CSCI 4448/5448 OOAD Project 3

1. **Team members: Yiou Gao, Ling Liu, Ji Zhao**

2. **Language: JAVA**

3. **Environment used for development: Eclipse, IntelliJ**

4. **Description of program design:**

   1) The code has 4 packages: store, customers, tools, and tests;

   2) Observer pattern was applied to store and customers; Factory pattern was applied to instantiate tools; Decorator pattern was applied when add options to tools;
   3) store package
       a. Main.java is in store package, it implements MyUnitTest first, then implements the StoreSimulation;
       b. StoreSimulation simulates 35 days and 34 nights rental activity in store;
       c. Each day randomly select customer to rent tool(s) with/without options. Each customer can rent once each day;
       d. Rent and Return rentals will create a record, daily income will also be recorded;
       e. When number of tools inventory less than 3, the store will notify all Business customers. If tool inventory is 0, it will notify all customers.
   4) customers package
       a. Twelve customers were created: 6 of them are Casual type, 4 of them are Business type, rest of them are Regular type;
       b. The number of tools and options and nights that customers can rent have restrictions for different type;
       c. Customers will return tools timely when rent periods end;
       d. When tools inventory less than 3, all Business customers will be notified;
       e. When tools inventory is 0, all customers will be notified;
   5) tools package
       a. Different type of tools are created through Factory Pattern;
       b. Total amount of tools are 24 and they have 5 different categories: 5 Painting tools, 5 Plumbing tools, 5 Concrete tools, 5 Woodwork Tools, and 4 Yardwork tools;
       c. Three kind of options was created: Accessory kit, Extension cord, and Protective gear. Options are always available. Options can be added when customer rents tools;
       d. When adding options to tools, use Decorator pattern to add;
       e. The price of tools and options:

Tool/Price	option price		
	Accessory kit	Extension cord	Protective Gear
Painting/20	3	5	6
Pluming/10	2	3	2
Concrete/25	4	4	5

Woodwork/30	5	10	10
Yardwork/15	6	8	3

6) tests package
   a. There are 10 JUnit tests in MyUnitTest;
   b. assertEquals, assertTrue, and assertFalse were used
   c. Cost of tools, cost of tools and options, and cost of different rent nights are tested. In addition, cost for unknown category tools tested;
   d. Number of tools and how many days that different type of customers can rent are tested;
   e. Observer pattern was tested: when tool inventory less than 3, Business customers are notified that they do not need to come, so all Business customers will be removed from customer list; when no tools left, all customers are notified that they do not need to come and all customers will be removed, therefore the number customer list will be 0;

5. UML class diagram