profit)
+void announce_event()
CasualCustomer
+String type
+String name
Order
+HashMaporder_func(int days_count, int customer_no, int tools_Available, ArrayList rrstore, boolean day_count_changed)
BusinessCustomer
+String type
+String name